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Folder Title:
GCC [Global Climate Change] and LDCs [Least Developed Countries] Competitiveness

Stack:	Row:	Section:	Shelf:	Position:
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Brian Fisher, ABARE, Australia

10/21/97

~~1990 by 2010~~ IF LDCs in:

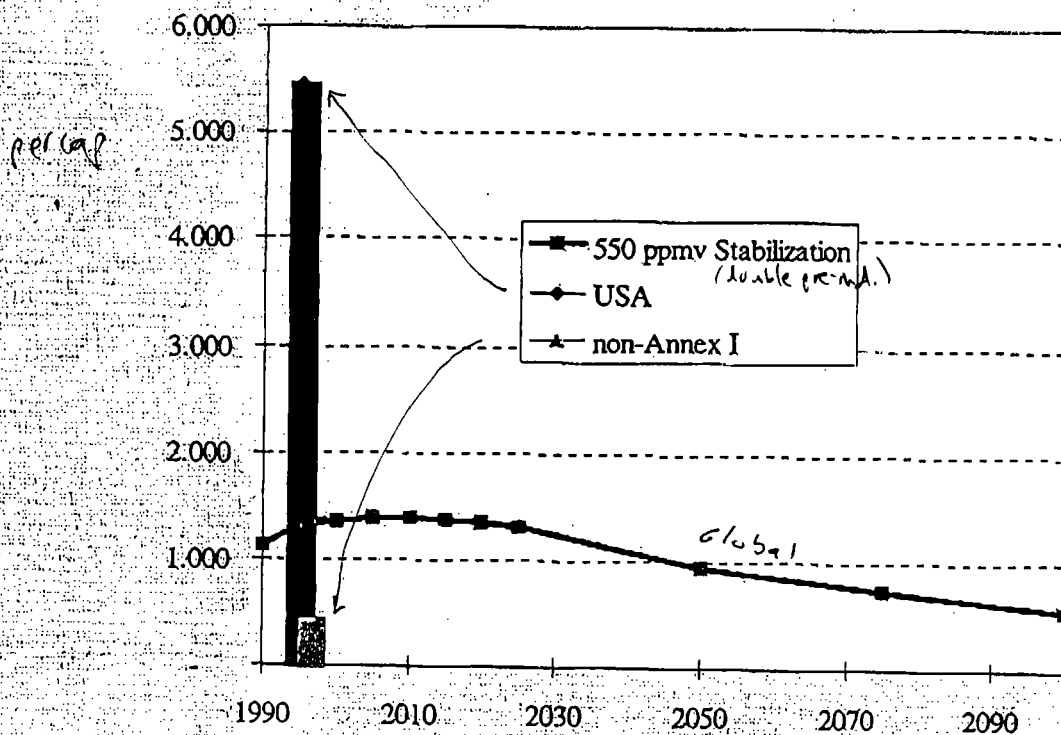
$\Rightarrow$ \$10 permit prices

+ targets pulled ^{everyone's} ~~that~~ ^{down} by 10-20%
for everybody

Transfer: 5-10% of GDP received by the India's

Equal % reduction in GNE.

1995 Carbon Emissions Per Capita and Per Capita Emissions to Stabilize CO₂ at 550 ppmv



GCC

7/21/97

LDCs

in WH conf. center

Evolution

by 2005

Korea

5,000

Robt. Gillingham

Byrd resolution

New scheduled commitments in same time period
Newly inserted

Berlin mandate says LDCs only have to advance existing commitments.

Tues m. (LDC)

4Q

What more need to know?

Are we in right place re our position?

What diplomatic strategy?

What domestic political strategy?

next phase.

techn. strategy

'Competitiveness'
Trade
negotiations
free-rider

Leakage $\Rightarrow$ little net gain ?

To: JY

JF; 7/22/97

Impact of climate change policies on U.S. industry: LDC issues

Those favoring specific CO₂ targets for developing countries often argue that they are necessary to prevent a deterioration in U.S. **competitiveness**. The “competitiveness” argument has at least two versions. Without specific developing country targets:

- U.S. industry will relocate abroad, or
- the demand for U.S. energy-intensive exports ^(and import-competing goods) will decline.

Firm location decisions

The first type of argument is a form of the “pollution havens” hypothesis, in which firms are tempted move to countries with lax environmental standards. There is very little, if any, relevant evidence from the climate change models. But there is evidence from other areas of environmental regulation. It suggests that the pollution havens hypothesis has little empirical support: the costs of complying with environmental regulations are apparently too small relative to other factors (labor costs, tax rates, infrastructure, etc.) to have much effect on firms’ location.

Loss of demand for U.S. energy-intensive exports

The second “competitiveness” argument is the impact on trade, even assuming firms stay put. Here there is a bit of evidence from climate change models: McKibbin and Wilcoxon examined the effect of a carbon tax of \$15 per ton applied in the United States alone, and in the United States and the OECD together, on trade flows. They conclude “our results suggest that a carbon tax would produce little redistribution of trade in either the short or long run.”

What about the effect on the trade balance?

- Reductions in U.S. energy-intensive exports would be to a greater or lesser extent offset in other ways. For example, there would be a fall in oil imports.
- There are also technical reasons why it may not be useful to look at the effect on the balance of payments. The answer depends on the precise definition: the current account balance is likely to move in the opposite direction from the balance on goods and services.
- The effect on the overall current account balance is heavily dependent on (1) whether the U.S. turns out to be a net buyer or seller under international emissions trading, and on (2) how any revenue is used (with the most beneficial effect from using the funds to raise public saving).
- It is probably more meaningful to talk about adverse effects on ~~a few~~ individual energy-intensive export sectors, than to look at the impact on the trade balance

Overall, the adverse “competitiveness” effects on U.S. industry are likely to be relatively small.

- A large share of carbon emissions come from non-tradeable sectors (e.g., utilities), which would not be adversely affected by international considerations.
- Energy is not a huge cost for most industries
- Only six energy-intensive industries are expected to suffer serious dislocation: basic chemicals, petroleum refining, aluminum, iron and steel, paper products, and cement.
- The main reasons we want LDC participation lie, not with the economic costs, but with the emission effects: i.e., concerns over “leakage” and free-riding.

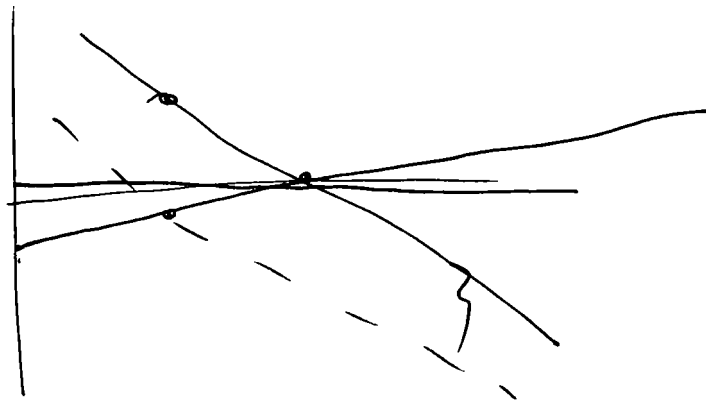
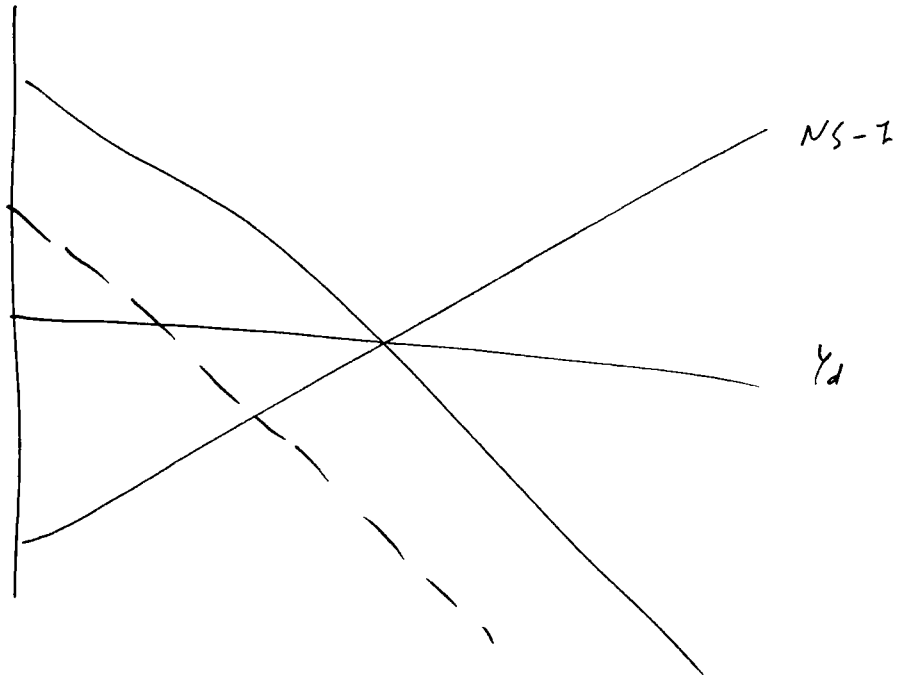
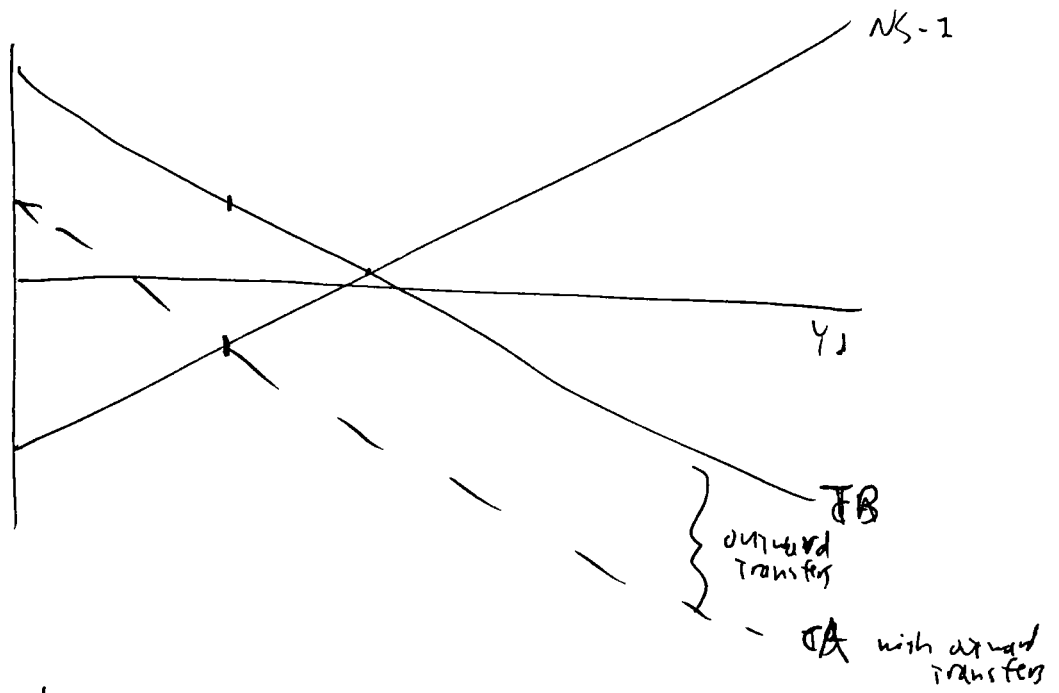
Impact of global climate change on US industry

22 July 97

Janet Yellen

Key points

- The direct evidence is scanty on the likely competitive impacts of an Annex I-only treaty.
- The likelihood the US will lose its competitive edge depends on several factors including the size of the carbon tax; and the industry's relative share of energy costs to its total costs.
- Will industries move? First, the "pollution haven" hypothesis does not apply to the large share of carbon emissions that come from the economy, such as the non-tradeable sectors (e.g., utilities and transportation). Second, the evidence suggests this hypothesis has little empirical support: the costs of complying with environmental regulations are apparently too small relative to other factors (labor costs, tax rates, infrastructure, etc.) to have much effect on firms' location decisions. But this literature might not apply to climate change policies given the magnitude of the policy options under consideration. Third, substantial differences in costs across countries already exist.
- Some industries with high energy costs might relocate. The DOE's Argonne study identifies six-energy intensive industries that might be affected: basic chemicals, petroleum refining, aluminum, iron and steel, paper and allied products, and cement. But even in these industries, firms do face some deterrents to relocate, including high fixed costs and sensitivity to transportation expenses. And if energy-efficient technologies come through, the impact would be lessened. *Existing plants closing down prematurely.*
- Will industries lose market share (trade deficit)? While exports in energy-intensive goods will fall, this will be offset by, say a decrease in oil imports, and an increase in energy-efficient technology exports. And flexible implementation matters: if an international emission trading system is established and depending on how emission permits are allocated, the US could be either net buyer or seller of emission permits. Plus if the revenues from a permit system are recycling through reductions in distortionary taxes, e.g., payroll or corporate income taxes, an offsetting effect would exist.
- Do we undermine our own efforts at emission reduction? Estimates of carbon leakage range from 1 to 20 percent, where carbon leakage is the ratio of increased non-Annex I emissions to decreased Annex I emissions. This remains an open and intriguing research question.



Email

- Next wk memo
- Reply to Janer & say on Tech.

Janet L. Yellen

07/22/97 08:19:40 PM

Record Type: Record

To: Jeffrey A. Frankel/CEA/EOP, Alicia H. Munnell/CEA/EOP, Jason Shogren/CEA/EOP, Peter R. Orszag/OPD/EOP

cc:

Subject: janet's presentation today

Thanks to all of you for the help. Could you all work to prepare a few pages for circulation and clearance?

----- Forwarded by Janet L. Yellen/CEA/EOP on 07/22/97 08:17 PM -----



Kathleen A. McGinty

07/22/97 08:16:59 PM

Record Type: Record

To: TARULLO_D @ A1 @ CD @ LNGTWY, Gene B. Sperling/OPD/EOP, Janet L. Yellen/CEA/EOP

cc: See the distribution list at the bottom of this message

Subject: janet's presentation today

many requests from many attendees at today's meeting for copies of janet's remarks. (many kudos janet for a succinct and very lucid presentation!)

i don't advise we give copies immediately UNLESS we are prepared to represent it as fully considered and cleared admin position. (call me paranoid, but i think copies would have a way of growing many legs).

i do believe that it is such an important issue, however, that it really makes sense to get a couple of pages layed out and agreed to on this, with cea coordinating its development among other relevant agencies.

views????? thx.

Message Copied To:

David B Sandalow/CEQ/EOP
forrister_d @ btgcinema.com @ inet
Shelley N. Fidler/CEQ/EOP
Wesley P. Warren/CEQ/EOP
Todd Stern/WHO/EOP

Jay: This is Mexico's FDI Data. They warn that 95 data isn't comparable to previous data but you can look at US shares from year to year. (In blue)

FOREIGN DIRECT INVESTMENT BY COUNTRY OF ORIGIN
(Millions of dollars)

YEAR	TOTAL	UNITED STATES	GREAT BRITAIN	GERMANY	JAPAN	SWITZERLAND	FRANCE	SPAIN	SWEDEN	CANADA	NETHERLANDS	ITALY	OTHER
1980	1,622.8	1,078.6	48.6	170.8	123.1	111.4	19.5	80.0	10.9	17.5	0.0	-29.3	-8.3
1981	1,701.1	1,072.1	40.9	146.3	212.1	74.9	10.3	101.8	15.3	5.2	0.0	5.1	17.1
1982	626.5	426.1	7.4	39.9	65.4	23.1	6.8	40.4	-2.0	8.1	0.0	1.9	9.4
1983	683.7	266.6	49.0	110.0	3.8	16.2	110.0	12.9	29.1	22.1	0.0	1.0	63.0
1984	1,429.8	912.0	44.3	152.5	35.6	59.8	8.7	11.7	61.1	32.5	0.0	0.5	111.1
1985	1,729.0	1,326.8	56.4	55.5	79.3	141.2	10.7	14.0	5.5	34.9	0.0	0.6	4.1
1986	2,424.2	1,206.4	104.3	218.6	142.2	34.1	316.9	93.7	24.6	40.6	0.0	4.0	238.8
1987	3,877.2	2,669.6	430.9	46.9	132.8	95.2	31.2	125.8	36.7	19.3	0.0	2.8	286.0
1988	3,157.1	1,241.6	767.6	136.7	148.8	86.3	152.4	34.1	32.5	33.9	0.0	0.0	523.2
1989	2,499.7	1,813.9	44.7	84.7	15.7	194.4	16.5	44.0	6.9	37.4	47.8	6.6	187.1
1990	3,722.4	2,308.0	114.4	288.2	120.8	148.0	181.0	10.8	13.3	56.1	126.1	4.6	351.1
1991	3,565.0	2,386.1	74.1	84.6	73.5	68.0	500.5	43.5	13.8	74.2	121.1	1.9	123.7
1992	3,599.6	1,651.7	426.8	84.9	86.9	315.2	68.9	37.2	2.0	88.4	83.1	7.5	747.0
1993	4,900.1	3,503.6	189.2	111.4	73.6	101.7	76.9	63.5	2.4	74.2	88.3	4.6	610.7
1994	8,026.2	4,004.5	1,099.5	374.9	699.9	52.9	63.2	151.8	17.1	163.5	385.7	14.3	998.9
1995	6,534.4	4,176.3	614.8	153.8	535.9	145.9	137.5	29.7	141.1	77.9	60.7	-1.0	461.8

Source: INEGI's database and Dirección General de Inversión Extranjera de SECOFI.

Note:

Statistics corresponding from 1980 to 1994 are the amounts of FDI reported to the Registro Nacional de Inversiones Extranjeras (RNIE) plus the amount of FDI involved in investment projects authorized by the Comisión Nacional de Inversiones Extranjeras.

On the other hand and due to a change in SECOFI's and Banxico's measuring methodology for 1995, the amounts corresponding to this year refer to the real FDI (FDI actually realized in that period) plus the amount of fixed assets imports made by the maquiladoras. Therefore, these amounts are not comparable or additive to the years before.

Note: these data appear to be flows, I don't have data from Mexico on the stock of US FDI in Mexico.

U. Md.

Michèle Jolin TS
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From Bill Antholis
DS
JG
MF
File (Comp. et.)

Using A Border Adjustment To Take The Lead On Climate Change Without Encouraging Runaway Shops

By Frank Muller and Andrew Hoerner

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Negotiations are currently underway through the Framework Convention on Climate Change (FCCC) for a new binding agreement by industrialized countries to reduce their emissions of greenhouse gases over the next few decades. The agreement is due to be signed in Kyoto, Japan, this December. It implements a key principle of the convention that was signed by President Bush in 1992 and ratified by the U.S. Senate: that developed countries should take the lead in combating climate change. Nevertheless, on July 25, in what has become known as the Byrd Resolution (after its chief sponsor), the Senate resolved that the United States should not sign the agreement unless it includes "new specific scheduled commitments to limit or reduce greenhouse gas emissions for Developing Country Parties within the same compliance period." Underlying this resolution are concerns that the Kyoto agreement will cause a loss of American jobs to China and other developing countries. Are these concerns justified? If so, does the Byrd resolution solve the problem? Is there a better solution?

Will the Kyoto agreement cause widespread loss of American jobs to developing countries?

No. An effective agreement will lead over time to lower employment in some industries, such as coal mining and higher employment in others, such as natural gas, energy efficiency and renewable energy technologies. But it will not cause widespread loss of American jobs to developing countries. Two-thirds of US carbon dioxide emissions come from energy used in transportation and buildings -- activities that by their nature cannot be exported. The remaining one third comes from manufacturing. In most of manufacturing, except for a few energy-intensive industries, energy is too small a cost factor for emissions limits to provide any real incentive for relocating overseas. Furthermore, American coal miners will not lose their jobs to China because emissions limits will apply equally to all coal consumed in the United States regardless of its origin.

the

But we're talking limits on products, not consumption.

Is there a risk of runaway shops in energy-intensive manufacturing?

Yes. It is widely recognized that to achieve long-term reductions in US carbon dioxide emissions at least cost will require an economy-wide incentive as well as incentives and other measures targeted to individual sectors. The two main options are a carbon tax or a system of tradable carbon emission permits. Either would raise the cost of energy from fossil fuels. Energy is a significant cost factor in a small number of industries including aluminum, pulp and paper, iron and steel, and basic chemicals (see attached table). Energy costs have always influenced where investments are made in these industries. Following the fuel price increases of the 1970s, for example, aluminum production was relocated from Japan and (to some extent) Europe to countries with cheaper electricity, such as Australia. Similarly, future investments might be redirected from countries where energy costs are expected to rise due to carbon dioxide emissions limits to countries with lower emissions constraints or no limits at all. In total, the industries facing this risk account at most for about 1 percent of US employment. In other words, critics have vastly exaggerated the magnitude of the runaway shop problem. Nevertheless, these

US 2+ M. might coal X

industries provide good jobs that form an important part of the economic base of some regions of the country.

Does relocation overseas of energy-intensive production help protect the climate?

No. Carbon dioxide has the same impact on the global climate system wherever emitted. In some cases, a marginal reduction in global emissions may be achieved, if efficient new greenfield plants overseas displace aging US production capacity. But, in other cases, displacement may involve greater utilization of existing inefficient power plants or manufacturing capacity in a developing or transition country, resulting in a net increase in global emissions. More importantly, though, the relocation option greatly weakens the economic incentive for developing more efficient production technologies and substitute low-emission products. The climate change convention's goal of stabilizing atmospheric greenhouse gas concentrations can only be achieved through a transition to sustainable production and consumption patterns. Simply shifting emissions around the world puts off the task of undertaking this transition. And from a political perspective, the threat of job displacement is used by special interests to undermine climate protection efforts, not only in the United States but also in every other developed country.

Does the Byrd resolution solve the runaway shop problem?

No. Even if developing countries agree at Kyoto to accept specific scheduled commitments on the same timetable as developed countries, this would not greatly diminish the risk of runaway shops. Senator Byrd himself has accepted that commitments will need to vary among countries according to level of development. Whereas industrial countries will be required to reduce emissions below current levels, developing countries at most will face limits to future growth. An American steel corporation, for example, could still move production and emissions to Mexico or Indonesia and export steel back to the United States without either country breaching its treaty commitments. Countries like China, India, and Indonesia with relatively low per-capita emissions (one-tenth of US levels or lower) would likely have considerable room within their emissions "budgets" to accommodate expansion in energy-intensive manufacturing for export to industrial countries. The Byrd resolution fails to address this problem, yet threatens to undermine the negotiations by reneging on earlier agreements by the United States.

Do joint implementation and international emissions trading solve the runaway shop problem?

No. US negotiators have proposed that the Kyoto agreement allow joint implementation (JI) between industrial and developing countries and emissions trading among industrial countries. Some proponents of JI and international trading have argued that these schemes address jobs concerns by promoting emissions reductions in developing countries and enabling affected US firms to reduce their compliance costs. Under JI, a firm could invest in a low-cost emission reduction project in a developing country and gain a credit for a share of the reductions against its own domestic emissions. Under international trading, a firm would purchase emission rights (directly or indirectly) from another industrial country with lower emission reduction costs that is able to do better than its treaty commitments. Whatever the merits of JI and international trading

in enhancing flexibility and lowering costs, though, they do not necessarily solve the runaway shop problem.

At best, JI and international trading would reduce, but not eliminate, the cost disadvantage imposed on US-based energy-intensive manufacturers by an effective emission-reduction agreement. Under such an agreement and a JI regime that provides real and verifiable emission reductions in developing countries, not just paper reductions, emission credits would be unlikely to cost less than around \$20 per ton of carbon. The purchase of such credits would still impose a significant cost disadvantage on energy-intensive plants selling into highly competitive global markets.

At worst, the expansive JI and trading schemes advanced by some proponents within the Administration and environmental community could actually promote footloose corporate behavior. For example, in the JI case, a US steel firm could invest in improving the efficiency of a steel plant in Brazil (or alternatively Mexico or Indonesia) as part of a joint venture deal that also included construction of a new steel plant. The firm could use the emission reduction at the upgraded plant to gain a credit under JI against its US emissions while also importing steel from the new plant to displace its highest-cost US capacity. Similarly, in the case of tradable permits, an aluminum major facing high electricity costs for its eastern US plants (or the coal-based utility which supplies it) might invest in Russia's inefficient and underutilized power supply and aluminum industries and close its oldest US plants. As Russia is expected to easily meet its treaty commitments, the deal could be partly financed through the sale of internationally tradable emission rights to the US utility. In these cases, JI and international trading form an integral element of the financing of deals that shift American jobs overseas.

Why not simply exempt energy-intensive industries from emission limits?

The manufacturing sector or particular energy-intensive industries could be exempted from a carbon tax or permit scheme. However, this would increase the cost to the economy as a whole by requiring a greater emission reduction effort in other sectors. It also would greatly diminish the incentive to improve production technologies in the exempted industries, develop substitute low-emission products and generally shift to more sustainable consumption patterns. Moreover, as the BTU tax debate demonstrated, exempting heavy industry would undermine broader support for the tax or permit scheme.

What is a border tax adjustment?

Under the "destination system" of border tax adjustments (BTAs), traded goods are subject to the taxes of the importing ("destination") country and exempted from the taxes of the exporting ("origin") country. For instance, gasoline trucked from Toronto to Buffalo is exempted from paying gasoline tax in Canada and subject to gasoline tax in New York, at the combined New York/federal tax rate. BTAs are a necessary part of a tax on national or in-state consumption, and are a nearly universal feature of sales, excise, value added and other taxes. Because BTAs are required for consistent treatment of a consumption tax base they are regarded as a normal part of the tax and not as a form of local favoritism.

How can a border tax adjustment solve the runaway shop problem?

BTAs are the most straightforward way to prevent firms in low-tax jurisdictions from preying on energy-intensive industries in high tax jurisdictions. A BTA system would rebate the tax on fuels used to produce energy-intensive exports (such as metal ingot and certain bulk chemicals), thus maintaining the competitiveness of exports. A comparable tax would be imposed on imports of energy-intensive basic materials to put foreign firms on a level playing field in the home market. This BTA system is a natural part of a tax on fuels used to produce goods consumed domestically.

BTAs should be distinguished from tariffs and other forms of industry protection. Energy-intensive manufacturers (e.g. basic chemicals, aluminum) already undertake large investments in developing countries that sometimes displace American production and jobs. Various factors make such investments attractive including lower resource costs and the prospect of winning large new markets. A BTA ensures that job displacement is not accelerated by the FCCC, but does not favor domestic over foreign production or otherwise alter underlying market conditions. Aluminum or ethylene production that already would have been shifted overseas, for example, will still be shifted. But it won't be shifted because of climate protection policies.

Why are border tax adjustments controversial?

Some advocates of unbridled free trade argue that BTAs for taxes on carbon embodied in energy-intensive traded goods are or should be barred by the General Agreement on Tariffs and Trade (GATT). (BTAs on the fuels themselves are universally accepted.) There are three major arguments for this position:

The basic policy argument. Many GATT experts take seriously the conclusion of the never-adopted Tuna-Dolphin decision that trade measures can be based only on taxes on *products*, and not on taxes on *processes*.

The practicality argument. Some administrators have argued that such BTAs would be *hard to enforce* or *easy to abuse*.

The technical legal argument. Some legal scholars argue that the rebate of taxes on embodied fuels is barred by the GATT Subsidies Code's ban on rebating *prior stage cumulative indirect taxes*.

Does the GATT forbid border tax adjustments on "process" taxes?

No. The GATT allows BTAs on taxes that fall "directly or indirectly" on like products. It was the intent of the original GATT negotiators that process as well as product charges be border adjustable. This language was first introduced in 1946 by U.S. negotiator Oscar B. Ryder at the London Preparatory Committee as part of the process of drafting the Havana Charter, the precursor to GATT. The Brazilian delegate, Mr. Rodrigues, demanded to know what was meant by the addition of the term "or indirectly." Mr. Ryder replied that the language was to allow border adjustments on "a tax, not a tax on a product as such, but on the processing of a product, which are covered by the word 'indirectly' here." The process/product distinction proposed by the Tuna-Dolphin Panel, like the Tuna-Dolphin decision itself has never been adopted by the GATT contracting parties or by the World Trade Organization (WTO).

Can border tax adjustments be administered effectively?

Yes. A BTA system for carbon taxes would be no more complicated than the BTA systems already in place for many other taxes. For instance, the U.S. administers border tax adjustments on hundreds of chemicals under the Superfund toxic chemical excise tax. BTAs apply to all taxed chemicals, and to all products manufactured primarily from a taxed chemical. If the producer documents the amount of taxed chemical used in the manufacture, the tax is based on the documented amount. Otherwise, it is taxed at a rate set by Treasury regulation, based on the amount of the taxed chemical that is used to manufacture the same product in the U.S. under the predominant method of production. This tax was held by the GATT to be consistent with international trade rules. The Ozone-Depleting Chemicals (ODC) Tax has similar BTA provisions, except that it is a "process" tax, in that it applies to products manufactured with taxed substances but not physically incorporating them, such as electronic parts cleaned with ODCs.

BTAs on the embodied carbon in energy-intensive goods would be administratively identical to the BTAs on these existing taxes. For plausible carbon tax rates, only a handful of energy-intensive basic materials — fewer than are covered under the existing Superfund chemical excise — would have price increases great enough to justify border adjustment.

Are border tax adjustments on taxes on embodied carbon barred as "prior stage cumulative indirect" (PSCI) taxes.

No. Border adjustment of carbon taxes is clearly not barred by the ban on PSCI taxes, for two reasons. First, the Uruguay Round Amendments to the GATT specifically excluded taxes on fossil fuels from the scope of the PSCI tax ban. Second, energy taxes are not PSCI taxes because they are not "cumulative." Although energy is used in every phase of the manufacturing process, each unit of fuel is taxed only once. This contrasts with the standard example of a PSCI tax, the cascade tax. A cascade tax is a tax on the value of all products sold, including goods used as materials in the manufacture of other goods. Cascade taxes cumulate, because the tax on, for example, sheet steel used to make an automobile, becomes part of the cost of manufacturing the automobile and the tax is *itself taxed again* when the automobile is sold. Cascade taxes were once common in Europe, but are now extinct in all but a few developing nations, having been replaced by VATs (which, like energy taxes, are not cumulative).

If the United States chooses a domestic emission trading scheme rather than a carbon/energy tax, could such a scheme include a border adjustment?

The Clinton Administration has not proposed specific domestic policies to implement the proposed Kyoto agreement. Current thinking within the Administration, however, favors a domestic tradable permit scheme over a carbon/energy tax. Such permits either would be auctioned by the government (most likely to coal, oil and gas companies at the point where carbon fuels enter the economy) or given away under "grandfathering" rules (most likely to utilities and other major industrial emitters). In principle, a border adjustment (at the current market price of permits) could be levied on imports and

rebated on exports of energy-intensive products as part of such a scheme. Doing so, however, would raise different and more difficult international legal and policy issues than in the case of a tax.

Whereas border adjustments on consumption taxes have long been used and accepted under international trade rules, this is not true for environmental requirements like emissions permits. In implementing a border-adjusted permit scheme, the United States could not rely on the above mentioned BTA provisions of Article III of the GATT, except by analogy, and therefore probably would have to claim an environmental exemption under Article XX from GATT trade rules otherwise prohibiting import charges and export subsidies. Such a scheme, therefore, would be more vulnerable than a BTA to a challenge through the WTO by a country seeking to exploit the climate change convention for competitive advantage. GATT and WTO dispute panels have not looked favorably on claims for environmental exemptions. Indeed, to date, no country has successfully defended the use of Article XX to justify an environmental policy measure that runs foul of GATT provisions. Given this history, the availability of border adjustments for tradable permits cannot be guaranteed without a multilateral agreement specifically allowing them as part of the Kyoto accord.

Although elements of the trade community might object to including such provisions in the Kyoto accord, there are precedents for including even stronger trade provisions in multilateral environmental agreements (e.g., Montreal Protocol, Convention on International Trade in Endangered Species). Article 5.3 of the FCCC states "Measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade." The earlier discussion makes clear that BTAs do not constitute "arbitrary or unjustifiable discrimination" within the meaning of this article. Although legally different, the trade policy arguments for allowing border adjustments for auctioned emission permits are virtually identical. However, in the case of grandfathered permits, the trade community might legitimately argue that border adjustments at the market price of the permit unjustifiably discriminate in favor of domestic producers by overcompensating them for the actual costs imposed by the emission permit scheme. In summary, the runaway shop problem can be avoided with a border-adjusted carbon tax but achieving the same goal with tradable permits may require a specific provision in the Kyoto agreement overriding GATT trade rules.

Frank Muller is Director and Andrew Hoerner is Research Director of the Environmental Tax Program. For a more detailed discussion of border tax adjustments, see J. Andrew Hoerner and Frank Muller, "Carbon Taxes for Climate Protection in a Competitive World," Center for Global Change, University of Maryland, June 1996 (available from the authors, and also published in an abbreviated form by the Swiss Federal Office for Foreign Economic Affairs in E. Staehelin-Witt and H. Blöchliger, "Ökologisch orientierte Steuerreformen," Verlag Paul Haupt, Bern, Switzerland, 1997.)

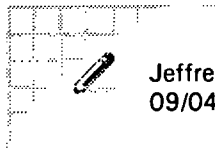
For further information, contact Frank Muller (E-mail: fgmuller@jgc.org; Fax: 202-775-0819; Ph: 202-331-5521).

Direct Cost Impact of a \$50 per ton Carbon/Energy Tax for the 24 Most-Affected Manufacturing Industries

Industry Groups and Industries	Energy Tax (% of Shipments)	Employment (1,000s)	Cumulative Employment (% of manufacturing)	Cumulative Value of Shipments (% of manufacturing)
Lime	23.9%	4	0%	0%
Primary Aluminum	15.0%	20	0%	0%
Cement Hydraulic	13.7%	16	0%	0%
Alkalies and Chlorine	9.9%	8	0%	0%
Industrial Gases	8.4%	9	0%	1%
Nitrogenous Fertilizers	8.0%	7	0%	1%
Paper Mills	7.4%	30	1%	1%
Electrometallurgical Products	7.2%	5	1%	1%
Paperboard Mills	6.2%	51	1%	2%
Blast Furnaces and Steel Mills	5.9%	177	3%	3%
Industrial Inorganic Chemicals nec	3.9%	79	3%	4%
Beet Sugar	3.7%	8	3%	4%
Synthetic Rubber	3.7%	12	3%	4%
Cellulosic Manmade Fibers	3.7%	11	3%	4%
Pulp Mills	3.5%	17	3%	4%
Wet Corn Milling	2.8%	10	3%	4%
Flat Glass	2.7%	13	3%	4%
Industrial Organic Chemicals nec	2.4%	101	4%	6%
Glass Containers	2.3%	35	4%	6%
Primary Nonferrous Metals nec	2.3%	11	4%	7%
Mineral Wool	2.2%	18	4%	7%
Gray and Ductile Iron Foundries	2.1%	76	5%	7%
Petroleum Refining	2.0%	74	5%	12%
Pressed and Blown Glass nec.	2.0%	33	5%	12%

Source: Analysis by J. Andrew Hoerner using energy consumption estimates from the U.S. Department of Energy's Manufacturing Energy Consumption Survey. Employment and value of shipment data is from the National Bureau of Economic Research's Productivity Database. Manufacturing industries are defined at the four digit SIC level. All data is for 1991.

Notes: The tax would apply to all fossil fuels at a rate of \$50 per ton of carbon and to large-scale hydro and nuclear electricity at the national average rate for utility fossil-fired generation. Such a tax is at the high end of proposals by advocates of stronger climate change policy, and ideally would be phased in over 5-10 years. It translates into 13 cents per gallon on gasoline, and measured in terms of its impact on electricity is about three times President Clinton's 1993 Btu tax proposal. Due to high transportation costs and other factors, some of the above industries (e.g., cement) face limited international competition, and therefore little risk of job exports. All manufacturing accounted for 15.3 percent of U.S. non-farm employment in 1996.



Jeffrey A. Frankel
09/04/97 01:16:32 PM

Record Type: Record

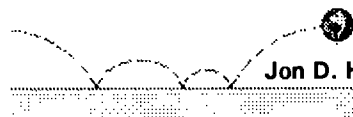
To: Jon D. Haveman/CEA/EOP
cc: Randall W. Lutter/CEA/EOP, Adele C. Morris/OMB/EOP, Joseph E. Aldy/CEA/EOP
bcc: Records Management
Subject: Re: Revised memo on competitiveness

Jon,

Yes, share it with our friends in Treasury (nowhere else as of yet). BUT, first, it MUST include two sentences saying that it is important to have the developing countries participate -- for reasons other than competitiveness (especially, that: without them our sacrifice will have been largely in vain; their emissions will undo our cuts for two reasons: free-riding and leakage). This is not the point of your memo. But we can't have a document with CEA name on it that anyone could misquote as saying that CEA says that LDC participation is not important !!

JF

Jon D. Haveman



Jon D. Haveman

09/03/97 01:28:04 PM

Record Type: Record

To: Jeffrey A. Frankel/CEA/EOP
cc:
Subject: Revised memo



EMITNEXA.WP Let me know if you'd like me to circulate this.

I've decided that looking at both high and low energy sectors is sufficient to get around the comparative advantage/net exports problem I raised before. The memo therefore contains contrasting information for high and low energy industries. The bottom line is still a lack of evidence supporting the position that the US will experience a worsened export position if the Annex 1 countries stay out....the LDCs appear to be net exporters energy-intensive products.

Jon

Council of Economic Advisers

Memorandum

To: Jeff Frankel September 3, 1997

From: Jon Haveman

Subject: Net Exports data for high energy and low energy industries.

An issue has been raised regarding the participation of less developed countries in the emission reduction efforts. The issue is basically that the trade position of US industries would be adversely affected if LDCs did not participate. The argument is theoretically correct if the United States is a net exporter of products requiring relatively more energy in their production and a net importer of products requiring relatively little energy. If this were the case, unilateral emission reductions taken on by the Annex 1 countries would likely have an adverse terms of trade effect for the United States.

The following tables present net exports data for the United States, Annex 1 countries and Non-Annex 1 countries for 1992. The US aggregate net-exports numbers (column 1 in the first table) could probably be obtained relatively easily for a more recent year, but almost none of the other numbers in the table could without a great deal of effort; in particular, the division between Annex 1 and non-Annex 1 trade.

Products with High Energy Content

Turning first to industries using relatively more energy in the production process, it appears as though the US is a net-IMporter in every industry except for Chemicals and Paper (column 1). Net exports vis a vis non-Annex 1 countries in particular, are positive in these 2 industries as well (column 3). This suggests that the US does not have a particularly strong export position in energy intensive industries. This is complicated by the fact that when you aggregate over the net exports with non-annex 1 countries (add up column 3), the US is a net exporter of these products.

United States

1992 US dollars (thousands)

Industry	Net Exports		Next Exports
	Net Exports	with Annex 1	with non-Annex 1
Chemicals	18,474,974	5,024,727	13,550,247
- Inorganic	966,300	-23,343	989,643
Paper	54,976	-4,169,457	4,224,433
Petroleum Products	-1,929,337	-1,630,863	-298,474
Stone, Clay & Glass Prod	-2,341,891	-1,701,501	-640,390
- Cement	-251,592	-192,579	-59,031

Metals	-10,133,481	-8,280,060	-1,853,421
- Aluminum	-753,690	-744,942	-8,748
- Steel	-6,206,960	-5,646,776	-560,184
Total	4,125,241	-10,757,154	14,982,395

The story is very different when looking at the Annex 1 countries as a group. As a group, the Annex 1 countries are net-EXporters of everything except for aluminum and petroleum products vis a vis the non-Annex 1 countries (column 1). It would appear as though the interests of the US were diametrically opposed to those of the other Annex 1 countries.

Annex 1

1992 US dollars (thousands)

Industry	Net Exports Annex 1	Total Exports to: Annex 1 non-Annex 1	
Chemicals	24,544,473	223,654,539	73,138,220
- Inorganic	2,221,421	16,589,668	5,878,740
Paper	10,159,322	64,062,628	13,776,217
Metals	8,835,147	99,025,368	35,094,639
- Aluminum	-2,484,699	7,353,999	1,252,587
- Steel	15,415,120	59,348,346	25,761,998
Stone, Clay & Glass Prod	4,244,144	33,159,151	9,018,053
- Cement	514,590	1,517,392	828,095
Petroleum Products	-8,539,332	344,359,994	13,030,131
Total	39,243,754	764,261,680	144,057,260

Products With Little Energy Content

As the United States is a net importer in the aggregate, it is useful to contrast the above results with the same numbers for industries requiring relatively little energy in production. Here, the situation is reversed. The US is a net exporter in four of the six industries.

United States

1992 US dollars (thousands)

Industry	Net Exports	Net Exports with Annex 1	Net Exports with non-Annex 1
Industrial Machinery and Equip	9,440,638	-1,595,447	11,036,085
Instruments and Related Products	4,725,811	1,522,040	3,203,771
Tobacco Products	4,472,328	2,418,224	2,054,104
Printing and Publishing	2,282,414	1,930,052	352,362
Electronic and other Electric Equip	-7,346,192	-6,001,832	-1,344,360
Transportation Equip	-8,127,588	-33,546,236	25,418,648

Total - Low Energy Sectors	5,447,411	-35,273,199	40,720,610
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The Annex 1 countries taken as a whole are also net exporters of these products. The trade surplus is, however, significantly larger than it was above; here, the surplus with non-Annex 1 countries represents 17% of total exports where it represented only 4% of total exports of energy intensive goods.

Annex 1
1992 US dollars (thousands)

Industry	Net Exports		Total Exports to:	
	Annex 1	Annex 1	non-Annex 1	
Transportation Equip	90,608,033	352,021,896	111,526,966	
Industrial Machinery and Equip	74,871,404	276,173,902	115,767,751	
Electronic and other Electric Equip	29,845,127	173,616,084	85,605,095	
Instruments and Related Products	16,873,294	78,029,553	27,471,780	
Tobacco Products	3,320,713	7,939,942	4,068,196	
Printing and Publishing	1,573,248	16,534,184	2,847,942	
Total - Low Energy Sectors	217,091,819	904,315,561	347,287,730	

The bottom line is that this data provides evidence against the view that excluding LDCs would have a substantial adverse effect on the overall US trade position. First, the Annex 1 countries as a whole rely on exports of low energy products to a greater extent than on exports of energy intensive products. Second, the US in particular is more broadly a net exporter of low energy products than it is of energy intensive products.

Note: The data in these tables were generated by aggregating up from 4-digit SITC r.2 industries. The concordance is not completely accurate in the sense that some of the included 4-digit industries are really a part of more than one industry. The industry numbers are therefore subject to a positive error. There is no reason to believe that this error is large enough to alter the above inferences.

Council of Economic Advisers

Memorandum

To: Jeff Frankel August 28, 1997

From: Jon Haveman

Subject: Net Exports data for high energy industries.

The following tables present a fair amount of net exports data for the United States, Annex 1 countries and Non-Annex 1 countries. In your e-mail, you only mention the US, but I thought that the aggregate Annex 1 and nonAnnex 1 data would really answer the question a little better - all the while recognizing that net-exports and comparative advantage have a somewhat tenuous link. These data are for 1992. The US aggregate net-exports numbers (column 1 in the first table) could probably be obtained relatively easily for a more recent year, but almost none of the other numbers in the table could without a great deal of difficulty.

Turning first to the US, it appears as though the US is a net-IMporter in every industry except for Chemicals and Paper (column 1). Net exports vis a vis non-Annex 1 countries in particular, are positive in these 2 industries as well (column 3). This apparently suggests that -- pollution externalities aside -- the US would rather exclude the nonAnnex 1 countries than include them. This is complicated by the fact that when you aggregate over the net exports with non-annex 1 countries (add up column 3), the US is a net exporter of these goods.

United States
1992 US dollars (thousands)

Industry	Net Exports	
	Net Exports	Net Exports
	with Annex 1	with non-Annex 1
Cement	-251,592	-192,579
Chemicals	18,474,974	5,024,727
- Inorganic	966,300	-23,343
Glass	-2,341,891	-1,701,501
Metals	-10,133,481	-8,280,060
- Aluminum	-753,690	-744,942
- Steel	-6,206,960	-5,646,776
Paper	54,976	-4,169,457
Total	5,254,578	-9,226,291

15,280,869

The story is very different when looking at the Annex 1 countries as a group. As a group, the Annex 1 countries are net-EXporters of everything except for aluminum vis a vis the nonAnnex 1 countries (column 1). It would appear as though the interests of the US were diametrically opposed to those of the other Annex 1 countries.

Annex 1

1992 US dollars (thousands)

Industry	Net Exports	Total Exports to:	
	Annex 1	Annex 1	non-Annex 1
Cement	514,590	1,517,392	828,095
Chemicals	49,454,001	223,654,539	73,138,220
- Inorganic	2,221,421	16,589,668	5,878,740
Glass	4,244,144	33,159,151	9,018,053
Metals	8,835,147	99,025,368	35,094,639
- Aluminum	-2,484,699	7,353,999	1,252,587
- Steel	15,415,120	59,348,346	25,761,998
Paper	10,159,322	64,062,628	13,776,217
Total	72,692,614	419,901,686	131,027,129

The bottom line, I believe, is that the US has a ready secondary source of supply for these goods should the nonAnnex 1 countries join in the agreement. That is, I believe that the terms of trade hit that the US would take from nonAnnex 1 compliance would be offset by sources within the Annex 1 group. I don't think that this superficial analysis really provides us with the basis to say that the US (from a strictly economic point of view) cares one way or another whether the nonAnnex 1 countries join in.

Note: The data in these tables were generated by aggregating up from 4-digit SITC r.2 industries. The concordance is not completely accurate in the sense that some of the included 4-digit industries are really a part of more than one industry. The industry numbers are therefore subject to a positive error. There is no reason to believe that this error is large enough to alter the above inferences.

Council of Economic Advisers

Memorandum

To: Jeff Frankel August 26, 1997

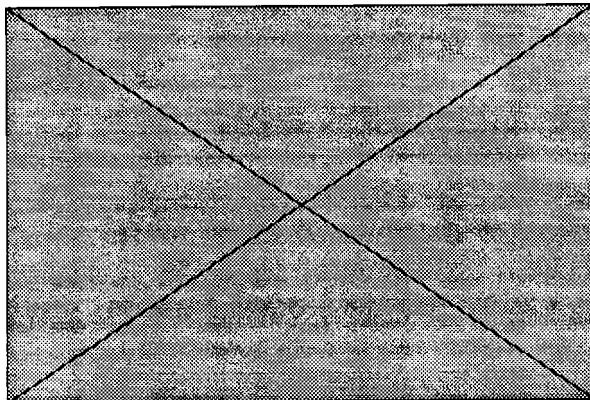
From: Jon Haveman

Subject: Simple model of the economic effects of CO2 reductions.

I've been thinking about emission reductions as more a decline in technology, rather than as an input. Basically, I was running up against problems with resource allocation/utilization/supply. In other words, what does one do with the fact that when you tax emissions, a country is not using up its allocation of emissions. How one defines a country's allocation is another issue entirely. Also, taking the approach that emissions are an input, you get into rather more complicated models than I think are necessary. I'm not certain of the adequacy of modeling it as technology change, but until you and I have a chance to talk, that's what I'm thinking about.

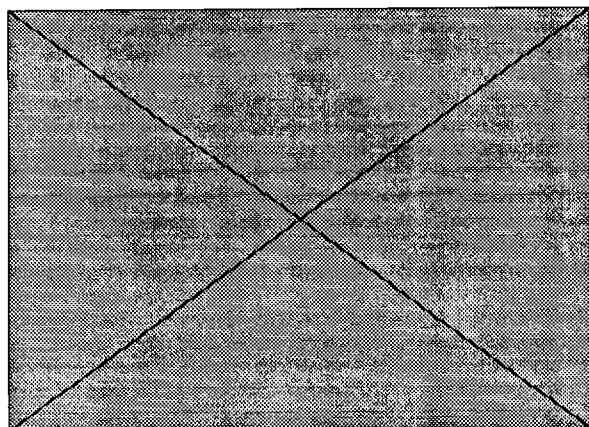
The first approach is a model with perfect competition, constant returns, a continuum of goods and a single input, labor (among other assumptions). There is some technology for producing each good that differs across countries; we'll play around a bit later with the relationship between technology differences across countries and emissions. Let's just assume 2 countries for the time being, I presume Annex 1 and non-Annex 1 countries. I'll call them the US and LDC, resp.

Figure 1



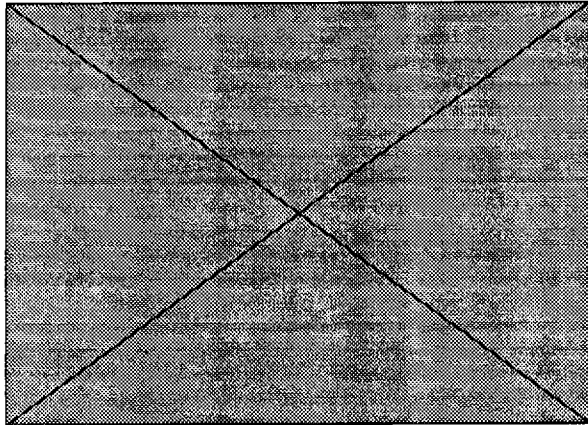
Taking the point of view of the US, rank all goods according to the labor required to produce one unit in the LDC relative to the labor required in the US. Going from left to right in figure 1, the US then has a comparative advantage in the goods on the left and the LDC has a comparative advantage in the goods on the right; there will be one good (z) somewhere in the middle that is produced by both countries. Assuming that US wages are equal to one, the wage in LDC is determined by the inverse of the labor requirements ratio for of good z.

We can now ask of the simple model, what is the impact of a unilateral emission reduction on the part of the US. We want to think about this in several different situations: a) the rate of emissions declines as US comparative advantage declines (from left to right), b) the rate of emissions expands as US comparative advantage declines, and c) the rate of industry emissions is essentially random. This final option is a challenge to model as it will imply a reordering of industries if the rate of emissions is non-monotonic around the jointly produced good. Therefore, instead of random, consider uniform emissions across goods, or, a uniform cost of emission reduction.



A) The US has a comparative advantage in high emission goods. Consider Figure 2. The way to represent a unilateral reduction of emissions in the US is by shifting down the line representing the productivity ratios in a way that is bigger for goods on the left (goods produced in the US) and smaller for goods on the right (goods produced in the LDC). If we hold wages in the US constant, we can make several inferences regarding prices and wages in the LDC. First, prices of goods produced in the US will rise; essentially labor requirements have risen in each industry. Second, wages in the LDC will rise. This second effect is due to a leftward shift in the jointly produced good and a reduction in the productivity ratio for that good. Wages in LDC rise because in order to get labor for production in the new industries, they must be bid away from the old industries. Finally, prices of goods initially produced in LDC will now rise; this being a consequence of the higher wages.

In terms of welfare consequences, prices of all goods have risen relative to US wages. The standard of living (SOL) in the US is therefore reduced. Note that LDC wages need not rise and prices of initially produced LDC goods need also not rise; in this case, the SOL in LDC has also fallen.



B) US comparative advantage in Low emission goods. Consider figure 3. Shift the productivity ratio in a fashion opposite that in figure 2; down more on the right and less on the left. The consequences of this shift are similar, but slightly different from (a). First, prices in US rise, although by less than in (a). Second, wages in LDC rise. Third, prices of initially produced LDC goods rise.

The welfare consequences in this case again represent a loss for US (smaller than in a), but potentially a gain for LDC. This gain comes about from the likely event that wages in LDC rise by more than prices of initially produced US goods.

C) The third case is similar to both A and B, except that the ambiguity surrounding welfare in LDC is greater. It is less clear whether wages in LDC rise by more than prices in US. The US again suffers a decline in welfare.

The second question we might ask of the model is: suppose the US has already limited emissions, what are the welfare consequences of LDC reducing its emissions? The answer is simply the reverse of the above. If the US has a comparative advantage in high emissions industries, then the US will likely gain, if the US has a comparative advantage in low emissions industries, then the US will likely lose. If there is no particular pattern of emissions relative to comparative advantage, then the impact on the US is ambiguous.

I'll turn my efforts towards producing results from a 2-factor model, but I'll be surprised if the intuition turns out to be entirely different. I'm thinking that the only difference will be presence of distributional issues, but we'll see.

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*Copy to
Shogren
Hutter*

**Climate change background paper on environmental measures
and economic competitiveness:
August 9, 1997**

There exist concerns that attempts to reduce carbon emissions will cause a marked deterioration in U.S. competitiveness. The "competitiveness" argument has at least two versions:

- Without specific developing country targets, U.S. industry will relocate abroad.
- Without specific developing country targets, the demand for U.S. energy-intensive goods will decline and the trade balance will deteriorate.

Before summarizing the literature, it is important to recognize factors that tend to militate against significant location or trade effects:

- Non-tradeable sectors account for a substantial share of carbon emissions. Transportation and buildings, for example, account for roughly two-thirds of U.S. emissions. For these sectors, the "competitiveness" argument seems largely irrelevant.
- In most manufacturing sectors, energy costs are a small percentage of total costs. According to the 1995 Annual Census of Manufactures, energy costs for manufacturing industries averaged just 2.2 percent of total costs. In electronic equipment (SIC code 36), for example, energy accounts for 1.2 percent of total costs. In instruments and related products (SIC code 38), energy also accounts for 1.2 percent of total costs. Given the small share of energy in total costs in most industries, differential shifts in the relative price of energy across countries are unlikely to have substantial effects on location decisions and trade flows. Another form of this argument notes that significant differentials in existing energy prices across countries do not seem to cause substantial movements in industries. The price of a barrel of heavy fuel oil in 1994, for example, was \$13.65 in the United States and \$5.06 in Venezuela.¹ Yet firms have not generally fled the United States for Venezuela.
- The burden of meeting an emission reduction target will be partially borne by non-participating countries because of changes mediated through international trade. For example, Annex I nations can be expected to demand less oil, shifting the terms of trade against oil-producing countries, and thereby forcing them to bear some of the costs of reducing greenhouse gases -- even if they do not formally participate in the international emissions reduction agreement.

The rest of this memorandum briefly summarizes the available literature on both forms of the competitiveness argument. The paucity of studies on climate change policies *per se*, especially on the subject of relocation, necessitates reliance on studies of environmental

¹ *Statistical Abstract 1996*, Table 1359, Page 848.

regulations more generally. Caution may therefore be warranted in applying these results to the climate change issue.

Firm location decisions

The first type of competitiveness argument is a form of the "pollution havens" hypothesis,² in which firms are tempted to relocate to (or to build new plants in) countries with lax environmental standards. The evidence, however, suggests that the pollution havens effect does not show up strongly: the costs of complying with environmental regulations are too small relative to other factors (labor costs, tax rates, infrastructure, etc.) to have much effect on firms' location decisions.

- The literature review conducted by Jaffe, Peterson, Portney, and Stavins concludes that "We assess the evidence and find that there is little to document the view that environmental regulations have had a measurably adverse effect on competitiveness. Although the long-run social costs of environmental regulation may be significant, including adverse effects on productivity, studies attempting to measure the effect of environmental regulation on net exports, overall trade flows, and plant-location decisions have produced estimates that are small, statistically insignificant, or not robust to tests of model specification."³
- Palmer, Oates, and Portney point out that (1) except for the biggest polluting industries, the costs of complying with environmental regulation is a small fraction of total cost, and are swamped by international differences in labor costs, capital costs, material costs, and exchange rate changes; (2) the differences between US environmental regulations and those of most major trading partners are not that big; and (3) US firms often build state-of-the-art facilities abroad regardless of the host nation's environmental regulations (this behavior makes sense if firms believe that tighter standards in developing countries are inevitable, and that better technology reduces the risks of major accidents like Bhopal).⁴
- Esty notes that "empirical studies have shown little propensity of pollution-intensive industries to move to 'pollution havens'...Even in industries with high pollution control costs, companies often face other deterrents to relocations, including high fixed costs and

² The term was coined in Walter and Ugelow, "Environmental policies in developing countries," *Ambio*, 8 (1979), 102-109.

³ Adam Jaffe, Steven Peterson, Paul Portney, and Robert Stavins, "Environmental Regulation and International Competitiveness: What Does the Evidence Tell Us?" Resources for the Future, Discussion Paper 94-08.

⁴ Karen Palmer, Wallace Oates, and Paul Portney, "Tightening Environmental Standards: The Benefit-Cost of the No-Cost Paradigm?" *Journal of Economic Perspectives* 9 (1995), 119-132.

sensitivity to transportation expenses.”⁵

- Dean writes that “More stringent regulations in one country are thought to result in loss of competitiveness, and perhaps industrial flight and the development of pollution havens. The many empirical studies which have attempted to test these hypotheses have shown no evidence to support them.”⁶
- Summers reaches the same conclusion: “costs of compliance with environmental regulations are generally not a sufficiently high fraction of total cost to be a crucial determinant of location...there is very little evidence of footloose polluting industries.”⁷

Studies of plant location decisions at the state level similarly conclude that “there is little direct evidence of a relationship between stringency of environmental regulations and plant location choices.”⁸ For example, separate studies by Bartik and Levinson both conclude that plant location is not significantly affected by state-level environmental regulations.⁹

Some have taken the argument even further, arguing that more rigorous environmental standards make domestic firms *more* competitive because the regulations spur innovation.¹⁰ Many who find this extreme position unconvincing are nevertheless willing to accept that environmental regulations seem to have little effect on firm location decisions.¹¹

⁵ Daniel Esty, *Greening the GATT*, Institute for International Economics, 1994, p. 159.

⁶ Judith Dean, “Trade and the Environment: A Survey of the Literature,” in Patrick Low, editor, *International Trade and the Environment* World Bank Discussion Paper No. 159, 1992.

⁷ Larry Summers, “Foreword,” in Patrick Low, editor, *International Trade and the Environment*, World Bank Discussion Paper No. 159, 1992.

⁸ Adam Jaffe, Steven Peterson, Paul Portney, and Robert Stavins, “Environmental Regulation and International Competitiveness: What Does the Evidence Tell Us?” *op. cit.*, page 23.

⁹ Timothy Bartik, “The Effects of Environmental Regulation on Business Location in the United States,” *Growth and Change*, 19 (1988), 22-44; Arik Levinson, *Environmental Regulations and Manufacturers’ Location Choices: Evidence from the Census of Manufactures* (Columbia University, 1992).

¹⁰ Michael Porter, “America’s Green Strategy,” *Scientific American*, August 1991.

¹¹ “When green is good,” *Economist*, November 20, 1993; Adam Jaffe et al., *op. cit.*; Palmer et al., *op. cit.*

Trade flows

Even if firms do not move or build plants abroad, trade flows could still shift in response to environmental policies. But existing studies have generally concluded that the effects on trade of environmental regulations are not large. For example, Grossman and Krueger conclude that pollution abatement costs in the United States have had little effect on imports from Mexico or activity in the maquiladora sector.¹² Consistent with the lack of a significant negative relationship at the national level, states with higher-than-average pollution abatement spending apparently do not export less than other states.¹³

Trade balance effects

Standard trade theory suggests that an increase in the relative price of energy should have some adverse impact on exports of energy-intensive manufactures from the U.S., as from other Annex I countries. But this decline in energy-intensive manufactured exports may not expand the *trade deficit* for several reasons:

- There would likely be a fall in oil imports that would offset the decline in energy-intensive exports. Reduced dependence on foreign oil has both economic and political advantages.
- Trade theory suggests a *positive* effect on U.S. exports of goods that are *not* intensive in energy. Resources would be expected to flow from energy-intensive to other sectors.
- Technical reasons also suggest it may not be useful to look at the effect on the trade balance. An appendix discusses these issues.

In short, to assess competitiveness concerns, it is probably more meaningful to talk about adverse effects on specific, individual energy-intensive export sectors than to look at the impact on the trade balance or current account balance.

Climate change studies

Few studies have examined the specific impact on competitiveness of climate change policies per se. One study by McKibbin and Wilcoxon examined how a carbon tax of \$15 per ton applied in the United States alone, and in the United States and the OECD together, affected trade flows. They conclude that "our results suggest that a carbon tax would produce little

¹² Gene Grossman and Alan Krueger, "Environmental Impacts of a North American Free Trade Agreement," in Peter Garber, ed., *The US-Mexico Free Trade Agreement* (MIT Press, 1992).

¹³ J. David Richardson, *Sizing Up U.S. Export Disincentives* (Institute for International Economics, 1993), pages 114-115.

redistribution of trade in either the short or long run."¹⁴

A seemingly related literature has studied the magnitude of "leakage effects" -- that is, to what extent cuts in domestic emissions would be offset by shifts in production and therefore increases in emissions abroad. But the relationship between carbon leakage and competitiveness is complicated: a large carbon leakage figure may not imply a large decline in competitiveness, and a small carbon leakage figure need not imply the opposite. In any case, the carbon leakage literature has not reached any firm conclusions: Repetto and Austin report that studies of unilateral emissions reduction policies in OECD countries predict leakage rates of between 3.5 and 70 percent.¹⁵ Based on a review of the recent modeling efforts that produced dramatically different results, Thomas Rutherford's (University of Colorado) best guess is that carbon leakage is probably larger than 10 percent and less than 50 percent.¹⁶

Caveat

In sum, the related literatures suggest that carbon policies are unlikely to effect a massive shift of energy-intensive production abroad. At the same time, the empirical literature on the specific impact of carbon policies is sparse. And an important caveat to the general findings above is that for several industries, energy costs are a significant share of total costs. These industries are vulnerable, and there may be substantial adjustment costs. For example, in primary aluminum production (SIC 3334), energy accounts for 21.4 percent of total costs. In hydraulic cement (SIC 3241), energy accounts for 20.5 percent of total costs, while in inorganic chemicals (SIC 281), the share is 13.7 percent. And in other industries -- including the pulp and paper industry, and the steel industry -- energy is a significant input. In these industries, which account for perhaps 2 to 3 percent of total industrial output, the effects are expected to be more significant than those outlined above.

The Department of Energy commissioned a study by the Argonne National Laboratory to study the potential impact of possible carbon emission restrictions on energy-intensive industries.¹⁷ The study focused on six sectors: chemicals, petroleum refining, paper and allied

¹⁴ Warwick McKibbin and Peter Wilcoxon, "Environmental Policy and International Trade," Brookings Discussion Papers in International Economics, October 1995, page 2.

¹⁵ Robert Repetto and Duncan Austin, *The Costs of Climate Protection: A Guide for the Perplexed*, World Resources Institute, 1997, page 31.

¹⁶ Thomas Rutherford, "International Competitiveness and National Plans," University of Colorado, 1995.

¹⁷ Ronald J. Sutherland, "The Impact of Potential Climate Change Commitments on Energy Intensive Industries: A Delphi Analysis," Argonne National Laboratory, 5 February 1997.

products, iron and steel, aluminum, and cement. The general conclusion of the study was that "the policy constraints placed on these six large industries in developed countries, but not on their less developed trading partners, would result in significant adverse impacts on the affected industries."

The precise impact of climate stabilization policies on the most energy-intensive industries, however, is sensitive to how the policies are implemented. If an emissions permit trading system is created, for example, and the permits are auctioned, the funds from the auctions could be used to boost national saving. The increase in national saving would reduce real interest rates. That reduction in real interest rates would stimulate demand for consumer durables, new construction and business investment -- which would, in turn, boost demand for energy-intensive products such as cement, aluminum, and steel. A study using the DRI/McGraw Hill Inter-Industry Model thus suggests that depending on how the carbon emission reductions are achieved, the results of the Argonne study could be exaggerated.

Implications for the importance of LDC participation

It is important to note that even if competitiveness problems are not likely to prove as substantial in practice as some have asserted, the serious participation of developing countries in a global program to address climate change remains essential. The importance of developing country participation has more to do with the objective of reducing emissions than with competitiveness. Despite possible adverse competitiveness effects on a few energy-intensive industries, the economic costs for the United States associated with the absence of developing countries would overall be expected to be relatively small. But the environmental costs could be large: without the participation of the developing countries, whose emissions are expected to exceed the developed countries by the middle of the 21st century, little progress is possible in attenuating the impact of carbon emission on global climate change.

Conclusion

In sum, the related literatures suggest that carbon policies are unlikely to effect a massive shift of energy-intensive production abroad. At the same time, the empirical literature on the specific impact of carbon policies is sparse. And an important caveat to the general findings is that for several industries, energy costs are a significant share of total costs and therefore the effects may be more significant. Finally, the involvement of the developing economies is crucial to carbon reduction efforts not for economic reasons, but rather for environmental ones.

Appendix A: Carbon emissions programs and the balance of payments

The impact of carbon emissions programs on the country's international accounts depends on the precise definition of the balance of payments: the current account balance or overall balance of payments could well move in the opposite direction of the merchandise balance or the balance on goods and services. The merchandise trade balance could very well improve in a system with international permit trading. This is a likely outcome if the U.S. and other industrialized countries buy emission permits from Russia, Ukraine, and other economically depressed countries. (If the U.S. turns out to be a net seller of permits, as is possible in the medium run if the Russian economy recovers, the effects would be reversed.)

Why might the trade balance be expected to improve? Imports of permits from Russia would likely not be counted as imports of merchandise, but would likely be counted on the broader measures of the balance of payments.¹⁸ Economists often term such transactions "international transfers." Such transfers, all else equal, reduce disposable income in the United States or other permit-buying countries, and raises disposable income in the recipient country. The first effect leads to a fall in imports into the U.S., and the second effect leads to a rise in exports to the recipient country. Thus both effects clearly work to narrow the trade deficit of the United States, and to expand the trade deficit (or narrow the trade surplus) of the recipient country. This illustrates the general principle that the trade balance is a highly misleading indicator of the effect on U.S. income or economic welfare.

Public attention tends to be more focussed on the trade balance, as it is the measure associated with output and employment. But the trade balance leaves out the outward transfers themselves. The effect on the overall current account, which adds in the transfers along with the balance on goods and services, would be more likely to be negative (as compared to the effect on the trade balance). But even the current account might improve, if carbon emissions programs were used to raise public saving, or if there were a flow of capital from the United States to developing countries.

¹⁸ The precise treatment within the balance of payments of emissions permits is currently being studied by the relevant officials at the Department of Commerce. This appendix is predicated on preliminary analysis by the Council of Economic Advisers, and is subject to revision following determinations by the Department of Commerce.

Appendix B: Other examples of environmental regulations and competitiveness

U.S. Investment in Mexico. Some detractors of NAFTA feared that U.S. industries would move to Mexico, attracted by looser environmental standards. But the facts suggest that such fears were unfounded. Overall, U.S. direct investment in Mexico from 1993 to 1996 grew about 14.5 percent. The share in Mexico peaked in 1994 at about 2.7 percent, but then the actual level of U.S. direct investment into Mexico fell in 1995.¹⁹

Mexico's share of U.S. FDI, pre- and post-NAFTA

1993	1996
2.7%	2.4%

The data show growth in U.S. direct investment into Mexico over the post NAFTA period, particularly in manufacturing (where growth has been about 22 percent). But this growth has not differed dramatically from the world as a whole -- where manufacturing FDI grew 23 percent over the same period. Even if the Mexico numbers are understated because of the peso devaluation, a generous upward adjustment doesn't change much.

Not only is Mexico's share changing little, but it has only a small share of total U.S. direct investment to begin with. The share of U.S. investment in Europe has remained relatively constant (about half) in the post-NAFTA period, and the share of U.S. investment in Asia and the Pacific has remained stable at about 18 percent. The top destination for U.S. FDI is still the United Kingdom, and its share remains at about 18 percent (the same as the whole of Latin America and Asia and the Pacific), while Canada has maintained 11 to 12 percent.

Japanese direct investment. Japan is one case where environmental regulation is thought to have had a noticeable relocation effect. Some polluting firms and activities have moved to Southeast Asia and Australia. Even in this case, however, environmental considerations appear to have been less important than other factors as causes of these investment flows -- rising prices in Japan for labor and land, other countries' barriers to Japanese exports, and general economic and political conditions in host countries.²⁰

¹⁹ This decline suggests that the measurement method may not have sufficiently adjusted U.S. assets denominated in pesos. But even adjusting the 1996 historical cost data for FDI in Mexico upward by 30 percent (roughly the value of the real depreciation) only raises Mexico's share to 3 percent compared to 2.7 percent pre-NAFTA.

²⁰ Pages 26-29 in Jeffrey Frankel and Shang-Jin Wei, "ASEAN in a Regional Perspective," Pacific Basin Working Paper Series NO. PB96-02, Federal Reserve Bank of San Francisco, August.

THE WHITE HOUSE
WASHINGTON

July 18, 1997

MEMORANDUM FOR DISTRIBUTION

FROM: MARK MAZUR
DAVID SANDALOW

SUBJECT: Climate Change

There will be a meeting Monday, July 21 from 10:30-12:00 in the Lincoln Room of the White House Conference Center. The agenda will be:

1. Developing country commitments paper (attached)
2. Additional preparations for principles meeting Tuesday, July 22 at 5:30 p.m.
3. Status of work on technology strategy

If you have any questions, please call.

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**DISCUSSION PAPER:
DEVELOPING COUNTRY COMMITMENTS**

1. Background

Developed countries are responsible for more than 75% of the increase in greenhouse gas concentrations since the beginning of the Industrial Revolution. In the decades ahead, however, emissions from developing countries are expected to grow sharply. By 2035, developing country emissions are expected to exceed those from the developing world.

Per capita emissions of greenhouse gases vary widely. In the United States, the figure is roughly 20 tons per person; for the OECD as a whole, roughly 16 tons per person; and for developing countries as a whole, roughly 2 tons per person.

The Framework Convention on Climate Change, signed at the Rio "Earth Summit" in 1992, established differentiated levels of commitments for developed and developing countries. It called upon developed countries to take the lead in addressing climate change and to aim to return emissions to 1990 levels by the year 2000. It called upon developing countries to adopt policies and measures to address climate change, but provided no aim for developing countries similar to the year 2000 goal. These differentiated commitments were intended to recognize both the unequal contribution of developed and developing countries to global greenhouse gas concentrations and the unequal capacity of those countries to control emissions.

In 1995, in Berlin, the Parties to the FCCC agreed to negotiate steps for controlling greenhouse gas emissions beyond the year 2000. The negotiating mandate calls on developed countries to set quantified emissions limits for the "medium term (e.g. 2005, 2010 and 2020)." In Berlin, the United States argued strongly that developing countries must participate meaningfully in negotiations over next steps. There was little support for the U.S. position on this point, with many Parties noting the failure of most developed countries to take significant steps toward meeting the year 2000 goal. The Berlin Mandate states that there will be "no new commitments" for developing countries in the current round of negotiation, but that developing countries will be required to advance the implementation of their existing commitments.

2. Kyoto Negotiations: Current Status

This is the most difficult issue in the current round of negotiations. There is a vast gulf between the dialogue abroad (where the U.S. proposal for developing country participation is almost uniformly considered too aggressive) and at home (where more than 60 Senators have signed a resolution insisting on developing country commitments beyond those contemplated in either the U.S. proposal or current negotiating mandate).

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A. U.S. Protocol Proposal

In January, 1997, the U.S. submitted a draft protocol proposal. Provisions on developing countries included three elements: (1) calling for the negotiation by 2005 of a new agreement with legally binding emissions targets for all countries, including developing countries, and a "graduation mechanism" under which Parties would automatically assume additional obligations as they become more developed (the "evolution" concept); (2) establishing a new category (Annex B) of commitments for the most advanced developing countries (providing a halfway house between commitments of developing countries and the more extensive obligations of OECD members); and (3) an elaboration of existing commitments (defining what would be meant by "continuing to advance the implementation of existing commitments"). This final element contained several components, including a requirement to report annually on emissions and actions taken to reduce emissions and take "no regrets" actions (actions which would benefit the climate system, but which might be taken for other economic or environmental reasons).

B. Reaction Abroad

Support for the U.S. proposal is scant. While the third element is considered within the ambit of the Berlin Mandate by nearly all Parties, most countries have argued that the other two elements (i.e., Annex B and evolution) are beyond its scope. The U.S. has been urged to drop its proposal for a new annex. We have also been urged to drop our proposal for evolution (in favor of a separate agreement at some future date).

The following blocs are active in the negotiations:

European Union. EU support for developing country commitments has been very soft. They have supported U.S. proposals for advancing existing commitments, and have proposed that Mexico and Korea take on stronger commitments (not too far removed in substance from the U.S. Annex B), but are not prepared to accept the U.S. language on "Evolution" adopted as part of the Kyoto agreement. They do not support joint implementation with developing countries.

Non-EU OECD Members (principally Japan, Canada, Australia). This group of countries broadly supports including developing country obligations under the Kyoto Agreement. Australia and Canada are the most vocal in support of action, while Japan, as host of the December session, is concerned that an aggressive approach would potentially derail the negotiations. As nearly all countries in this bloc have extensive competitive trade outside of the OECD, they are more aggressive in demanding developing country action. With the exception of Japan, this group supports joint implementation.

Big Developing Countries (China, India and Brazil). These three countries are the primary drivers of the developing country position – and some of the world's largest emitters (China is second after the U.S., and India is number six). These countries have taken a standard north-south line, arguing that global warming has been caused by the developed world, and calling upon the industrialized countries

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to pay for the clean-up. They claim that when developing countries have income and per capita emissions equal to those of the North, they will then participate in the clean-up effort. In spite of their often strident public rhetoric, these countries (particularly China and Brazil) have shown a willingness to engage on this issue on a bilateral basis. They have active domestic climate change mitigation efforts, and have privately indicated a support for many elements of the U.S. proposal. However, they all oppose joint implementation.

OPEC. Well organized in the climate negotiations, the OPEC countries have been led by Saudi Arabia and Nigeria, and advocate positions designed to slow or block the negotiations. These countries have strongly urged: (1) that developing countries should not have to act now, and (2) that industrialized countries should compensate developing countries that might be affected by any action taken in industrialized countries to reduce emissions (principally noting that reduction in oil revenues should be compensated).

Small Island States. A group of 37 small island states have banded together to create an alliance (AOSIS) that seeks to balance OPEC's influence. Largely composed of member countries with low lying territory which will be gradually inundated by climate-associated sea level rise, these countries have pushed an aggressive next steps to combat the problem – calling for a 20 percent reduction in industrialized country emissions below 1990 levels by the year 2005. The AOSIS countries have been reluctant to support U.S. calls for developing country action; their proposal omits any mention of any developing country commitments to be undertaken as part of the Kyoto agreement, and they oppose it.

An agreement in Kyoto that includes the current U.S. developing country position will be extremely difficult to achieve. State Department believes that, at a minimum, this would require U.S. support for a target and timetable perceived by the rest of the world to be serious, an aggressive effort to support replenishment of the Global Environment Facility, and an intensive diplomatic campaign. Even with these elements, an agreement that includes the U.S. developing country position will be very difficult to achieve.

C. Reaction At Home

The domestic dialogue on this issue stands in stark contrast to discussions abroad. Many in the business and labor community are deeply concerned about the trade and competitiveness impacts of "differentiated" commitments for developing countries under the climate treaty. Particular concern has focused on China and "newly industrialized countries," such as Korea.

Last month, Senator Robert Byrd proposed a sense of the Senate resolution opposed to any agreement that does not contain "specific scheduled requirements" for developing countries during the same compliance period as those for developed countries. The resolution quickly garnered 60 co-sponsors. As drafted, the resolution appears inconsistent with the current negotiating mandate (which does not envision quantified emissions limits for developing countries). During the past several weeks, however, there

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has been considerable discussion with Senator Byrd and others about the exact meaning of the resolution. Senator Byrd has stated that commitments of developing countries commitments should be based upon their own "pace of industrialization." Senator Chaffee has prepared a more moderate resolution that would require developing countries to take on commitments with a 10-year lag behind the commitments of developed countries.

3. Engaging Developing Countries in the Long-Term

Any solution to the problem of climate change requires the participation of developing countries. The long-term issue is how best to engage developing countries in global efforts to address greenhouse gas emissions.

The original vision of the Framework Convention on Climate Change is that developed countries would lead in controlling greenhouse gases, and that developing countries would follow. This is similar to the approach in the Montreal Protocol (the 1987 treaty that addresses stratospheric ozone depletion). Under that agreement, developing country obligations generally follow 10 years behind those of developed countries. Developing countries receive financial assistance for their efforts from a multilateral fund.

Under this model, long-term engagement of developing countries depends on action by developed countries to control emissions. However, the Byrd resolution underscores the domestic political difficulties associated with differentiated commitments between developing and developed countries. In addition, any competitiveness or leakage issues would present substantive concerns.

Various efforts are underway to encourage developing country efforts to control greenhouse gas emissions. These include: U.S. bilateral assistance; multilateral assistance through the Global Environment Facility (GEF); calls for reorienting the loan guidelines for the international lending institutions; and work on joint implementation (which would encourage the private sector to undertake projects in developing countries to reduce emissions and claim credit for these reductions against a domestic obligation).

The first of these, announced in the President's New York statement at the U.N. Special Session on the Environment, establishes a \$1 billion, five-year package to help developing countries plot a climate friendly path to development. The primary component of this initiative will be a five year minimum of at least \$150 million per year in bilateral assistance for climate related programs, and the potential to use development credits dedicated to climate friendly investment projects. The initiative will also include a \$25 million 5-year interagency program to assist developing countries to meet the terms of the climate treaty. A significant focus in this initiative will be on using credit tools to induce greater U.S. private sector involvement in transferring climate friendly technologies.

Our financial contribution to the GEF was one of the original incentives to developing countries to support the Framework Convention on Climate Change – and to

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take action to mitigate climate change. However, while the U.S. had pledged a contribution of \$430 million to the GEF over a three year period, Congressional funding has lagged considerably. FY96 contributions were at \$35 million rather than \$110 million. The reduced U.S. contribution to the GEF will make any subsequent calls for developing country action much more difficult to sustain.

One of the most significant elements of the U.S. approach to encourage developing country participation is joint implementation (JI). Similar to the concept of emissions trading, JI allows countries to offset emissions at home through projects undertaken elsewhere. However, unlike the situation in emissions trading, under a JI regime, projects could be undertaken in developing countries – countries without legally binding emissions budgets. The analytic work performed to date suggests that allowing JI could reduce costs within the U.S. substantially. Developing countries see enormous benefits as well, in the form of technology transfer and private sector investment flows. In spite of the potential benefits, significant opposition remains: developing countries are concerned at the loss of control over domestic emissions; environmentalists are concerned that it may be impossible to measure project based emission reductions, and some in the private sector and Congress have suggested that JI will result in significant transfers of wealth overseas.

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Impact of climate change policies on U.S. "competitiveness"

Those favoring specific CO₂ targets for developing countries often argue that they are necessary to prevent a deterioration in U.S. competitiveness. The "competitiveness" argument has at least two versions

- Without specific developing country targets, U.S. industry will relocate abroad.
- Without specific developing country targets, the demand for U.S. energy-intensive goods will decline and the U.S. current account deficit will expand substantially.

Firm location decisions

The first type of argument is a form of the "pollution havens" hypothesis, in which firms are tempted move to countries with lax environmental standards. The evidence, however, suggests that the pollution havens hypothesis has little empirical support: the costs of complying with environmental regulations are apparently too small relative to other factors (labor costs, tax rates, infrastructure, etc.) to have much effect on firms' location decisions.¹ As Esty has noted, "empirical studies have shown little propensity of pollution-intensive industries to move to 'pollution havens'...Even in industries with high pollution control costs, companies often face other deterrents to relocations, including high fixed costs and sensitivity to transportation expenses."² Consistent with the lack of a significant negative relationship at the national level, states with higher-than-average pollution abatement spending apparently do not suffer from lower exports than other states.³ Some have taken the argument even farther, arguing that more rigorous environmental standards make domestic firms *more* competitive because the regulations spur innovation.⁴ Many who find this extreme position unconvincing are nevertheless willing to accept that environmental regulations have little effect on firm location decisions.⁵

¹ See, for example, Judith Dean, "Trade and the Environment: A Survey of the Literature," in Patrick Low, *International Trade and the Environment*, World Bank Discussion Paper No. 159, 1992; and U.S. Congress, Office of Technology Assessment, *Trade and Environment: Conflict and Opportunities*, May 1992.

² Daniel Esty, *Greening the GATT* (Institute for International Economics, 1994), page 159.

³ J. David Richardson, *Sizing Up U.S. Export Disincentives* (Institute for International Economics, 1993), pages 114-115.

⁴ Michael Porter, "America's Green Strategy," *Scientific American*, August 1991.

⁵ "When green is good," *Economist*, November 20, 1993; Adam Jaffe, Steven Peterson, Paul Portney, and Robert Stavins, "Environmental Regulation and International Competitiveness: What Does the Evidence Tell Us?" Resources for the Future Discussion Paper 94-08, 1994.

This previous literature on pollution havens may, however, not apply to climate change policies for a variety of reasons. For example, climate change policies potentially involve much larger changes than any that have been examined in the existing literature. And the policy tools applied may also be different. On the other hand, the pollution havens hypothesis is not even applicable to the large share of carbon emissions that come from non-tradeable sectors (e.g., utilities).

Few studies have examined the specific impact of climate change policies. McKibbin and Wilcoxon did examine the effect of a carbon tax of \$15 per ton applied in the United States alone, and in the United States and the OECD together, on trade flows. (The impact on trade flows may be linked to, but is not necessarily the same as, the impact on firm location decisions.) They conclude that "our results suggest that a carbon tax would produce little redistribution of trade in either the short or long run."⁶

A related literature has studied the magnitude of "leakage effects" -- that is, to what extent cuts in domestic emissions would be offset by shifts in production and therefore increases in emissions abroad. This literature has not reached any firm conclusions: Repetto and Austin report that studies of unilateral emissions reduction policies in OECD countries predict leakage rates of between 3.5 and 70 percent.⁷

In sum, related literatures suggest that carbon policies are unlikely to effect a massive shift of energy-intensive production abroad. At the same time, the empirical literature on the specific impact of carbon policies is sparse.

Loss of demand for U.S. energy-intensive goods

The second "competitiveness" argument is difficult to address without specifying how any revenue will be recycled and how a putative international trading regime would work. Some studies have found that there could be a *positive* effect on the U.S. current account deficit, as energy imports decline. McKibbin and Wilcoxon conclude that the impact on the deficit depends crucially on how any revenue from climate policies is used (with the most beneficial effect from using the funds to raise public saving).⁸ Interestingly, McKibbin and Wilcoxon find that the trade deficit improves *more* if the U.S. acts unilaterally than if it acts with other countries. (If the U.S. acts by itself and dedicates any revenue to deficit reduction, the U.S. interest rate falls relative to the rest of the world. That decline in the U.S. relative interest rate -- which does not occur when all countries implement policies -- produces an improvement in the trade balance in the model.)

⁶ Warwick McKibbin and Peter Wilcoxon, "Environmental Policy and International Trade," Brookings Discussion Papers in International Economics, October 1995, page 2.

⁷ Robert Repetto and Duncan Austin, *The Costs of Climate Protection: A Guide for the Perplexed*, World Resources Institute, 1997, page 31.

⁸ Warwick McKibbin and Peter Wilcoxon, "Environmental Policy and International Trade," Brookings Discussion Papers in International Economics, October 1995, pages 20 and 21.

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

The Parties to this Convention,

Acknowledging that change in the Earth's climate and its adverse effects are a common concern of humankind,

Concerned that human activities have been substantially increasing the atmospheric concentrations of greenhouse gases, that these increases enhance the natural greenhouse effect, and that this will result on average in an additional warming of the Earth's surface and atmosphere and may adversely affect natural ecosystems and humankind,

Noting that the largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs,

Aware of the role and importance in terrestrial and marine ecosystems of sinks and reservoirs of greenhouse gases,

Noting that there are many uncertainties in predictions of climate change, particularly with regard to the timing, magnitude and regional patterns thereof,

Acknowledging that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions,

Recalling the pertinent provisions of the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972,

Recalling also that States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction,

Reaffirming the principle of sovereignty of States in international cooperation to address climate change,

Recognizing that States should enact effective environmental legislation, that environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply, and that standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries,

Recalling the provisions of General Assembly resolution 44/228 of 22 December 1989 on the United Nations Conference on Environment and Development, and resolutions 43/53 of 6 December 1988, 44/207 of 22 December 1989, 45/212 of 21 December 1990 and 46/169 of 19 December 1991 on protection of global climate for present and future generations of mankind,

Recalling also the provisions of General Assembly resolution 44/206 of 22 December 1989 on the possible adverse effects of sea-level rise on islands and coastal areas, particularly low-lying coastal areas and the pertinent provisions of General Assembly resolution 44/172 of 19 December 1989 on the implementation of the Plan of Action to Combat Desertification,

Recalling further the Vienna Convention for the Protection of the Ozone Layer, 1985, and the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, as adjusted and amended on 29 June 1990,

Noting the Ministerial Declaration of the Second World Climate Conference adopted on 7 November 1990,

Conscious of the valuable analytical work being conducted by many States on climate change and of the important contributions of the World Meteorological Organization, the United Nations Environment Programme and other organs, organizations and bodies of the United Nations system, as well as other international and intergovernmental bodies, to the exchange of results of scientific research and the coordination of research,

Recognizing that steps required to understand and address climate change will be environmentally, socially and economically most effective if they are based on relevant scientific, technical and economic considerations and continually re-evaluated in the light of new findings in these areas,

Recognizing that various actions to address climate change can be justified economically in their own right and can also help in solving other environmental problems,

Recognizing also the need for developed countries to take immediate action in a flexible manner on the basis of clear priorities, as a first step towards comprehensive response strategies at the global, national and, where agreed, regional levels that take into account all greenhouse gases, with due consideration of their relative contributions to the enhancement of the greenhouse effect,

Recognizing further that low-lying and other small island countries, countries with low-lying coastal, arid and semi-arid areas or areas liable to floods, drought and desertification, and developing countries with fragile mountainous ecosystems are particularly vulnerable to the adverse effects of climate change,

Recognizing the special difficulties of those countries, especially developing countries, whose economies are particularly dependent on fossil fuel production, use and exportation, as a consequence of action taken on limiting greenhouse gas emissions,

Affirming that responses to climate change should be coordinated with social and economic development in an integrated manner with a view to avoiding adverse impacts on the latter, taking into full account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty,

Recognizing that all countries, especially developing countries, need access to resources required to achieve sustainable social and economic development and that, in order for developing countries to progress towards that goal, their energy consumption will need to grow taking into account the possibilities for achieving greater energy efficiency and for controlling greenhouse gas emissions in general, including through the application of new technologies on terms which make such an application economically and socially beneficial,

Determined to protect the climate system for present and future generations,

Have agreed as follows:

ARTICLE 1

DEFINITIONS *

For the purposes of this Convention:

1. "Adverse effects of climate change" means changes in the physical environment or biota resulting from climate change which have significant deleterious effects on the composition, resilience or productivity of natural and managed ecosystems or on the operation of socio-economic systems or on human health and welfare.

* Titles of articles are included solely to assist the reader.

2. "Climate change" means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.
3. "Climate system" means the totality of the atmosphere, hydrosphere, biosphere and geosphere and their interactions.
4. "Emissions" means the release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period of time.
5. "Greenhouse gases" means those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation.
6. "Regional economic integration organization" means an organization constituted by sovereign States of a given region which has competence in respect of matters governed by this Convention or its protocols and has been duly authorized, in accordance with its internal procedures, to sign, ratify, accept, approve or accede to the instruments concerned.
7. "Reservoir" means a component or components of the climate system where a greenhouse gas or a precursor of a greenhouse gas is stored.
8. "Sink" means any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere.
9. "Source" means any process or activity which releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere.

ARTICLE 2

OBJECTIVE

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

ARTICLE 3

PRINCIPLES

In their actions to achieve the objective of the Convention and to implement its provisions, the Parties shall be guided, inter alia, by the following:

1. The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.
2. The specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration.
3. The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost. To achieve this, such policies and measures should take into account different socio-economic contexts, be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and comprise all economic sectors. Efforts to address climate change may be carried out cooperatively by interested Parties.
4. The Parties have a right to, and should, promote sustainable development. Policies and measures to protect the climate system against human-induced change should be appropriate for the specific conditions of each Party and should be integrated with national development programmes, taking into account that economic development is essential for adopting measures to address climate change.
5. The Parties should cooperate to promote a supportive and open international economic system that would lead to sustainable economic growth and development in all Parties, particularly developing country Parties, thus enabling them better to address the problems of climate change. Measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.

ARTICLE 4

COMMITMENTS

1. All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall:
 - (a) Develop, periodically update, publish and make available to the Conference of the Parties, in accordance with Article 12, national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies to be agreed upon by the Conference of the Parties;
 - (b) Formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and measures to facilitate adequate adaptation to climate change;
 - (c) Promote and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol in all relevant sectors, including the energy, transport, industry, agriculture, forestry and waste management sectors;
 - (d) Promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases not controlled by the Montreal Protocol, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems;
 - (e) Cooperate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management, water resources and agriculture, and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods;
 - (f) Take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment, of projects or measures undertaken by them to mitigate or adapt to climate change;

I. DECISIONS ADOPTED BY THE CONFERENCE OF THE PARTIES

— Decision 1/CP.1

The Berlin Mandate: Review of the adequacy of Article 4, paragraph 2 (a) and (b), of the Convention, including proposals related to a protocol and decisions on follow-up

The Conference of the Parties, at its first session,

Having reviewed Article 4, paragraph 2(a) and (b), of the United Nations Framework Convention on Climate Change, and

Having concluded that these subparagraphs are not adequate,

Agrees to begin a process to enable it to take appropriate action for the period beyond 2000, including the strengthening of the commitments of the Parties included in Annex I to the Convention (Annex I Parties) in Article 4, paragraph 2(a) and (b), through the adoption of a protocol or another legal instrument:

I

1. The process shall be guided, inter alia, by the following:

(a) The provisions of the Convention, including Article 3, in particular the principles in Article 3.1, which reads as follows: "The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof;"

(b) The specific needs and concerns of developing country Parties referred to in Article 4.8; the specific needs and special situations of least developed countries referred to in Article 4.9; and the situation of Parties, particularly developing country Parties, referred to in Article 4.10 of the Convention;

(c) The legitimate needs of the developing countries for the achievement of sustained economic growth and the eradication of poverty, recognizing also that all Parties have a right to, and should, promote sustainable development;

(d) The fact that the largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that the per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs;

(e) The fact that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions;

(f) Coverage of all greenhouse gases, their emissions by sources and removals by sinks and all relevant sectors;

(g) The need for all Parties to cooperate in good faith and to participate in this process.

II

2. The process will, inter alia:

(a) Aim, as the priority in the process of strengthening the commitments in Article 4.2(a) and (b) of the Convention, for developed country/other Parties included in Annex I, both

- to elaborate policies and measures, as well as
- to set quantified limitation and reduction objectives within specified time-frames, such as 2005, 2010 and 2020, for their anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol,

taking into account the differences in starting points and approaches, economic structures and resource bases, the need to maintain strong and sustainable economic growth, available technologies and other individual circumstances, as well as the need for equitable and appropriate contributions by each of these Parties to the global effort, and also the process of analysis and assessment referred to in section III, paragraph 4, below;

(b) Not introduce any new commitments for Parties not included in Annex I, but reaffirm existing commitments in Article 4.1 and continue to advance the implementation of these commitments in order to achieve sustainable development, taking into account Article 4.3, 4.5 and 4.7;

(c) Take into account any result from the review referred to in Article 4.2(f), if available, and any notification referred to in Article 4.2(g).

(d) Consider, as provided in Article 4.2(e), the coordination among Annex I Parties, as appropriate, of relevant economic and administrative instruments, taking into account Article 3.5;

(e) Provide for the exchange of experience on national activities in areas of interest, particularly those identified in the review and synthesis of available national communications; and

(f) Provide for a review mechanism.

III

3. The process will be carried out in the light of the best available scientific information and assessment on climate change and its impacts, as well as relevant technical, social and economic information, including, *inter alia*, reports of the Intergovernmental Panel on Climate Change. It will also make use of other available expertise.

4. The process will include in its early stages an analysis and assessment, to identify possible policies and measures for Annex I Parties which could contribute to limiting and reducing emissions by sources and protecting and enhancing sinks and reservoirs of greenhouse gases. This process could identify environmental and economic impacts and the results that could be achieved with regard to time horizons such as 2005, 2010, and 2020.

5. The protocol proposal of the Alliance of Small Island States (AOSIS), which contains specific reduction targets and was formally submitted in accordance with Article 17 of the Convention, along with other proposals and pertinent documents, should be included for consideration in the process.

6. The process should begin without delay and be conducted as a matter of urgency, in an open-ended ad hoc group of Parties hereby established, which will report to the second session of the Conference of the Parties on the status of this process. The sessions of this group should be scheduled to ensure completion of the work as early as possible in 1997, with a view to adopting the results at the third session of the Conference of the Parties.

FACT SHEET ON U.S. CLIMATE CHANGE PROPOSAL

June, 1997

In July, 1996 the United States outlined a broad framework for negotiation of next steps under the Framework Convention on Climate Change. In December, 1996 the U.S. further elaborated its ideas by describing the key elements that should be discussed for inclusion in a protocol to guide greenhouse gas emissions reduction efforts in the post-2000 period. The attached document represents further elaboration of the proposed framework. In January, 1997, the United States presented to the Convention's Secretariat draft text for consideration in international negotiations that will occur throughout 1997. Several technical elements left undefined in the January submission (principally those relating to compliance issues, and to which gases should be included in an agreement) were further developed and submitted in early June, 1997. The revised U.S. draft protocol proposal containing these new elements will form the basis for the U.S. position in the next session of the Ad Hoc Group on the Berlin Mandate (scheduled to meet in late July). Consistent with previous U.S. statements and proposals, the U.S. submission addresses the following key topics:

EMISSIONS TARGETS

- A new concept is set forth to guide the establishment of developed country emissions targets. Building on the concept of cumulative and averaged emissions, the U.S. proposes creation of an "emissions budget". Multiple emissions budget periods are proposed, including a second period in which emissions are equal to or less than the first period, thus assuring continued progress toward achievement of the Convention's objective.
 - For a given period, each developed country Party would be allocated an emissions budget.
 - The submission does not identify either the size of the budgets or the duration of the periods.
 - Parties would be allowed to "bank" for future use emissions not used during a given period; to "borrow" a limited amount of emissions (with a penalty) from a subsequent period; and to trade emissions.
 - A new category is proposed to encourage rapidly developing countries to voluntarily adopt emissions budgets.

REPORTING AND COMPLIANCE

- The proposal establishes procedures to ensure adequate reporting, measurement, review and compliance.
 - Countries would have to set national systems for measuring emissions accurately, achieving compliance and ensuring enforcement.

- Annual reports on measurement, compliance and enforcement efforts for the relevant budget period would be required and made available to the public.
- Implementation efforts would be reviewed under the Convention by expert teams and discussed at appropriate meetings of the Parties.
- The Parties would be assigned responsibility for determining the consequences of non-compliance, for example: denial of emissions trading/joint implementation rights; loss of voting and other decision-making rights.

ADVANCING DEVELOPING COUNTRY EFFORTS

- The proposal advances implementation of developing country commitments under the Convention by:
 - Requiring developing countries to identify and adopt "no-regrets" measures to mitigate net greenhouse gas emissions.
 - Requiring developing countries to prepare annual emissions inventories and report on steps taken to reduce emissions.
 - Establishing a process for reviewing developing country reports and improving emissions reduction strategies.

EMISSIONS TRADING AND JOINT IMPLEMENTATION

- The U.S. submission provides for full emissions trading among countries with emissions budgets (provided they are in compliance with all obligations under the agreement); it also provides for "joint implementation", through which countries without emissions budgets could create and transfer emissions reduction credits achieved by qualified projects.

LONG-TERM EFFORTS UNDER THE CONVENTION

- The proposal calls for periodic review of the agreement as scientific knowledge and information grow; it also requires the Parties to seek establishment of a long-term goal for atmospheric greenhouse gas concentrations.
- The proposal calls for establishment of a date certain for negotiation of emissions obligations for all Parties, and calls for development of graduation mechanisms to strengthen the obligations of developing nations.

Byrd Resolution

Resolved,

(1) The U.S. should not be a signatory to any protocol to, or other agreement regarding, the United Nations Framework Convention on Climate Change of 1992, at negotiations in Kyoto in December 1997, or thereafter, which would --

(a) mandate new commitments to limit or reduce greenhouse gas emissions for the Annex I Parties, unless the protocol or other agreement also mandates new specific scheduled commitments to limit or reduce greenhouse gas emissions for developing country Parties within the same compliance period.

Developing Countries

Q: What is the U.S. doing to make sure that developing countries make similar sacrifices as developed countries? Are we letting developing countries off the hook?

A: Our position on developing countries is the most comprehensive, and frankly, the most far reaching from among industrialized countries. We are practically alone among developed countries in pushing forward developing country participation.

We have a five part approach for involving the developing countries:

1. Developing countries are required to advance their existing commitments under the climate change treaty. Examples of these steps include:
 - Policies to improve energy efficiency.
 - The elimination of subsidies.
 - Removing obstacles to the limitation of greenhouse gas emissions.
 - Improvements in the transport efficiency.
 - Taking action, such as through market structure reforms, that are justified economically in their own right.
 - The reduction of conventional air pollution (which can help reduce greenhouse gas emissions) through fuel switching and energy efficiency programs.
 - Investment in renewable energy sources.
 - Continuing to improve their ability to measure and report on emissions.
2. We are pressing for agreement on the creation of an Annex B category for countries which are rapidly developing. These countries would take on more modest emissions targets, but their targets would, nonetheless, be obligatory.
3. The U.S. proposal also calls on developing country Parties to adopt, by 2005, binding provisions so that all Parties have quantitative greenhouse gas emissions obligations and so that there is a mechanism or "trigger" for automatic application of those obligations,

based on agreed criteria. This is our idea of “evolving” the developing countries’ participation in greenhouse gas emissions reductions.

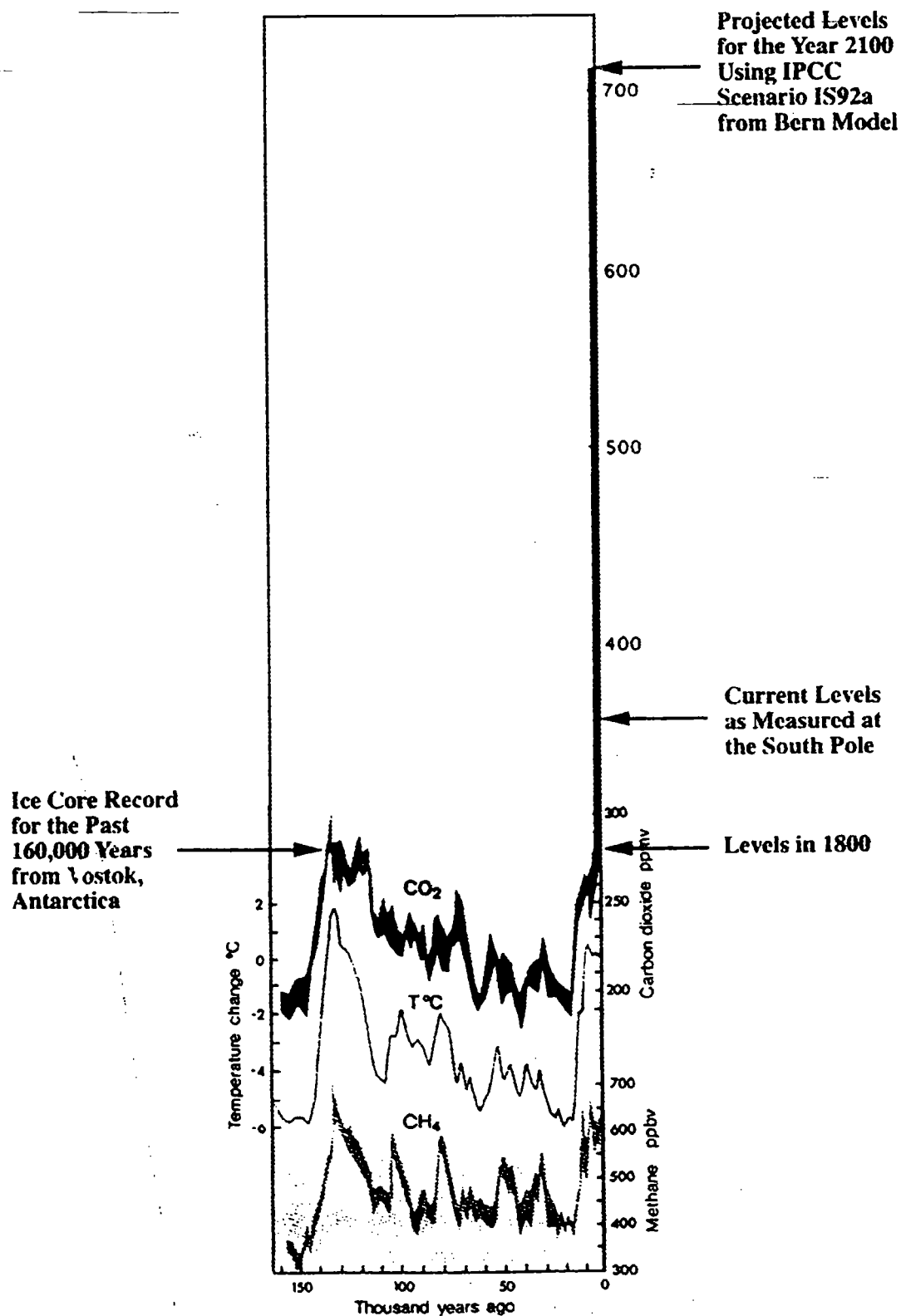
4. Another element of the U.S. proposal on developing countries is Joint Implementation for Credit (which is also a key element of our package of flexible measures). Through joint implementation, countries are allowed to undertake emissions reductions projects in developing countries and count these reductions against their own emissions. We believe that joint implementation holds enormous potential to reduce global greenhouse gas emissions in a cost-effective manner.

5. Finally, the U.S. is carrying out other bilateral initiatives as part of our treaty obligations, to promote energy efficiency, forest protection, and technical country assessments.

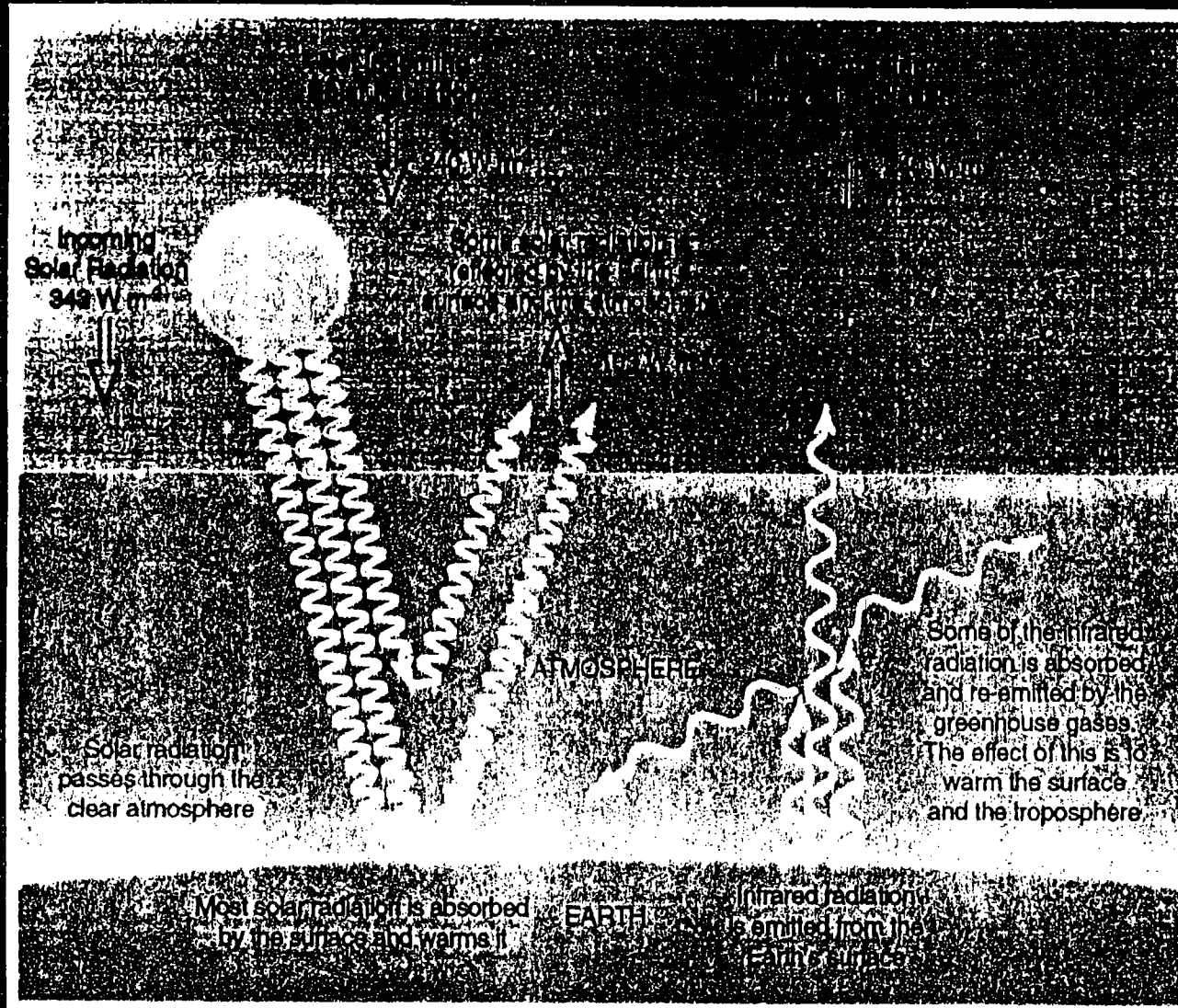
Atmospheric Carbon Dioxide Concentrations

-- Comparing Past Interglacial Ice Core Records with IPCC Projections for the Next 100 Years --

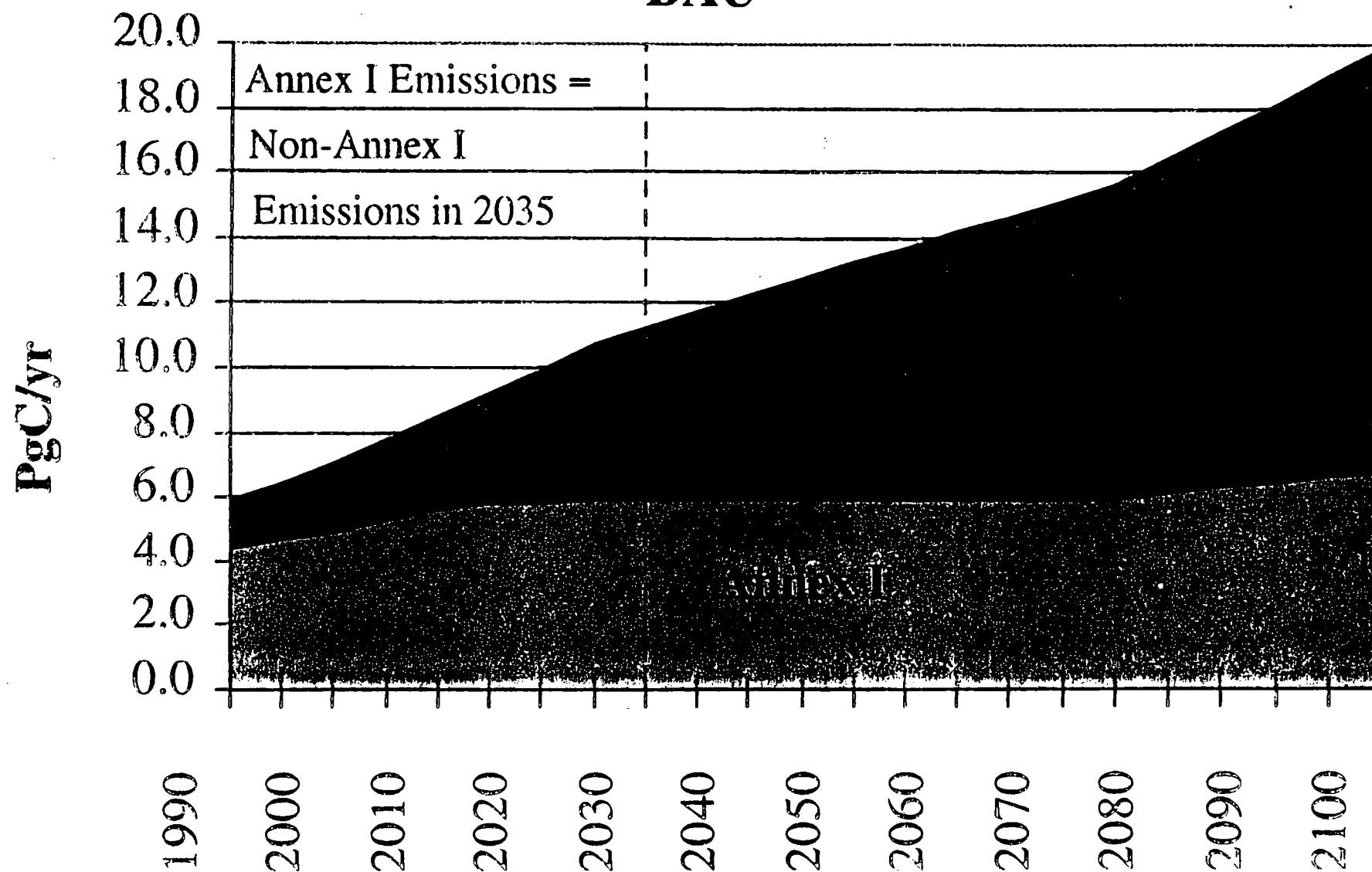
Source: "Radiative Forcing of Climate Change" Climate Change 1994, IPCC Record, Cambridge University Press, 1995



The Greenhouse Effect

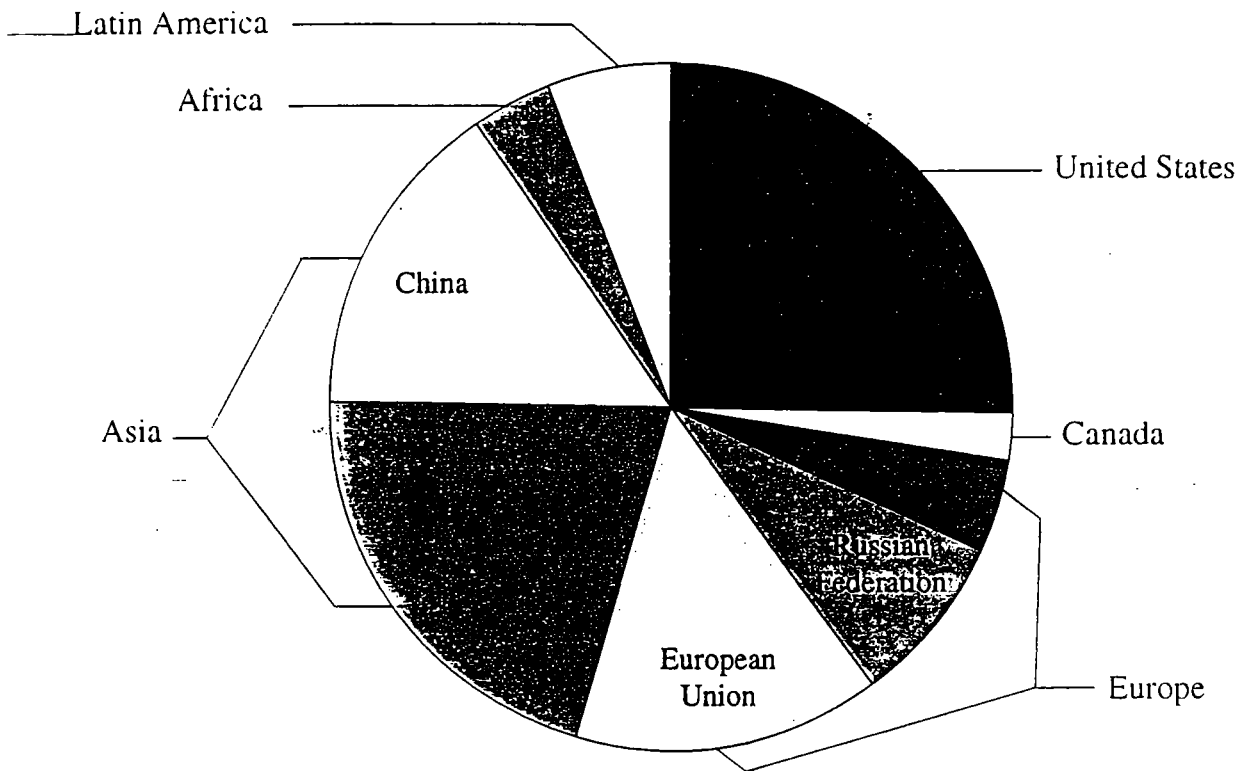


Annex I and Non-Annex I Fossil Fuel Carbon Emissions: BAU



Comparative Continental Carbon Emissions, 1994

Million Metric Tons

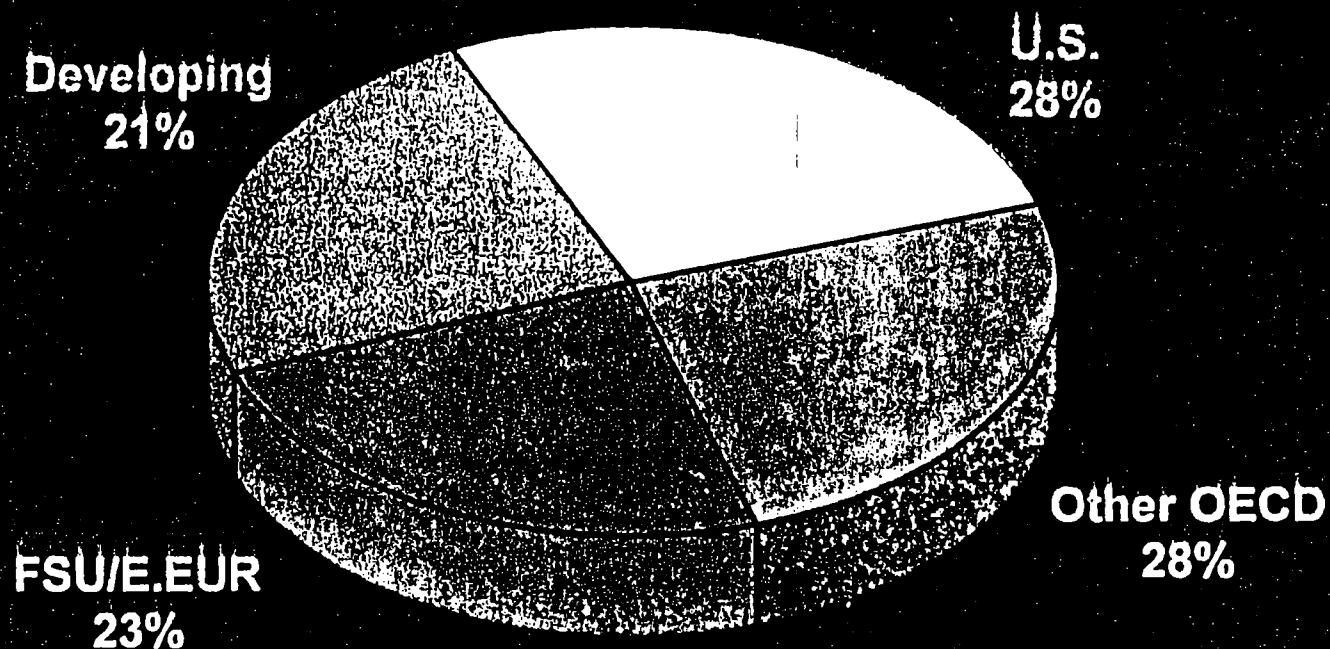


Source: Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory

Unclassified

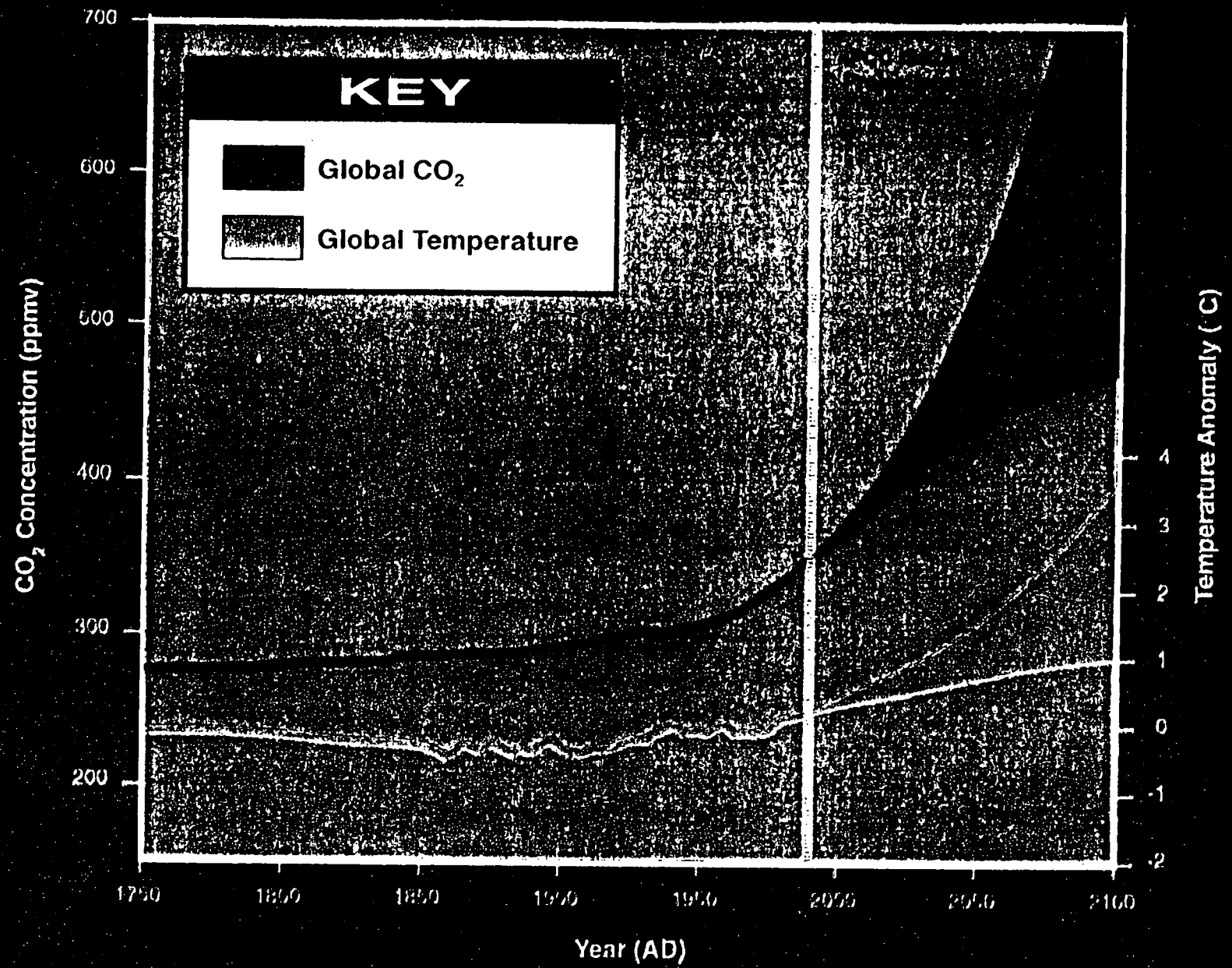
1950-1990: Cumulative CO₂ Emissions from Fossil Energy and Cement Production

Global Total: 583 Billion Tonnes CO₂



Source: Marland *et al.* (1995)





AGENDA FOR CLIMATE CHANGE MEETING ON DEVELOPING ECONOMIES

Tuesday, July 22, 1997

5:30 pm, OEOB 180

- I. Substantive background
 - A. Overview (Tim Wirth)
 - B. Developing country perspective (Larry Summers)
 - C. Impact on U.S. industry (Janet Yellen)
 - D. General discussion
- II. Negotiating perspectives (Dan Tarullo)
 - A. Kyoto
 - B. Domestic perspective
- III. Solutions and issues for further study

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

The Parties to this Convention,

Acknowledging that change in the Earth's climate and its adverse effects are a common concern of humankind,

Concerned that human activities have been substantially increasing the atmospheric concentrations of greenhouse gases, that these increases enhance the natural greenhouse effect, and that this will result on average in an additional warming of the Earth's surface and atmosphere and may adversely affect natural ecosystems and humankind,

Noting that the largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs,

Aware of the role and importance in terrestrial and marine ecosystems of sinks and reservoirs of greenhouse gases,

Noting that there are many uncertainties in predictions of climate change, particularly with regard to the timing, magnitude and regional patterns thereof,

Acknowledging that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions,

Recalling the pertinent provisions of the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972,

Recalling also that States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction,

Reaffirming the principle of sovereignty of States in international cooperation to address climate change,

Recognizing that States should enact effective environmental legislation, that environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply, and that standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries,

Recalling the provisions of General Assembly resolution 44/228 of 22 December 1989 on the United Nations Conference on Environment and Development, and resolutions 43/53 of 6 December 1988, 44/207 of 22 December 1989, 45/212 of 21 December 1990 and 46/169 of 19 December 1991 on protection of global climate for present and future generations of mankind,

Recalling also the provisions of General Assembly resolution 44/206 of 22 December 1989 on the possible adverse effects of sea-level rise on islands and coastal areas, particularly low-lying coastal areas and the pertinent provisions of General Assembly resolution 44/172 of 19 December 1989 on the implementation of the Plan of Action to Combat Desertification,

Recalling further the Vienna Convention for the Protection of the Ozone Layer, 1985, and the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, as adjusted and amended on 29 June 1990,

Noting the Ministerial Declaration of the Second World Climate Conference adopted on 7 November 1990,

Conscious of the valuable analytical work being conducted by many States on climate change and of the important contributions of the World Meteorological Organization, the United Nations Environment Programme and other organs, organizations and bodies of the United Nations system, as well as other international and intergovernmental bodies, to the exchange of results of scientific research and the coordination of research,

Recognizing that steps required to understand and address climate change will be environmentally, socially and economically most effective if they are based on relevant scientific, technical and economic considerations and continually re-evaluated in the light of new findings in these areas,

Recognizing that various actions to address climate change can be justified economically in their own right and can also help in solving other environmental problems,

Recognizing also the need for developed countries to take immediate action in a flexible manner on the basis of clear priorities, as a first step towards comprehensive response strategies at the global, national and, where agreed, regional levels that take into account all greenhouse gases, with due consideration of their relative contributions to the enhancement of the greenhouse effect,

Recognizing further that low-lying and other small island countries, countries with low-lying coastal, arid and semi-arid areas or areas liable to floods, drought and desertification, and developing countries with fragile mountainous ecosystems are particularly vulnerable to the adverse effects of climate change,

Recognizing the special difficulties of those countries, especially developing countries, whose economies are particularly dependent on fossil fuel production, use and exportation, as a consequence of action taken on limiting greenhouse gas emissions,

Affirming that responses to climate change should be coordinated with social and economic development in an integrated manner with a view to avoiding adverse impacts on the latter, taking into full account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty,

Recognizing that all countries, especially developing countries, need access to resources required to achieve sustainable social and economic development and that, in order for developing countries to progress towards that goal, their energy consumption will need to grow taking into account the possibilities for achieving greater energy efficiency and for controlling greenhouse gas emissions in general, including through the application of new technologies on terms which make such an application economically and socially beneficial,

Determined to protect the climate system for present and future generations,

Have agreed as follows:

ARTICLE 1

DEFINITIONS *

For the purposes of this Convention:

1. "Adverse effects of climate change" means changes in the physical environment or biota resulting from climate change which have significant deleterious effects on the composition, resilience or productivity of natural and managed ecosystems or on the operation of socio-economic systems or on human health and welfare.

* Titles of articles are included solely to assist the reader.

2. "Climate change" means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.
3. "Climate system" means the totality of the atmosphere, hydrosphere, biosphere and geosphere and their interactions.
4. "Emissions" means the release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period of time.
5. "Greenhouse gases" means those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation.
6. "Regional economic integration organization" means an organization constituted by sovereign States of a given region which has competence in respect of matters governed by this Convention or its protocols and has been duly authorized, in accordance with its internal procedures, to sign, ratify, accept, approve or accede to the instruments concerned.
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ARTICLE 2

OBJECTIVE

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

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2. The specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration.
3. The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost. To achieve this, such policies and measures should take into account different socio-economic contexts, be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and comprise all economic sectors. Efforts to address climate change may be carried out cooperatively by interested Parties.
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COMMITMENTS

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 - (c) Promote and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol in all relevant sectors, including the energy, transport, industry, agriculture, forestry and waste management sectors;
 - (d) Promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases not controlled by the Montreal Protocol, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems;
 - (e) Cooperate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management, water resources and agriculture, and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods;
 - (f) Take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment, of projects or measures undertaken by them to mitigate or adapt to climate change;

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Decision 1/CP.1

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Agrees to begin a process to enable it to take appropriate action for the period beyond 2000, including the strengthening of the commitments of the Parties included in Annex I to the Convention (Annex I Parties) in Article 4, paragraph 2(a) and (b), through the adoption of a protocol or another legal instrument:

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(g) The need for all Parties to cooperate in good faith and to participate in this process.

II

2. The process will, inter alia:

(a) Aim, as the priority in the process of strengthening the commitments in Article 4.2(a) and (b) of the Convention, for developed country/other Parties included in Annex I, both

- to elaborate policies and measures, as well as
- to set quantified limitation and reduction objectives within specified time-frames, such as 2005, 2010 and 2020, for their anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol,

taking into account the differences in starting points and approaches, economic structures and resource bases, the need to maintain strong and sustainable economic growth, available technologies and other individual circumstances, as well as the need for equitable and appropriate contributions by each of these Parties to the global effort, and also the process of analysis and assessment referred to in section III, paragraph 4, below;

(b) Not introduce any new commitments for Parties not included in Annex I, but reaffirm existing commitments in Article 4.1 and continue to advance the implementation of these commitments in order to achieve sustainable development, taking into account Article 4.3, 4.5 and 4.7;

(c) Take into account any result from the review referred to in Article 4.2(f), if available, and any notification referred to in Article 4.2(g).

(d) Consider, as provided in Article 4.2(e), the coordination among Annex I Parties, as appropriate, of relevant economic and administrative instruments, taking into account Article 3.5;

(e) Provide for the exchange of experience on national activities in areas of interest, particularly those identified in the review and synthesis of available national communications; and

(f) Provide for a review mechanism.

III

3. The process will be carried out in the light of the best available scientific information and assessment on climate change and its impacts, as well as relevant technical, social and economic information, including, inter alia, reports of the Intergovernmental Panel on Climate Change. It will also make use of other available expertise.

4. The process will include in its early stages an analysis and assessment, to identify possible policies and measures for Annex I Parties which could contribute to limiting and reducing emissions by sources and protecting and enhancing sinks and reservoirs of greenhouse gases. This process could identify environmental and economic impacts and the results that could be achieved with regard to time horizons such as 2005, 2010, and 2020.

5. The protocol proposal of the Alliance of Small Island States (AOSIS), which contains specific reduction targets and was formally submitted in accordance with Article 17 of the Convention, along with other proposals and pertinent documents, should be included for consideration in the process.

6. The process should begin without delay and be conducted as a matter of urgency, in an open-ended ad hoc group of Parties hereby established, which will report to the second session of the Conference of the Parties on the status of this process. The sessions of this group should be scheduled to ensure completion of the work as early as possible in 1997, with a view to adopting the results at the third session of the Conference of the Parties.

FACT SHEET ON U.S. CLIMATE CHANGE PROPOSAL

June, 1997

In July, 1996 the United States outlined a broad framework for negotiation of next steps under the Framework Convention on Climate Change. In December, 1996 the U.S. further elaborated its ideas by describing the key elements that should be discussed for inclusion in a protocol to guide greenhouse gas emissions reduction efforts in the post-2000 period. The attached document represents further elaboration of the proposed framework. In January, 1997, the United States presented to the Convention's Secretariat draft text for consideration in international negotiations that will occur throughout 1997. Several technical elements left undefined in the January submission (principally those relating to compliance issues, and to which gases should be included in an agreement) were further developed and submitted in early June, 1997. The revised U.S. draft protocol proposal containing these new elements will form the basis for the U.S. position in the next session of the Ad Hoc Group on the Berlin Mandate (scheduled to meet in late July). Consistent with previous U.S. statements and proposals, the U.S. submission addresses the following key topics:

EMISSIONS TARGETS

- A new concept is set forth to guide the establishment of developed country emissions targets. Building on the concept of cumulative and averaged emissions, the U.S. proposes creation of an "emissions budget". Multiple emissions budget periods are proposed, including a second period in which emissions are equal to or less than the first period, thus assuring continued progress toward achievement of the Convention's objective.
 - For a given period, each developed country Party would be allocated an emissions budget.
 - The submission does not identify either the size of the budgets or the duration of the periods.
 - Parties would be allowed to "bank" for future use emissions not used during a given period; to "borrow" a limited amount of emissions (with a penalty) from a subsequent period; and to trade emissions.
 - A new category is proposed to encourage rapidly developing countries to voluntarily adopt emissions budgets.

REPORTING AND COMPLIANCE

- The proposal establishes procedures to ensure adequate reporting, measurement, review and compliance.
 - Countries would have to set national systems for measuring emissions accurately, achieving compliance and ensuring enforcement.

- Annual reports on measurement, compliance and enforcement efforts for the relevant budget period would be required and made available to the public.
- Implementation efforts would be reviewed under the Convention by expert teams and discussed at appropriate meetings of the Parties.
- The Parties would be assigned responsibility for determining the consequences of non-compliance, for example: denial of emissions trading/joint implementation rights; loss of voting and other decision-making rights.

ADVANCING DEVELOPING COUNTRY EFFORTS

- The proposal advances implementation of developing country commitments under the Convention by:
 - Requiring developing countries to identify and adopt "no-regrets" measures to mitigate net greenhouse gas emissions.
 - Requiring developing countries to prepare annual emissions inventories and report on steps taken to reduce emissions.
 - Establishing a process for reviewing developing country reports and improving emissions reduction strategies.

EMISSIONS TRADING AND JOINT IMPLEMENTATION

- The U.S. submission provides for full emissions trading among countries with emissions budgets (provided they are in compliance with all obligations under the agreement); it also provides for "joint implementation", through which countries without emissions budgets could create and transfer emissions reduction credits achieved by qualified projects.

LONG-TERM EFFORTS UNDER THE CONVENTION

- The proposal calls for periodic review of the agreement as scientific knowledge and information grow; it also requires the Parties to seek establishment of a long-term goal for atmospheric greenhouse gas concentrations.
- The proposal calls for establishment of a date certain for negotiation of emissions obligations for all Parties, and calls for development of graduation mechanisms to strengthen the obligations of developing nations.

Byrd Resolution

Resolved,

(1) The U.S. should not be a signatory to any protocol to, or other agreement regarding, the United Nations Framework Convention on Climate Change of 1992, at negotiations in Kyoto in December 1997, or thereafter, which would --

(a) mandate new commitments to limit or reduce greenhouse gas emissions for the Annex I Parties, unless the protocol or other agreement also mandates new specific scheduled commitments to limit or reduce greenhouse gas emissions for developing country Parties within the same compliance period.

Developing Countries

Q: What is the U.S. doing to make sure that developing countries make similar sacrifices as developed countries? Are we letting developing countries off the hook?

A: Our position on developing countries is the most comprehensive, and frankly, the most far reaching from among industrialized countries. We are practically alone among developed countries in pushing forward developing country participation.

We have a five part approach for involving the developing countries:

1. Developing countries are required to advance their existing commitments under the climate change treaty. Examples of these steps include:
 - Policies to improve energy efficiency.
 - The elimination of subsidies.
 - Removing obstacles to the limitation of greenhouse gas emissions.
 - Improvements in the transport efficiency.
 - Taking action, such as through market structure reforms, that are justified economically in their own right.
 - The reduction of conventional air pollution (which can help reduce greenhouse gas emissions) through fuel switching and energy efficiency programs.
 - Investment in renewable energy sources.
 - Continuing to improve their ability to measure and report on emissions.
2. We are pressing for agreement on the creation of an Annex B category for countries which are rapidly developing. These countries would take on more modest emissions targets, but their targets would, nonetheless, be obligatory.
3. The U.S. proposal also calls on developing country Parties to adopt, by 2005, binding provisions so that all Parties have quantitative greenhouse gas emissions obligations and so that there is a mechanism or “trigger” for automatic application of those obligations,

based on agreed criteria. This is our idea of “evolving” the developing countries’ participation in greenhouse gas emissions reductions.

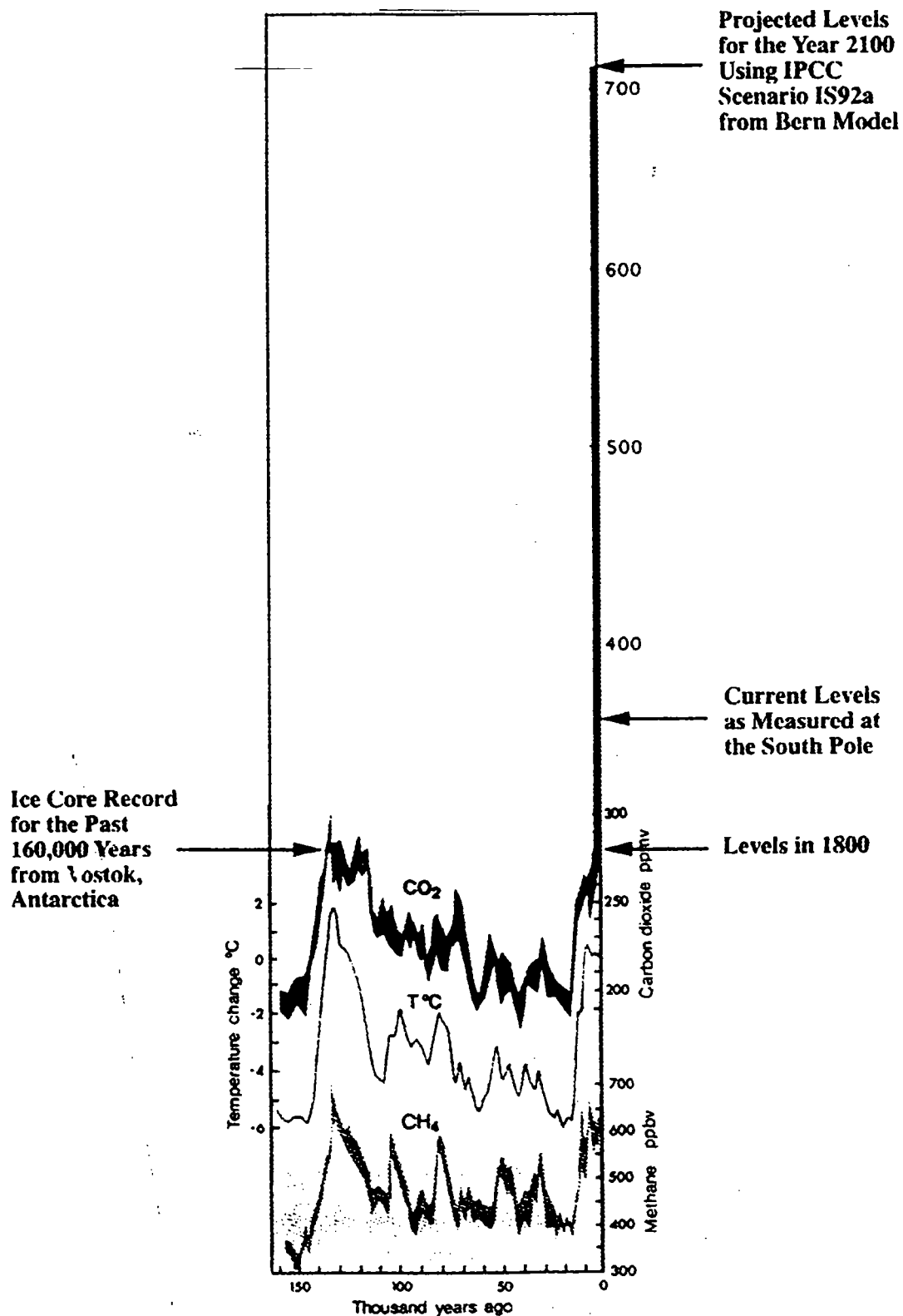
4. Another element of the U.S. proposal on developing countries is Joint Implementation for Credit (which is also a key element of our package of flexible measures). Through joint implementation, countries are allowed to undertake emissions reductions projects in developing countries and count these reductions against their own emissions. We believe that joint implementation holds enormous potential to reduce global greenhouse gas emissions in a cost-effective manner.

5. Finally, the U.S. is carrying out other bilateral initiatives as part of our treaty obligations, to promote energy efficiency, forest protection, and technical country assessments.

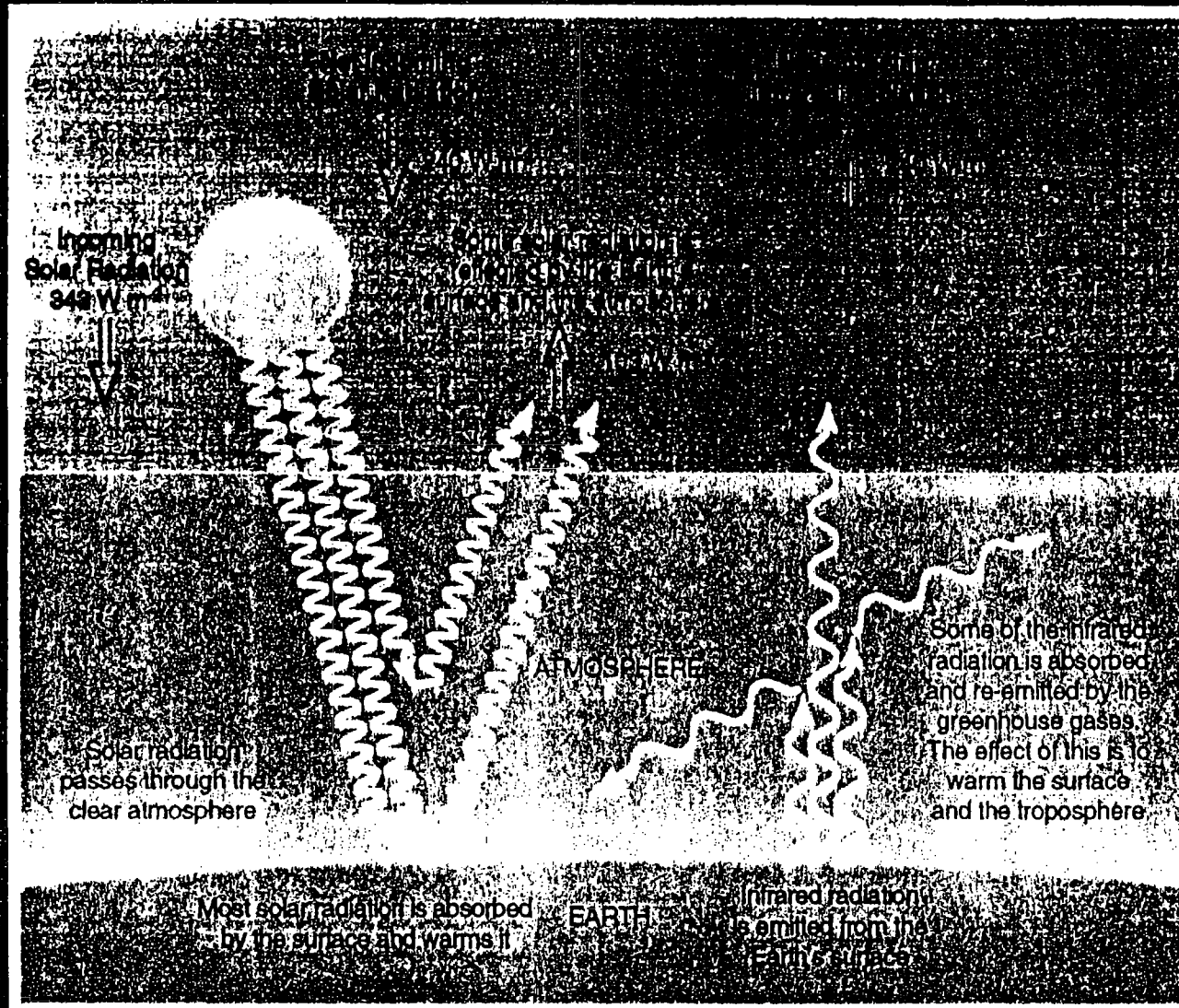
Atmospheric Carbon Dioxide Concentrations

-- Comparing Past Intergracial Ice Core Records with IPCC Projections for the Next 100 Years --

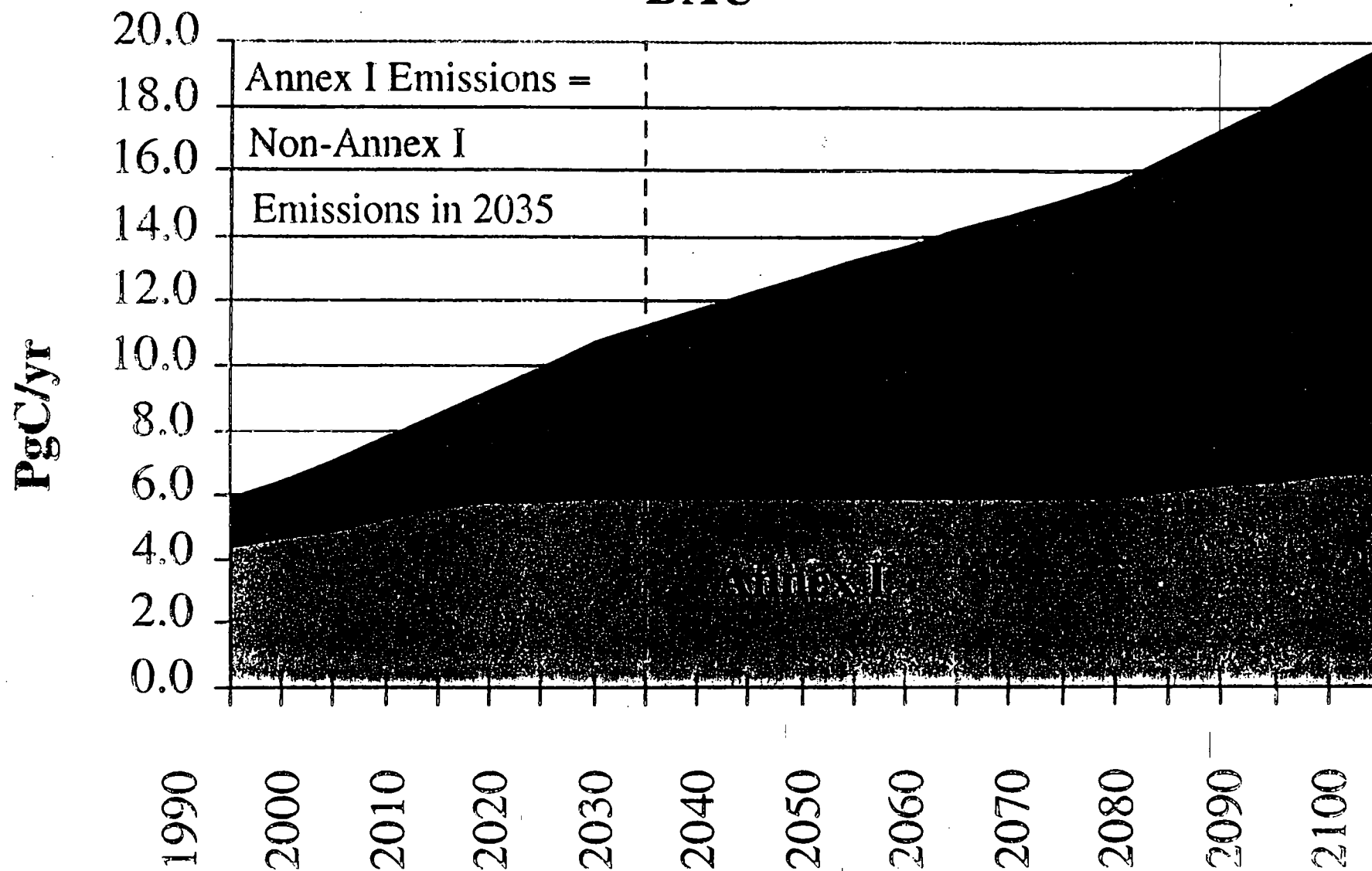
Source: "Radiative Forcing of Climate Change" Climate Change 1994, IPCC Record, Cambridge University Press, 1995



The Greenhouse Effect

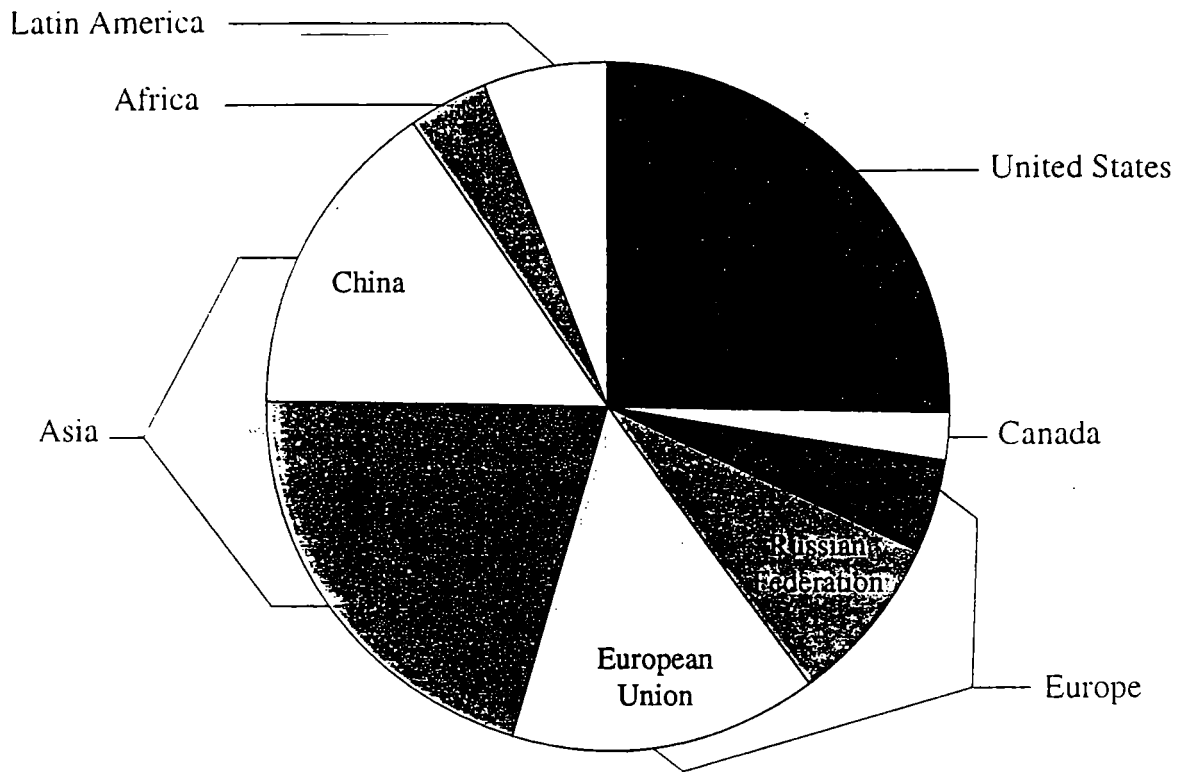


Annex I and Non-Annex I Fossil Fuel Carbon Emissions: BAU



Comparative Continental Carbon Emissions, 1994

Million Metric Tons

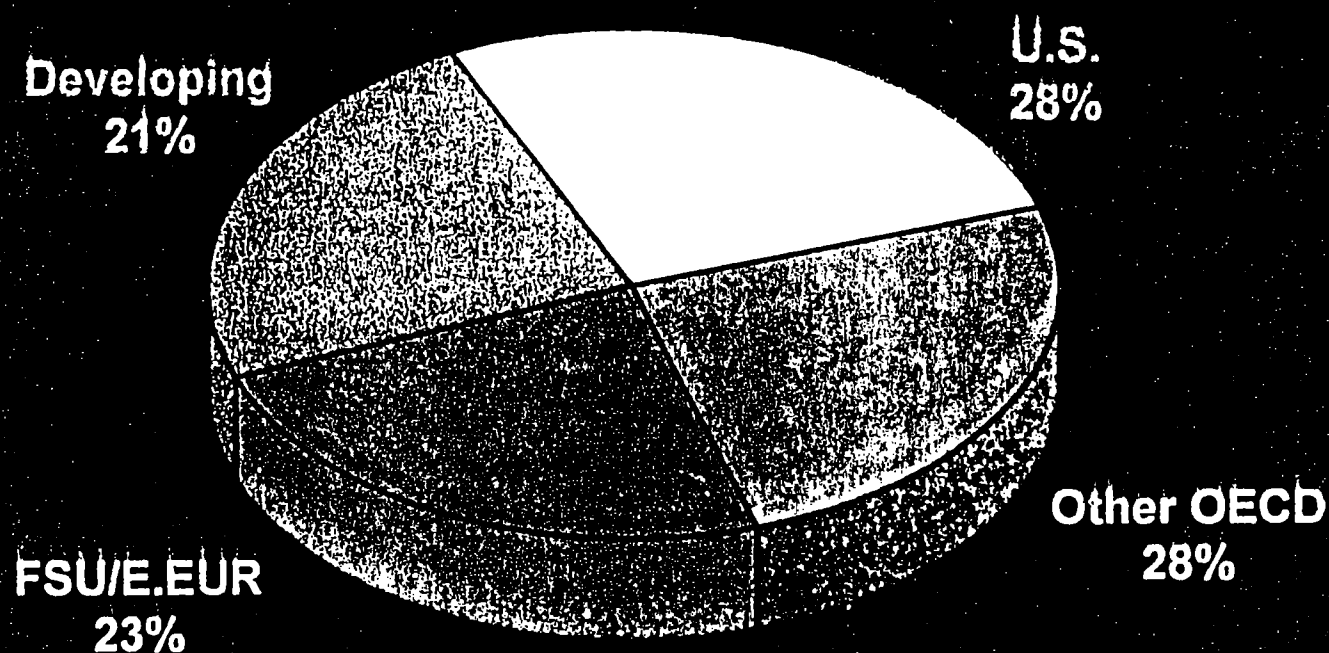


Source: Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory

Unclassified

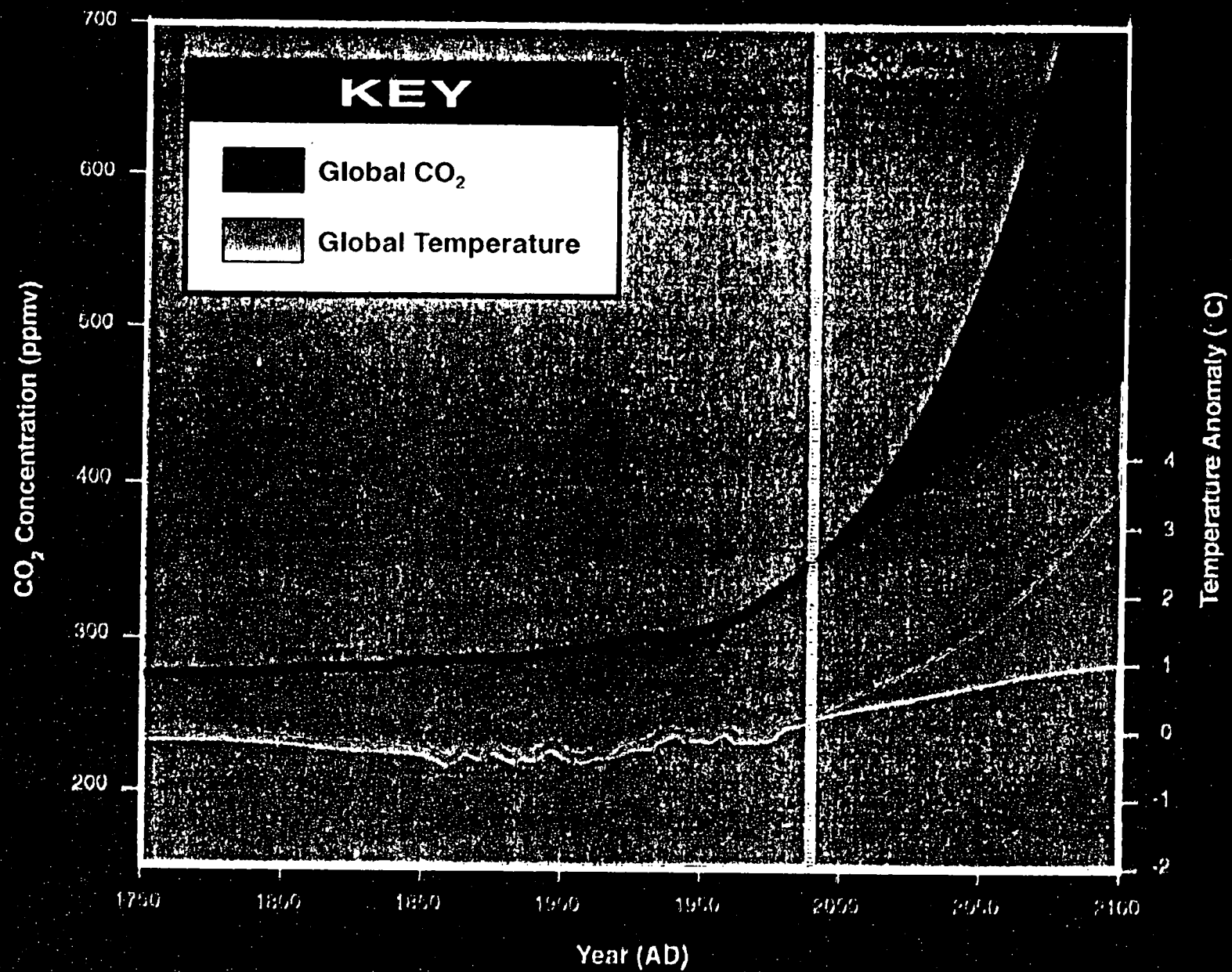
1950-1990: Cumulative CO₂ Emissions from Fossil Energy and Cement Production

Global Total: 583 Billion Tonnes CO₂

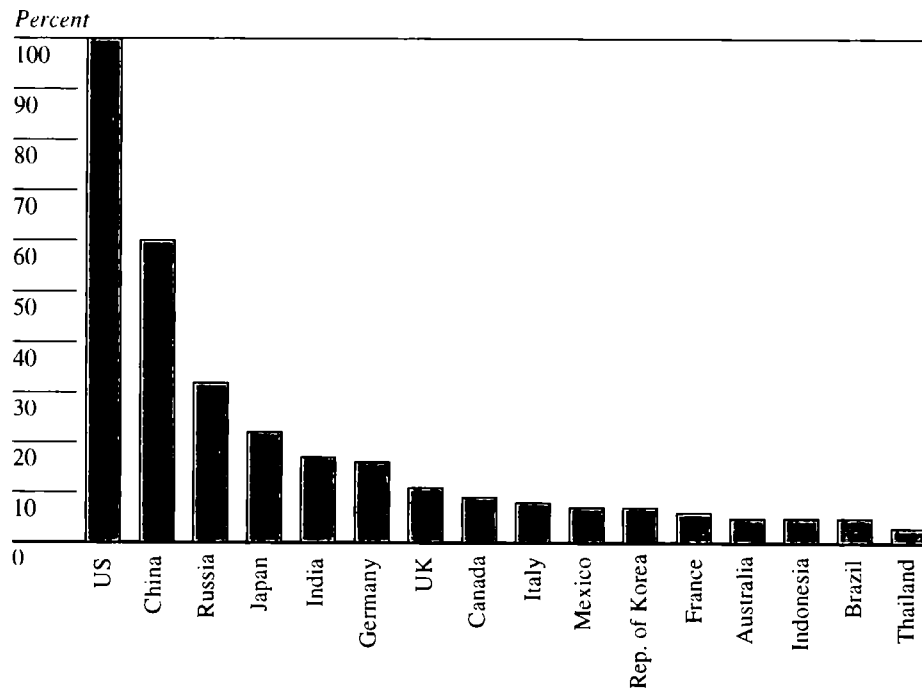


Source: Marland *et al.* (1995)





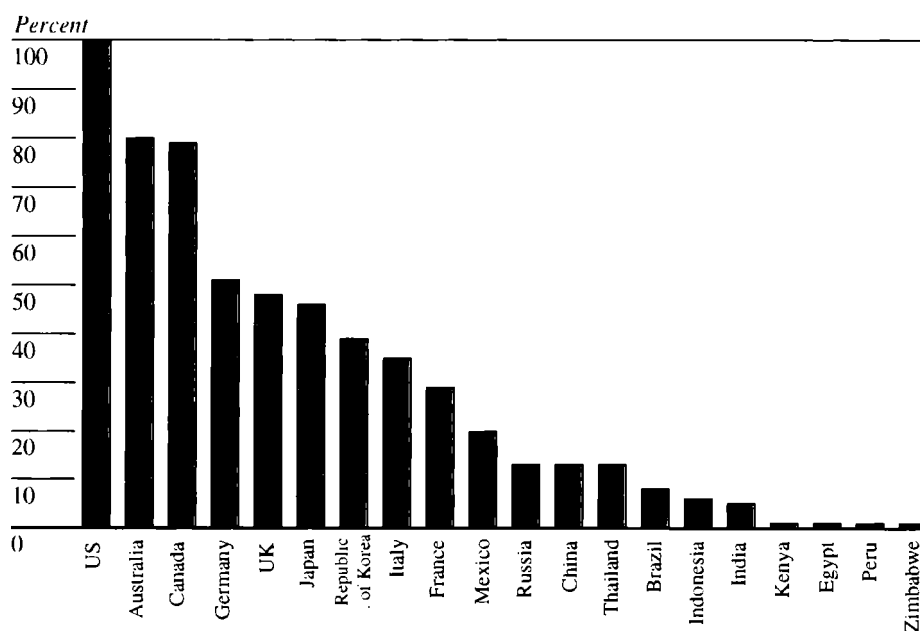
Selected Shares of US Volume of Carbon Emissions, 1994 (U)



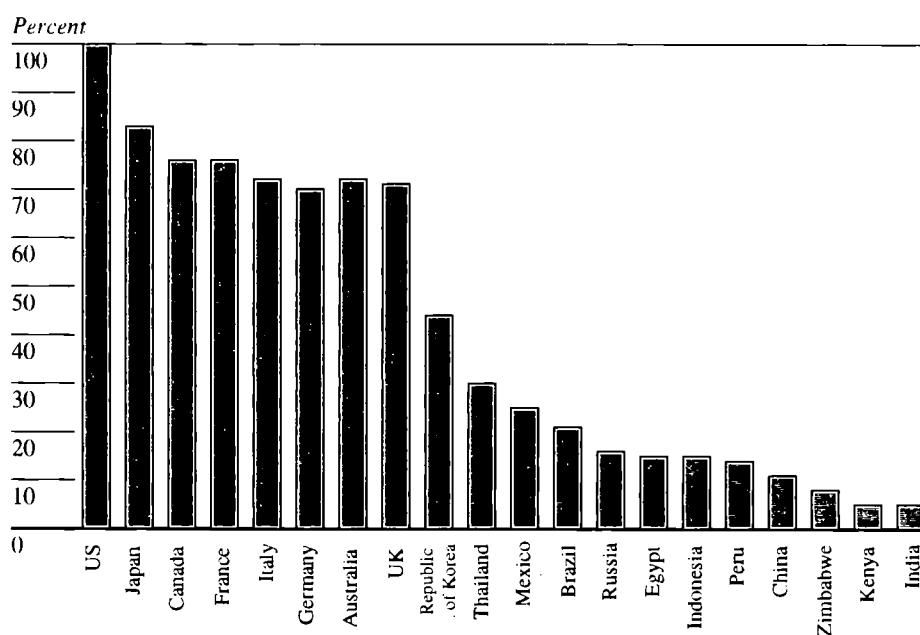
Sources: Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory

Selected Shares of US Per Capita Carbon Emissions and of US Per Capita GDP (U) *Note scale change*

Emissions, 1994



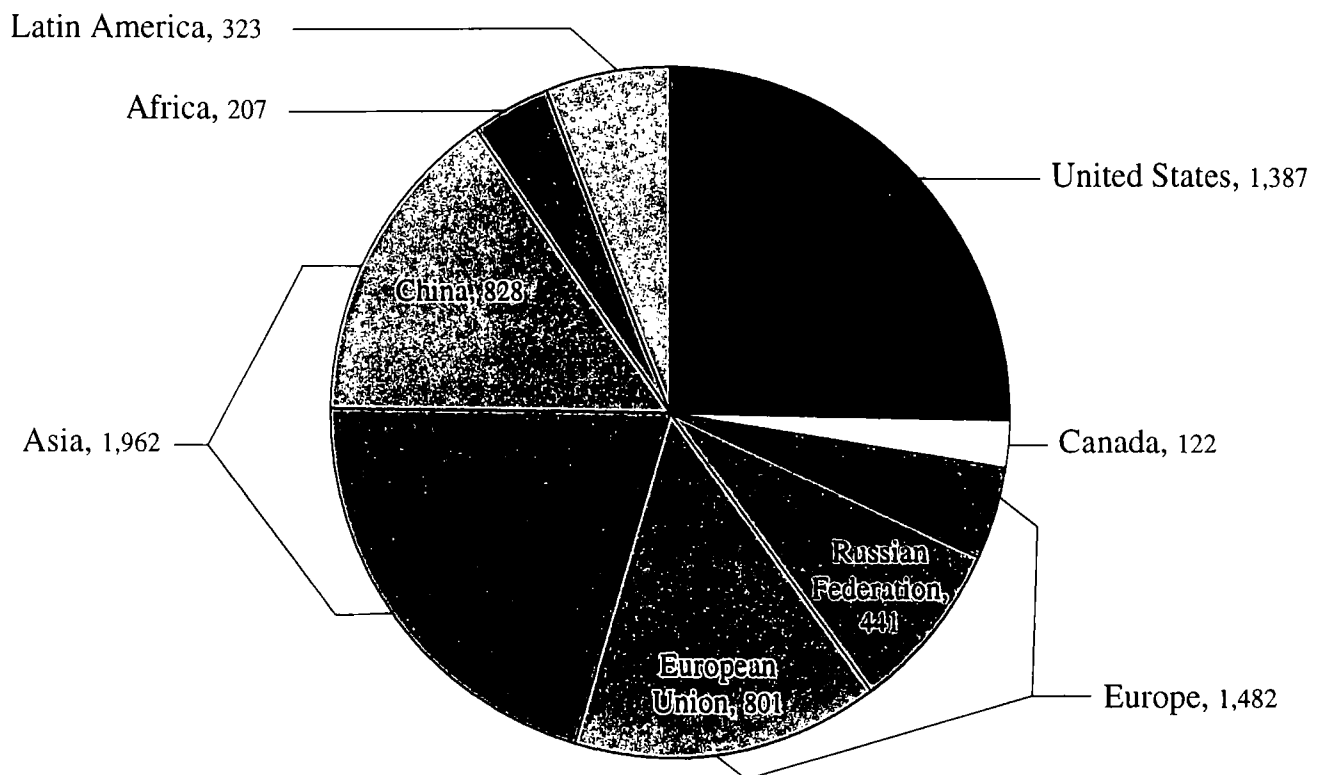
GDP, 1994



Sources: Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory; World Bank

Comparative Continental Carbon Emissions, 1994

Million Metric Tons



Source: Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory

7/22/97

GCC LDCs
PRINCIPALS

at table	
speaking	ARGENT
Tarullo	Wirth
T. Stern	Gibbons
Yellen	Podest
Babbitt	Lois Schifter
Fuerth	Rubin
Lang	F. Hanson
Kitty O'H.	Downey, Transp.
Raines	Atwood
B. Moller	Glickman
Shalala	Summer
Daley	

OT: 18 different agencies

Tim W.

By early Sept. want overall plan

Issues 1 by 1 discussed by principals

Tim Wirth Bio, Berlin, Geneva.

Byrd. Also coalition treats it as poison pill

L.S.

would be perspective. (i) 40 yrs. from now, 2/3 emissions from LDCs

cii) cheaper for them to reduce, than DCs.

But fairness is big constraint.

If same cuts imposed on rapidly-growing LDCs, the p of energy there >> DCs.
Need int. trade in permits.

In 2020, ^{roughly} \$ half billion = value of permits, to stabilize at 1990 levels.

Allocation a matter of tension. we favor market-based allocs, LDCs not.

some scope for J1

2 F just Annex 1 countries,
same pt. applies, x 1/2
(4250 b)

WB: 10% of GHG from subsidies in past (now probably less).

J4 Large transfers of money.

Atwood
AID

4: BEIMS, other LDCs, OPEC, island states

2-edged sword

we're increasing X to LDCs at 11-12% vs only 2-3%

to DCs. so getting along with LDCs important

KTR McG

we've proposed Annex B for advanced developing ^{voluntary} middle country

* Once country reaches certain income, have to accept full obligation

L.S.

Can't divorce how much we're asking LDCs from how much we are planning on doing, politically

Leon F

What's in it for countries to step forward even middle-income

Raines L2

J2. [Confused] Can't police world wide regulatory regime "command & control" so things in own interest.

Kitty O'H

job loss

Dan T.

policy proposals will have to withstand long-term scrutiny. Start with good policy.

then polit. constraints, first domestic. Last int.

(Dan T) cont. worth pursuing simpler less comprehensive strategies
e.g., elim. energy subsidies. unilaterally

(F Ramey) yes. start with a small number of countries. then increase later

(Moler) big e increases in other countries. We could reduce, but if other non-Annex 1 countries don't participate, we're dead.

(K T Mee) will ask consultants to help flesh out.

next wk: technology

This discussion is too calm.

we'll get a lot of

"selling out economy to China".

we have to be comfortable

with what Janet said.

(Gene) yes. Like on trade

(Leon) TDCs need capital. so that's leverage for conditioning it on clean tech.
(LS) premise is wrong. capital is plentiful.

(Glickman) Byrd probably isn't central of the problem.

(Tim W) Senate won't do it until yr. 2000, pres. elect. yr. ~~that's~~ time is on our side
Time frame for educating people.
Gene otherwise might not allow that.

**Climate change background paper on environmental measures
and economic competitiveness:
August 9, 1997**

There exist concerns that attempts to reduce carbon emissions will cause a marked deterioration in U.S. competitiveness. The "competitiveness" argument has at least two versions:

- Without specific developing country targets, U.S. industry will relocate abroad.
- Without specific developing country targets, the demand for U.S. energy-intensive goods will decline and the trade balance will deteriorate.

Before summarizing the literature, it is important to recognize factors that tend to militate against significant location or trade effects:

- Non-tradeable sectors account for a substantial share of carbon emissions. Transportation and buildings, for example, account for roughly two-thirds of U.S. emissions. For these sectors, the "competitiveness" argument seems largely irrelevant.
- In most manufacturing sectors, energy costs are a small percentage of total costs. According to the 1995 Annual Census of Manufactures, energy costs for manufacturing industries averaged just 2.2 percent of total costs. In electronic equipment (SIC code 36), for example, energy accounts for 1.2 percent of total costs. In instruments and related products (SIC code 38), energy also accounts for 1.2 percent of total costs. Given the small share of energy in total costs in most industries, differential shifts in the relative price of energy across countries are unlikely to have substantial effects on location decisions and trade flows. Another form of this argument notes that significant differentials in existing energy prices across countries do not seem to cause substantial movements in industries. The price of a barrel of heavy fuel oil in 1994, for example, was \$13.65 in the United States and \$5.06 in Venezuela.¹ Yet firms have not generally fled the United States for Venezuela.
- The burden of meeting an emission reduction target will be partially borne by non-participating countries because of changes mediated through international trade. For example, Annex I nations can be expected to demand less oil, shifting the terms of trade against oil-producing countries, and thereby forcing them to bear some of the costs of reducing greenhouse gases -- even if they do not formally participate in the international emissions reduction agreement.

The rest of this memorandum briefly summarizes the available literature on both forms of the competitiveness argument. The paucity of studies on climate change policies *per se*, especially on the subject of relocation, necessitates reliance on studies of environmental regulations more generally. Caution may therefore be warranted in applying these results to the climate change issue.

Firm location decisions

The first type of competitiveness argument is a form of the “pollution havens” hypothesis,² in which firms are tempted to relocate to (or to build new plants in) countries with lax environmental standards. The evidence, however, suggests that the pollution havens effect does not show up strongly: the costs of complying with environmental regulations are too small relative to other factors (labor costs, tax rates, infrastructure, etc.) to have much effect on firms’ location decisions.

- The literature review conducted by Jaffe, Peterson, Portney, and Stavins concludes that “We assess the evidence and find that there is little to document the view that environmental regulations have had a measurably adverse effect on competitiveness. Although the long-run social costs of environmental regulation may be significant, including adverse effects on productivity, studies attempting to measure the effect of environmental regulation on net exports, overall trade flows, and plant-location decisions have produced estimates that are small, statistically insignificant, or not robust to tests of model specification.”³
- Palmer, Oates, and Portney point out that (1) except for the biggest polluting industries, the costs of complying with environmental regulation is a small fraction of total cost, and are swamped by international differences in labor costs, capital costs, material costs, and exchange rate changes; (2) the differences between US environmental regulations and those of most major trading partners are not that big; and (3) US firms often build state-of-the art facilities abroad regardless of the host nation’s environmental regulations (this behavior makes sense if firms believe that tighter standards in developing countries are inevitable, and that better technology reduces the risks of major accidents like Bhopal).⁴
- Esty notes that “empirical studies have shown little propensity of pollution-intensive industries to move to ‘pollution havens’...Even in industries with high pollution control costs, companies often face other deterrents to relocations, including high fixed costs and sensitivity to transportation expenses.”⁵
- Dean writes that “More stringent regulations in one country are thought to result in loss of competitiveness, and perhaps industrial flight and the development of pollution havens. The many empirical studies which have attempted to test these hypotheses have shown no evidence to support them.”⁶
- Summers reaches the same conclusion: “costs of compliance with environmental regulations are generally not a sufficiently high fraction of total cost to be a crucial determinant of location...there is very little evidence of footloose polluting industries.”⁷

Studies of plant location decisions at the state level similarly conclude that “there is little direct evidence of a relationship between stringency of environmental regulations and plant location choices.”⁸ For example, separate studies by Bartik and Levinson both conclude that

plant location is not significantly affected by state-level environmental regulations.⁹

Some have taken the argument even further, arguing that more rigorous environmental standards make domestic firms *more* competitive because the regulations spur innovation.¹⁰ Many who find this extreme position unconvincing are nevertheless willing to accept that environmental regulations seem to have little effect on firm location decisions.¹¹

Trade flows

Even if firms do not move or build plants abroad, trade flows could still shift in response to environmental policies. But existing studies have generally concluded that the effects on trade of environmental regulations are not large. For example, Grossman and Krueger conclude that pollution abatement costs in the United States have had little effect on imports from Mexico or activity in the maquiladora sector.¹² Consistent with the lack of a significant negative relationship at the national level, states with higher-than-average pollution abatement spending apparently do not export less than other states.¹³

Trade balance effects

Standard trade theory suggests that an increase in the relative price of energy should have some adverse impact on exports of energy-intensive manufactures from the U.S., as from other Annex I countries. But this decline in energy-intensive manufactured exports may not expand the *trade deficit* for several reasons:

- There would likely be a fall in oil imports that would offset the decline in energy-intensive exports. Reduced dependence on foreign oil has both economic and political advantages.
- Trade theory suggests a *positive* effect on U.S. exports of goods that are *not* intensive in energy. Resources would be expected to flow from energy-intensive to other sectors.
- Technical reasons also suggest it may not be useful to look at the effect on the trade balance. An appendix discusses these issues.

In short, to assess competitiveness concerns, it is probably more meaningful to talk about adverse effects on specific, individual energy-intensive export sectors than to look at the impact on the trade balance or current account balance.

Climate change studies

Few studies have examined the specific impact on competitiveness of climate change policies per se. One study by McKibbin and Wilcoxon examined how a carbon tax of \$15 per ton applied in the United States alone, and in the United States and the OECD together, affected trade flows. They conclude that “our results suggest that a carbon tax would produce little redistribution of trade in either the short or long run.”¹⁴

A seemingly related literature has studied the magnitude of "leakage effects" -- that is, to what extent cuts in domestic emissions would be offset by shifts in production and therefore increases in emissions abroad. But the relationship between carbon leakage and competitiveness is complicated: a large carbon leakage figure may not imply a large decline in competitiveness, and a small carbon leakage figure need not imply the opposite. In any case, the carbon leakage literature has not reached any firm conclusions: Repetto and Austin report that studies of unilateral emissions reduction policies in OECD countries predict leakage rates of between 3.5 and 70 percent.¹⁵ Based on a review of the recent modeling efforts that produced dramatically different results, Thomas Rutherford's (University of Colorado) best guess is that carbon leakage is probably larger than 10 percent and less than 50 percent.¹⁶

Caveat

In sum, the related literatures suggest that carbon policies are unlikely to effect a massive shift of energy-intensive production abroad. At the same time, the empirical literature on the specific impact of carbon policies is sparse. And an important caveat to the general findings above is that for several industries, energy costs are a significant share of total costs. These industries are vulnerable, and there may be substantial adjustment costs. For example, in primary aluminum production (SIC 3334), energy accounts for 21.4 percent of total costs. In hydraulic cement (SIC 3241), energy accounts for 20.5 percent of total costs, while in inorganic chemicals (SIC 281), the share is 13.7 percent. And in other industries -- including the pulp and paper industry, and the steel industry -- energy is a significant input. In these industries, which account for perhaps 2 to 3 percent of total industrial output, the effects are expected to be more significant than those outlined above.

The Department of Energy commissioned a study by the Argonne National Laboratory to study the potential impact of possible carbon emission restrictions on energy-intensive industries.¹⁷ The study focused on six sectors: chemicals, petroleum refining, paper and allied products, iron and steel, aluminum, and cement. The general conclusion of the study was that "the policy constraints placed on these six large industries in developed countries, but not on their less developed trading partners, would result in significant adverse impacts on the affected industries."

The precise impact of climate stabilization policies on the most energy-intensive industries, however, is sensitive to how the policies are implemented. If an emissions permit trading system is created, for example, and the permits are auctioned, the funds from the auctions could be used to boost national saving. The increase in national saving would reduce real interest rates. That reduction in real interest rates would stimulate demand for consumer durables, new construction and business investment -- which would, in turn, boost demand for energy-intensive products such as cement, aluminum, and steel. A study using the DRI/McGraw Hill Inter-Industry Model thus suggests that depending on how the carbon emission reductions are achieved, the results of the Argonne study could be exaggerated.

Implications for the importance of LDC participation

It is important to note that even if competitiveness problems are not likely to prove as substantial in practice as some have asserted, the serious participation of developing countries in a global program to address climate change remains essential. The importance of developing country participation has more to do with the objective of reducing emissions than with competitiveness. Despite possible adverse competitiveness effects on a few energy-intensive industries, the economic costs for the United States associated with the absence of developing countries would overall be expected to be relatively small. But the environmental costs could be large: without the participation of the developing countries, whose emissions are expected to exceed the developed countries by the middle of the 21st century, little progress is possible in attenuating the impact of carbon emission on global climate change.

Conclusion

In sum, the related literatures suggest that carbon policies are unlikely to effect a massive shift of energy-intensive production abroad. At the same time, the empirical literature on the specific impact of carbon policies is sparse. And an important caveat to the general findings is that for several industries, energy costs are a significant share of total costs and therefore the effects may be more significant. Finally, the involvement of the developing economies is crucial to carbon reduction efforts not for economic reasons, but rather for environmental ones.

Appendix: Carbon emissions programs and the balance of payments

The impact of carbon emissions programs on the country's international accounts depends on the precise definition of the balance of payments: the current account balance or overall balance of payments could well move in the opposite direction of the merchandise balance or the balance on goods and services. The merchandise trade balance could very well improve in a system with international permit trading. This is a likely outcome if the U.S. and other industrialized countries buy emission permits from Russia, Ukraine, and other economically depressed countries. (If the U.S. turns out to be a net seller of permits, as is possible in the medium run if the Russian economy recovers, the effects would be reversed.)

Why might the trade balance be expected to improve? Imports of permits from Russia would likely not be counted as imports of merchandise, but would likely be counted on the broader measures of the balance of payments.¹⁸ Economists often term such transactions "international transfers." Such transfers, all else equal, reduce disposable income in the United States or other permit-buying countries, and raises disposable income in the recipient country. The first effect leads to a fall in imports into the U.S., and the second effect leads to a rise in exports to the recipient country. Thus both effects clearly work to narrow the trade deficit of the United States, and to expand the trade deficit (or narrow the trade surplus) of the recipient country. This illustrates the general principle that the trade balance is a highly misleading indicator of the effect on U.S. income or economic welfare.

Public attention tends to be more focussed on the trade balance, as it is the measure associated with output and employment. But the trade balance leaves out the outward transfers themselves. The effect on the overall current account, which adds in the transfers along with the balance on goods and services, would be more likely to be negative (as compared to the effect on the trade balance). But even the current account might improve, if carbon emissions programs were used to raise public saving, or if there were a flow of capital from the United States to developing countries.

Appendix: Other examples of environmental regulations and competitiveness

U.S. Investment in Mexico. Some detractors of NAFTA feared that U.S. industries would move to Mexico, attracted by looser environmental standards. But the facts suggest that such fears were unfounded. Overall, U.S. direct investment in Mexico from 1993 to 1996 grew about 14.5 percent. The share in Mexico peaked in 1994 at about 2.7 percent, but then the actual level of U.S. direct investment into Mexico fell in 1995.¹⁹

Mexico's share of U.S. FDI, pre- and post-NAFTA

1993	1996
2.7%	2.4%

The data show growth in U.S. direct investment into Mexico over the post NAFTA period, particularly in manufacturing (where growth has been about 22 percent). But this growth has not differed dramatically from the world as a whole -- where manufacturing FDI grew 23 percent over the same period. Even if the Mexico numbers are understated because of the peso devaluation, a generous upward adjustment doesn't change much.

Not only is Mexico's share changing little, but it has only a small share of total U.S. direct investment to begin with. The share of U.S. investment in Europe has remained relatively constant (about half) in the post-NAFTA period, and the share of U.S. investment in Asia and the Pacific has remained stable at about 18 percent. The top destination for U.S. FDI is still the United Kingdom, and its share remains at about 18 percent (the same as the whole of Latin America and Asia and the Pacific), while Canada has maintained 11 to 12 percent.

Japanese direct investment. Japan is one case where environmental regulation is thought to have had a noticeable relocation effect. Some polluting firms and activities have moved to Southeast Asia and Australia. Even in this case, however, environmental considerations appear to have been less important than other factors as causes of these investment flows -- rising prices in Japan for labor and land, other countries' barriers to Japanese exports, and general economic and political conditions in host countries.²⁰

Climate change, environmental costs, and U.S. "competitiveness"

August 9, 1997

There exist concerns that attempts to reduce carbon emissions will cause a marked deterioration in U.S. competitiveness. The "competitiveness" argument has at least two versions:

- Without specific developing country targets, U.S. industry will relocate abroad.
- Without specific developing country targets, the demand for U.S. energy-intensive goods will decline and the trade balance will deteriorate.

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- The burden of meeting an emission reduction target will be partially borne by non-participating countries because of changes mediated through international trade. For example, Annex I nations can be expected to demand less oil, shifting the terms of trade against oil-producing countries, and thereby forcing them to bear some of the costs of reducing greenhouse gases -- even if they do not formally participate in the international emissions reduction agreement.

The rest of this memorandum briefly summarizes the available literature on both forms of the competitiveness argument. The paucity of studies on climate change policies *per se*, especially on the subject of relocation, necessitates reliance on studies of environmental regulations more generally. Caution may therefore be warranted in applying these results to the climate change issue.

¹ *Statistical Abstract 1996*, Table 1359, Page 848.

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The first type of competitiveness argument is a form of the “pollution havens” hypothesis,² in which firms are tempted to relocate to (or to build new plants in) countries with lax environmental standards. The evidence, however, suggests that the pollution havens effect does not show up strongly: the costs of complying with environmental regulations are too small relative to other factors (labor costs, tax rates, infrastructure, etc.) to have much effect on firms’ location decisions.

- The literature review conducted by Jaffe, Peterson, Portney, and Stavins concludes that “We assess the evidence and find that there is little to document the view that environmental regulations have had a measurably adverse effect on competitiveness. Although the long-run social costs of environmental regulation may be significant, including adverse effects on productivity, studies attempting to measure the effect of environmental regulation on net exports, overall trade flows, and plant-location decisions have produced estimates that are small, statistically insignificant, or not robust to tests of model specification.”³
- Palmer, Oates, and Portney point out that (1) except for the biggest polluting industries, the costs of complying with environmental regulation is a small fraction of total cost, and are swamped by international differences in labor costs, capital costs, material costs, and exchange rate changes; (2) the differences between US environmental regulations and those of most major trading partners are not that big; and (3) US firms often build state-of-the-art facilities abroad regardless of the host nation’s environmental regulations (this behavior makes sense if firms believe that tighter standards in developing countries are inevitable, and that better technology reduces the risks of major accidents like Bhopal).⁴
- Esty notes that “empirical studies have shown little propensity of pollution-intensive industries to move to ‘pollution havens’...Even in industries with high pollution control costs, companies often face other deterrents to relocations, including high fixed costs and sensitivity to transportation expenses.”⁵

² The term was coined in Walter and Ugelow, “Environmental policies in developing countries,” *Ambio*, 8 (1979), 102-109.

³ Adam Jaffe, Steven Peterson, Paul Portney, and Robert Stavins, “Environmental Regulation and International Competitiveness: What Does the Evidence Tell Us?” Resources for the Future, Discussion Paper 94-08.

⁴ Karen Palmer, Wallace Oates, and Paul Portney, “Tightening Environmental Standards: The Benefit-Cost of the No-Cost Paradigm?” *Journal of Economic Perspectives* 9 (1995), 119-132.

⁵ Daniel Esty, *Greening the GATT*, Institute for International Economics, 1994, p. 159.

- Dean writes that “More stringent regulations in one country are thought to result in loss of competitiveness, and perhaps industrial flight and the development of pollution havens. The many empirical studies which have attempted to test these hypotheses have shown no evidence to support them.”⁶
- Summers reaches the same conclusion: “costs of compliance with environmental regulations are generally not a sufficiently high fraction of total cost to be a crucial determinant of location...there is very little evidence of footloose polluting industries.”⁷

Studies of plant location decisions at the state level similarly conclude that “there is little direct evidence of a relationship between stringency of environmental regulations and plant location choices.”⁸ For example, separate studies by Bartik and Levinson both conclude that plant location is not significantly affected by state-level environmental regulations.⁹

Some have taken the argument even further, arguing that more rigorous environmental standards make domestic firms *more* competitive because the regulations spur innovation.¹⁰ Many who find this extreme position unconvincing are nevertheless willing to accept that environmental regulations seem to have little effect on firm location decisions.¹¹

Trade flows

Even if firms do not move or build plants abroad, trade flows could still shift in response

⁶ Judith Dean, “Trade and the Environment: A Survey of the Literature,” in Patrick Low, editor, *International Trade and the Environment* World Bank Discussion Paper No. 159, 1992.

⁷ Larry Summers, “Foreword,” in Patrick Low, editor, *International Trade and the Environment*, World Bank Discussion Paper No. 159, 1992.

⁸ Adam Jaffe, Steven Peterson, Paul Portney, and Robert Stavins, “Environmental Regulation and International Competitiveness: What Does the Evidence Tell Us?” op. cit., page 23.

⁹ Timothy Bartik, “The Effects of Environmental Regulation on Business Location in the United States,” *Growth and Change*, 19 (1988), 22-44; Arik Levinson, *Environmental Regulations and Manufacturers’ Location Choices: Evidence from the Census of Manufactures* (Columbia University, 1992).

¹⁰ Michael Porter, “America’s Green Strategy,” *Scientific American*, August 1991.

¹¹ “When green is good,” *Economist*, November 20, 1993; Adam Jaffe et al., op. cit.; Palmer et al., op cit.

to environmental policies. But existing studies have generally concluded that the effects on trade of environmental regulations are not large. For example, Grossman and Krueger conclude that pollution abatement costs in the United States have had little effect on imports from Mexico or activity in the maquiladora sector.¹² Consistent with the lack of a significant negative relationship at the national level, states with higher-than-average pollution abatement spending apparently do not export less than other states.¹³

Trade balance effects

Standard trade theory suggests that an increase in the relative price of energy should have some adverse impact on exports of energy-intensive manufactures from the U.S., as from other Annex I countries. But this decline in energy-intensive manufactured exports may not expand the *trade deficit* for several reasons.¹⁴

¹² Gene Grossman and Alan Krueger, "Environmental Impacts of a North American Free Trade Agreement," in Peter Garber, ed., *The US-Mexico Free Trade Agreement* (MIT Press, 1992).

¹³ J. David Richardson, *Sizing Up U.S. Export Disincentives* (Institute for International Economics, 1993), pages 114-115.

¹⁴ Technical reasons also suggest why it may not be useful to look at the effect on the trade balance. The answer depends on the precise definition of the balance of payments: the current account balance or overall balance of payments could move in the opposite direction from the merchandise balance or the balance on goods and services. The merchandise trade balance could very well improve in a system with international permit trading. This is a likely outcome if the U.S. and other industrialized countries buy emission permits from Russia, Ukraine, and other economically depressed countries. (If the U.S. turns out to be a net seller of permits, as is possible in the medium run if the Russian economy recovers, the effects would be reversed.)

Why might the trade balance be expected to improve? Imports of permits from Russia would not be counted as imports of merchandise, but would be counted on the broader measures of the balance of payments. Economists often term such transactions international transfers. But the transfer reduces disposable income in the United States or other permit-buying countries, and raises disposable income in Russia. The first effect leads to a fall in imports into the U.S., and the second effect leads to a rise in exports to Russia. Thus both effects clearly work to increase the trade balance of the United States, and to decrease the trade balance of Russia. This illustrates the general principle that the effect on the trade balance is a highly misleading indicator of the effect on U.S. income or economic welfare.

Public attention tends to be more focussed on the trade balance, as it is the measure associated with output and employment. But it leaves out the outward transfers themselves. The effect on the overall current account, which adds in the transfers along with the balance on goods and services, would be more likely to be negative (as compared to the effect on the trade balance). This might in turn require a real depreciation of the dollar. But even the current account might improve, if federal

- There would likely be a fall in oil imports that would offset the decline in energy-intensive exports. Reduced dependence on foreign oil has both economic and political advantages.
- Trade theory suggests a *positive* effect on U.S. exports of goods that are *not* intensive in energy. Resources would be expected to flow from energy-intensive to other sectors.

In short, to assess competitiveness concerns, it is probably more meaningful to talk about adverse effects on some individual energy-intensive export sectors, than to look at the impact on the trade balance or current account balance.

U.S. Investment in Mexico

Some detractors of NAFTA feared US industries would move to Mexico, attracted by laxer environmental standards. To understand what has actually happened to US investment in Mexico pre- and post-Nafta, consider Mexico's share of U.S. Foreign Direct Investment (FDI). The historical cost data is collected by the Bureau of Economic Analysis and broken out by country and industry, relying primarily on book value.

Mexico share of U.S. FDI Pre-Nafta (1993)	Mexico share of U.S. FDI Post-Nafta (1996)
2.7%	2.4%

Overall, U.S. direct investment in Mexico from 1993 to 1996 grew about 14.5 percent. The share in Mexico peaked in 1994 at about 2.7 percent, but then the actual level of U.S. direct investment into Mexico fell in 1995. This fall suggests that the measurement method did not sufficiently adjust U.S. assets denominated in pesos. But adjusting the 1996 historical cost data upwards for Mexico by 30% (roughly the value of the real depreciation) only raises Mexico's share to 3% compared to 2.7% pre-NAFTA. Hardly a giant sucking sound.

The share of U.S. investment in Europe has remained relatively constant (about half) in the post-NAFTA period, and the share of U.S. investment in Asia and the Pacific has remained stable at about 18%. The top destination for U.S. FDI is still the United Kingdom, and its share remains at about 18 percent (the same as the whole of Latin America and Asia and the Pacific), while Canada has maintained 11-12%.

revenues were used to raise public saving, or if there were a flow of capital from the United States to developing countries.

The data show growth in U.S. direct investment into Mexico over the post NAFTA period, particularly in manufacturing (where growth has been about 22%). But this growth has not differed dramatically from the world as a whole where manufacturing grew 23% over the same period. Even if the Mexico numbers are understated because of the devaluation, a generous upward adjustment doesn't change much. In addition, not only is Mexico's share changing little, but it has only a small share of total U.S. direct investment to begin with.

One could argue that the figures on US direct investment in Mexico in 1995 were depressed by the peso crisis, and thus do not reflect the effects of NAFTA. But U.S. direct investment flows to Mexico as a percentage of all direct investment flows to Mexico were smaller in 1995 than in 1993 (64% vs. 72%). Again, no sucking sound.

Japanese direct investment

Japan is one case where environmental regulation is thought to have had a noticeable relocation effect. Some polluting firms and activities have moved to Southeast Asia and Australia. Even in this case however, environmental considerations appear to have been less important than other factors as causes of these investment flows -- rising prices in Japan for labor and land, other countries' barriers to Japanese exports, and general economic and political conditions in host countries.¹⁵

Climate change studies

Few studies have examined the specific impact on competitiveness of climate change policies per se. One study by McKibbin and Wilcoxon examined how a carbon tax of \$15 per ton applied in the United States alone, and in the United States and the OECD together, affected trade flows. They conclude that "our results suggest that a carbon tax would produce little redistribution of trade in either the short or long run."¹⁶

A related literature has studied the magnitude of "leakage effects" -- that is, to what extent cuts in domestic emissions would be offset by shifts in production and therefore increases in emissions abroad. This literature has not reached any firm conclusions: Repetto and Austin report that studies of unilateral emissions reduction policies in OECD countries predict leakage rates of between 3.5 and 70 percent.¹⁷ Based on a review of the recent modeling efforts that produced

¹⁵ Pages 26-29 in Jeffrey Frankel and Shang-Jin Wei, "ASEAN in a Regional Perspective," Pacific Basin Working Paper Series NO. PB96-02, Federal Reserve Bank of San Francisco, August.

¹⁶ Warwick McKibbin and Peter Wilcoxon, "Environmental Policy and International Trade," Brookings Discussion Papers in International Economics, October 1995, page 2.

¹⁷ Robert Repetto and Duncan Austin, *The Costs of Climate Protection: A Guide for the Perplexed*, World Resources Institute, 1997, page 31.

dramatically different results, Thomas Rutherford's (University of Colorado) best guess is that carbon leakage is probably larger than 10 percent and less than 50 percent.¹⁸

Among non-Annex I nations, the Australian government projects that South Korea and China will experience economic benefits under medium-term carbon policies.¹⁹ South Korea is a net exporter in fossil fuel intensive products (mainly iron and steel) to Annex I nations. Its exports contribute around 28 percent of GDP. Producers in South Korea could gain a comparative advantage in these markets given an Annex I-only policy.²⁰ A similar story is projected for China. India and Brazil, are not predicted to gain because the availability of capital is reduced as income in Annex I nations falls, and it becomes more costly to import from Annex I nations the key capital goods that promote growth (e.g., machinery and transportation equipment).

Caveat

In sum, the related literatures suggest that carbon policies are unlikely to effect a massive shift of energy-intensive production abroad. At the same time, the empirical literature on the specific impact of carbon policies is sparse. And an important caveat to the general findings above is that for several industries, energy costs are a significant share of total costs. These industries are vulnerable, and there may be substantial adjustment costs. For example, in primary aluminum production (SIC 3334), energy accounts for 21.4 percent of total costs. In hydraulic cement (SIC 3241), energy accounts for 20.5 percent of total costs, while in inorganic chemicals (SIC 281), the share is 13.7 percent. And in other industries -- including the pulp and paper industry, and the steel industry -- energy is a significant input. In these industries, which account for perhaps 2 to 3 percent of total industrial output, the effects are expected to be more significant than those outlined above.

The Department of Energy commissioned a study by the Argonne National Laboratory to study the potential impact of these restrictions on energy intensive industries.²¹ The study focused on six

¹⁸Thomas Rutherford, "International Competitiveness and National Plans," University of Colorado, 1995.

¹⁹Stephen Brown et al., *The Economic Impact of International Climate Change Policy*, Australian Bureau of Agricultural and Resource Economics (ABARE), 1997.

²⁰South Korea's gain is also projected by Paul Bernstein, W. David Montgomery, and Thomas Rutherford, *World Economic Impacts of US Commitments to Medium Term Carbon Emission Limits*, Charles River Assoc. Prepared for the American Petroleum Institute.

²¹Ronald J. Sutherland, "The Impact of Potential Climate Change Commitments on Energy Intensive Industries: A Delphi Analysis," Argonne National Laboratory, 5 February 1997.

sectors: chemicals, petroleum refining, paper and allied products, iron and steel, aluminum, and cement. The study assumed the prices of fossil fuels increased based on their carbon content: boosting electricity rates by slightly more than 50 percent from the year 2000 to 2010, tripling coal prices, increasing natural gas charges by about 80 percent, and increasing fuel oil costs between 70 and 90 percent.

The Argonne lab set up six working groups, one for each of the sectors, consisting of eight or nine experts, including representatives from the industry, trade associations, environmental groups, academe, the financial community, labor unions, and the government. The general conclusion of the study was that "the policy constraints placed on these six large industries in developed countries, but not on their less developed trading partners, would result in significant adverse impacts on the affected industries."

Implications for the importance of LDC participation

Nothing in this paper is meant to imply that it is not important to have serious participation of developing countries in a global program to address climate change. To the contrary, such participation is essential. But the main reasons lie with the objective of reducing emissions -- concerns over "leakage" and free-riding. Despite possible serious adverse competitiveness effects on a few energy-intensive industries, the economic costs for the United States associated with the absence of developing countries would overall be expected to be relatively small.



United States Department of State

*Bureau of Oceans and International
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Attached please find a draft paper on developing countries for consideration at the principals' meeting this Friday. We have scheduled a meeting on Wednesday, July 16, at the State Department from noon to 1:00 p.m. in Room 7835 to discuss it. For entry into the building, please contact Ms. Debra Clark-Ware on 202-647-2232.

If you are unable to attend the meeting, we ask that you send us your comments no later than COB, tomorrow, July 16, 1997. The fax number is 202-647-0217. If you have any questions about the paper, please contact Dr. Jonathan Pershing on 202-647-4069.

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DEVELOPING COUNTRY PAPER (DRAFT 7/15/97)

Greenhouse gases are emitted by all countries in varying quantities. The United States is the world's largest emitter, with approximately 22 percent of the global total. Collectively, the developed countries of the world, including the countries with economies in transition (Russia/NIS and Eastern Europe) account for more than 60 percent of the global total. However, developing country emissions are growing much more rapidly than those in the industrialized world; within the next 30 years, developing country emissions will comprise more than half of the world's aggregate emissions although they will account for 80 percent of global population.

While compelling in suggesting the need for global action, these statistics obscure a critical point: per capita emission levels vary widely as do national totals, and developing countries have the lowest levels. Currently, global average emissions of CO₂ are approximately 4 tons per person; this contrasts with emissions of nearly 20 tons per person in the United States, 16 tons per person in the OECD, and less than two tons per person in most of the developing world. Furthermore, the contribution to global concentrations of greenhouse gases is the result of cumulative emissions over time. When considered from this vantage, North America is responsible for 35 percent of the increase in ambient concentrations of CO₂ since 1800, Western Europe 26 percent, the USSR/FSU and Eastern Europe nearly 20 percent; the combined total of the developing countries is only about 15 percent. (see figures/charts).

Recognizing both the unequal contribution to global emissions, and the unequal capacity to develop and implement policies and measures to reduce emissions, the United Nations Framework Convention on Climate Change (FCCC) established differentiated levels of commitments for developed and developing countries. It called upon developed countries to take the lead in addressing the climate change problem, and to aim to return emissions to 1990 levels; it provided no similar aim for the developing country Parties. Similarly, in agreeing on the mandate for negotiations of a next step, the Parties recognized that developed countries had failed to "lead" over the three years after the FCCC was signed in Rio in 1992, a period during which developed country emissions continued to rise. The next step therefore focused on a more concerted effort by developed countries toward reducing the rising trend in atmospheric concentrations. Thus, while calling on developed countries to set "quantified emissions limitation and reductions objectives" and to elaborate policies and measures to reduce emissions, the mandate specifically stated that there would be no new commitments for developing countries, and that they would instead continue to advance the implementation of their existing commitments.

U.S. Protocol Proposal

Recognizing the need for a solution that involves all countries, yet agreeing that the Berlin Mandate appropriately acknowledges valid differences between Parties, the U.S. draft protocol proposal sought to develop a set of appropriate elements for a developing country strategy. It included three elements: (1) an elaboration of the existing commitments (defining what would be meant by "continuing to advance the implementation of existing commitments"); (2) establishing a new category (Annex B) of commitments for the most advanced developing countries (providing a halfway house between a limited obligation and the more extensive obligations agreed by the OECD members); and (3) calling for the negotiation of a new

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agreement by 2005 which would include legally binding emissions targets for all countries, including developing countries (the "evolution" concept).

The first element contained three separate components, including a requirement to annually inventory and report on emissions and actions taken to reduce emissions; (2) taking "no regrets" actions (actions which would benefit the climate system, but which might be taken for other economic or environmental reasons); and (3) calling for an in-depth review process so that the actions taken by developing countries could be assessed by a neutral group and examined for adequacy.

While the first of the U.S. elements is considered within the ambit of the Berlin Mandate by nearly all Parties to the FCCC, to date, most other countries have argued that the other two (i.e., Annex B and evolution) are beyond its scope. The U.S. has been urged to drop its proposal for a new annex (with many countries suggesting that the annex concept be revisited in light of the revision to the existing groupings in the Convention, scheduled for 1998). We have also been urged to drop our proposal for evolution (in favor of a separate agreement at some future date).

Incentives for Developing Country Participation

While a combination of peer pressure and self-interest may guide the willingness of developing countries to commit themselves to legally binding obligations to reduce emissions, a series of incentives may facilitate this choice. To this end, the Administration has established a number of elements in its developing country approach (both within the draft protocol proposal - but more significantly outside the agreement). These include: a strong bilateral assistance program; an ongoing commitment to providing a contribution to the Global Environment Facility (designed to support the incremental global benefit of development projects); calls for reorienting the loan guidelines for the international lending institutions; and the establishment of a proposal for joint implementation (which would encourage the private sector to undertake projects in developing countries to reduce emissions and claim credit for these reductions against a domestic obligation).

The first of these, announced in the President's New York statement at the U.N. Special Session on the Environment, establishes a \$1 billion, five-year package to help developing countries plot a climate friendly path to development. The primary component of this initiative will be a five year minimum of at least \$150 million per year in bilateral assistance for climate related programs, and the potential to use development credits dedicated to climate friendly investment projects. The initiative will also include a \$25 million 5-year interagency program to assist developing countries to meet the terms of the FCCC. A significant focus in this initiative will be on using credit tools to induce greater U.S. private sector involvement in transferring climate friendly technologies.

Our financial contribution to the GEF was one of the original incentives to developing countries to support the FCCC - and to take action to mitigate climate change. However, while the U.S. had pledged a contribution of \$430 million to the GEF over a three year period, Congressional funding has lagged considerably. FY96 contributions were at \$35 million rather than \$110 million and FY97 prospects are just about as bleak. To date, we have no proposals within the Administration to cover our previous pledged amounts. In combination with the steadily declining percentage of the U.S. budget that is directed toward development assistance, the reduced U.S. contribution to the GEF will make any subsequent calls for developing country action much more difficult to sustain.

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One of the most significant elements of the U.S. approach to encourage developing country participation is joint implementation (JI). Similar to the concept of emissions trading, JI allows countries to offset emissions at home through projects undertaken elsewhere. However, unlike the situation in emissions trading, under a JI regime, projects could be undertaken in developing countries – countries without legally binding emissions budgets. The analytic work performed to date suggests that allowing JI could reduce costs within the U.S. substantially. Emissions trading could reduce costs by as much as 40 percent. JI could reduce costs by another 50% – or by as much as 80 percent below costs in systems which did not allow trading or JI. Developing countries see enormous benefits as well, in the form of technology transfer and private sector investment flows. In spite of the potential benefits, significant opposition remains: developing countries are concerned at the loss of control over domestic emissions; environmentalists are concerned that it may be impossible to measure project based emission reductions, and some in the private sector and Congress have suggested that JI will result in significant transfers of wealth overseas.

The International Reception: Views on Developing Countries by Negotiating Blocs

Other countries have had a varied reaction to the U.S. proposals on developing country engagement in the process. The following blocs are active in the negotiations, and provide a sense of the current dynamics in the process.

European Union. While calling for an extremely aggressive commitment from developed countries (15 percent reduction in emissions below 1990 levels by 2010) the EU has proposed only very soft commitments on developing countries. They have supported U.S. proposals for elaborating commitments in the FCCC Article 4.1, and have proposed that Mexico and Korea commit to the same obligations as those in the OECD (not too far removed in substance from the U.S. Annex B), but are not prepared to accept the U.S. language on "Evolution" adopted as part of the Kyoto agreement. They do not support JI with developing countries.

Non-EU OECD Members (principally Japan, Canada, Australia). This group of countries broadly supports including developing country obligations under the Kyoto Agreement. Australia and Canada are the most vocal in support of action, while Japan, as host of the December session, is concerned that an aggressive approach would potentially derail the negotiations. As nearly all countries in this bloc have extensive competitive trade outside of the OECD, they are more aggressive in demanding developing country action (For comparative purposes, nearly 90 percent of EU trade is within the OECD, while for Australia, it is only about 50 percent.) With the exception of Japan, this group supports JI.

Big Developing Countries (China, India and Brazil). These three countries are the primary drivers of the developing country position – and some of the world's largest emitters (China is second after the U.S., and India is number six). These countries have taken a standard north-south line, arguing that global warming has been caused by the developed world, and calling upon the industrialized countries to pay for the clean-up. They claim that when developing countries have incomes and per capita emissions equal to those of the North, they will then participate in the clean-up effort. In spite of their often strident public rhetoric, these countries (particularly China and Brazil) have shown a willingness to constructively engage on this issue on a bilateral basis. They have active domestic climate change mitigation efforts, and have privately indicated a support for many elements of the U.S. proposal. However, they have all opposed JI.

OPEC. Well organized in the climate negotiations, the OPEC countries have been led by Saudi Arabia and Nigeria, and advocate positions designed to slow or block the negotiations.

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These countries have strongly urged: (1) that developing countries should not have to act now (recognizing that this is antithetic to the U.S. view and will therefore help derail negotiations), and (2) that industrialized countries should compensate developing countries that might be affected by any action taken in industrialized countries to reduce emissions (principally noting that reduction in oil revenues should be compensated). This group has also created procedural barriers to reaching agreement (including blocking the adoption of rules of procedure); this last tactic may require any agreement be by consensus in Kyoto – and allow OPEC countries to block at the end.

Small Island States. A group of 37 small island states have banded together to create an alliance (AOSIS) that seeks to balance OPEC's influence. Largely composed of member countries with low lying territory which will be gradually inundated by climate- associated sea level rise, these countries have pushed an aggressive next steps to combat the problem – calling for a 20 percent reduction in industrialized country emissions below 1990 levels by the year 2005. Unfortunately, despite their convictions, they are often quelled by the big developing countries and by OPEC – so that their moral righteousness is often muted in public debates. Thus, in spite of a recognition that to solve the problem, all countries must participate, the AOSIS countries have been reluctant to support U.S. calls for developing country action; their proposal omits any mention of any developing country commitments to be undertaken as part of the Kyoto agreement, and they oppose II.

NIS/FSU. While active in some elements of the negotiations (e.g., emissions trading), this group has been relatively silent on the issue of developing countries. Russia has a proposal similar to that of the U.S. on evolution – but they have not been particularly vocal on this position. They have supported II.

Other Countries. Playing mostly lesser roles in the negotiating process, the influence of these countries is more a function of individual personalities than institutional positions. These countries may be individually persuaded by elements of the U.S. position (and will occasionally voice public support for these), but most of the positions are driven by internal G-77 politics – largely dominated by the more organized OPEC group, or by the large and dominant big countries. The formal G-77 position on developing country obligations has been to deny any obligation to act under the Kyoto agreement, to insist that developed countries transfer to developing countries appropriate technologies and resources, and to call for compensation, and to date, to oppose II.

The Domestic Debate: Congress, the Private Sector and the Environmental Community

While for the majority of the deliberations under the FCCC, the issue of developing countries had taken a back seat to the establishment of a target and timetable, it has more recently moved to the fore. For most observers, the issue seems to have been created as a red herring to derail the negotiating process. Certain industry lobbies opposed to any action to address climate change have parlayed their message on developing countries into Congressional objections, full-page newspaper advertisements, and international consternation.

Those concerned with developing country participation have pointed to two principal rationales for action: (1) that the problem cannot ultimately be solved without developing country participation, and (2) that any action we take, if not balanced by equal developing country commitments, will have an immediate, significant and negative impact on our competitiveness. While there is some grain of truth in both arguments, neither is fully supported by an analysis of the U.S. proposal. On the first, the U.S. draft protocol language does not envision a lengthy gap between developed and developing country commitments, and recognizes

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that the international negotiations at this stage will never stand for a concurrent commitment in light of the enormous disparity in per capita emissions, per capita income and historic contribution to the problem. On the latter, the level of action likely to be called for is anticipated to be so low as to be of limited value in reducing global emissions – but also too low to significantly effect international competitiveness. While more stringent reductions might have this effect, any such future reduction obligations would be anticipated to cover all countries.

Notwithstanding these arguments, opponents to the treaty have persuaded many that the developing country issue is adequate reason not to act now. Senator Robert Byrd (with more than 60 co-sponsors) has proposed a sense of the Senate resolution which warns the Administration that the Senate will not provide advice and consent to ratification of any agreement that does not call for and adopt new scheduled developing country commitments in the same time period as those adopted by developed countries. The Global Climate Coalition (made up of the coal companies, the coal-fired utilities and many in the manufacturing sector) has set forward a similar – albeit more rhetorically strident – position. They have actively sought to delay, postpone or derail negotiations since they began. The environmental community, strongly supportive of the developed countries acting first, has yet to make a clear and cogent case for this view – and has been unable to persuade many in the Senate of its validity.

Getting to Yes: Agreement in Kyoto

An agreement in Kyoto that accommodates the current U.S. developing country position (which while considerably more stringent than that of any other country is substantially less stringent than that demanded by the Senate) will be extremely difficult to achieve. The next scheduled negotiations (July 28-August 7) will not resolve any of the developing country questions, absent some change in the U.S. position. However, we can anticipate that the meeting will be a difficult one in which U.S. intent to seriously address the climate change problem will be fundamentally questioned. Reports (similar to those that surrounded the Denver Summit and the New York UN session) will be repeated. To avoid another repetition in October (at the last officials level negotiations prior to the Kyoto meeting), a number of steps should be taken – although even these do not guarantee success in December.

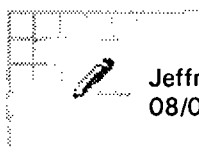
- 1) It will be necessary to continue an intensive diplomatic campaign to convince other countries of the appropriateness of our views – and the fact that we will “walk away” from an agreement which does not adequately cover our developing country concerns. Such an effort must proceed at all levels, from the staff level to the cabinet; to be successful, it must ultimately include both the President and Vice President. Calls to key players in each of the international blocs will be necessary to persuade – and ultimately to exhort – to join in on the U.S. position. A possible pitfall here is that some developing countries may not want an agreement yet – not only OPEC, but China may choose to let us take the heat for derailing negotiations.
- 2) It will be necessary to reach a domestic agreement on the level and timeframe of a target which would be acceptable to us – and it must be sufficiently progressive to convince other countries we are serious about the problem – and therefore “entitled” to demand more from developing countries. A signal of the direction in which we intend to move must be given as soon as possible. If no signal is provided by July (at the next negotiating session), we will begin to see elements of the U.S. position – particularly our developing country positions – removed from the table.
- 3) It will be necessary to compromise with others – particularly developing countries. This will necessitate giving up or postponing some of our most cherished ideas. We may need to be

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6

flexible in the timing of various actions (e.g., JI might be postponed until 2005 in order to be included in the agreement, or we might delay beyond 2005 in agreeing on a new legal instrument). It will be difficult to know where the final "deal" is until the end of the day - December in Kyoto.

- 4) Developing countries must be mollified. This will be particularly difficult in light of the U.S. inability to pay our pledged contribution to the Global Environment Facility. Persuading developing countries that they must engage in next steps while at the same time denying them financial support to help them undertake these steps will be nearly impossible. An aggressive effort must be mounted to support the GEF replenishment, and to seek Congressional support for paying off our earlier pledge. The President's announcement of the \$1 billion initiative may also be viewed with considerable skepticism internationally - as it largely involves reprogramming of existing funds (a factor which will not be well-received by many in the developing country community) and the fact that we do not yet have a clear view on how the funds will be distributed. However, properly packaged, it could provide an enormous boost.
- 5) Of the U.S. developing country proposals, the most difficult to obtain will be agreement on "evolution" (the commitment from all parties to negotiate a next step with legally binding obligations, including for developing countries, by 2005. Nearly as hard will be getting agreement for the creation of a new category to allow countries to "graduate" from the ranks of developing to developed. To get the international agreement will ultimately require high level contact and arm-twisting; no amount of technical or scientific support for the U.S. position will be persuasive. Given the enormous importance attached to the developing country commitments in Kyoto, decisions will need to be made (probably at the cabinet level) on what negotiating flexibility might be given to the U.S. delegation on these issues.



Jeffrey A. Frankel
08/04/97 03:10:41 PM

Record Type: Record

To: Jason Shogren/CEA/EOP

cc:

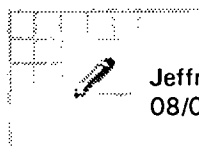
Subject: Re: trade paper

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08/04/97 08:30:52 AM



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COMPET~1.DOC

janet and jeff

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jay

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Short literature summary on environmental costs and U.S. "competitiveness"

4 August 1997

People are often concerned that attempts to reduce carbon emissions will cause a marked deterioration in U.S. competitiveness. The "competitiveness" argument has at least two versions:

- Without specific developing country targets, U.S. industry will relocate abroad.
- Without specific developing country targets, the demand for U.S. energy-intensive goods will decline and the ~~current account~~ ^{trade} balance will deteriorate.

Before summarizing the literature, it is important to recognize factors that tend to militate against significant location or trade effects:

- Non-tradeable sectors account for a substantial share of carbon emissions. Transportation and buildings, for example, account for roughly two-thirds of U.S. emissions. For these sectors, the "competitiveness" argument seems largely irrelevant.
- In most manufacturing sectors, energy costs are a small percentage of total costs. According to the 1995 Annual Census of Manufactures, energy costs for manufacturing industries averaged just 2.2 percent of total costs. In electronic equipment (SIC code 36), for example, energy accounts for 1.2 percent of total costs. In instruments and related products (SIC code 38), energy also accounts for 1.2 percent of total costs. Given the small share of energy in total costs in most industries, differential shifts in the relative price of energy across countries are unlikely to have substantial effects on location decisions and trade flows. Another form of this argument notes that significant differentials in existing energy prices across countries do not seem to cause substantial movements in industries. The price of a barrel of heavy fuel oil in 1994, for example, was \$13.65 in the United States and \$5.06 in Venezuela.¹ Yet firms have not generally fled the United States for Venezuela.
- The burden of meeting an emission reduction target will be partially borne by non-participating countries because of the changes mediated through international trade. For example, Annex I nations may demand fewer exports from non-participating countries, shifting the terms of trade against these countries, and thereby forcing them to bear some of the costs of reducing greenhouse gases -- even if they do not formally participate in the international emissions reduction agreement.

The rest of this memorandum briefly summarizes the available literature on both forms of the competitiveness argument. The paucity of studies on climate change policies *per se*, especially on the subject of relocation, necessitates reliance on studies of environmental regulations more generally. Caution may therefore be warranted in applying these results to the climate change issue.

Firm location decisions

Shouldn't this point be made separately below (cheaper oil)?
As Peter did earlier.

[OPEC, right?]

does not show up strongly

The first type of competitiveness argument is a form of the "pollution havens" hypothesis,² in which firms are tempted to relocate to (or to build new plants in) countries with lax environmental standards. The evidence, however, suggests that the pollution havens effect hypothesis has little empirical support: the costs of complying with environmental regulations are too small relative to other factors (labor costs, tax rates, infrastructure, etc.) to have much effect on firms' location decisions.

- The literature review conducted by Jaffe, Peterson, Portney, and Stavins concludes that "We assess the evidence and find that there is little to document the view that environmental regulations have had a measurably adverse effect on competitiveness. Although the long-run social costs of environmental regulation may be significant, including adverse effects on productivity, studies attempting to measure the effect of environmental regulation on net exports, overall trade flows, and plant-location decisions have produced estimates that are small, statistically insignificant, or not robust to tests of model specification."³
- Palmer, Oates, and Portney point out that (1) except for the biggest polluting industries, the costs of complying with environmental regulation is a small fraction of total cost, and are swamped by international differences in labor costs, capital costs, material costs, and exchange rate changes; (2) the differences between US environmental regulations and those of most major trading partners are not that big; and (3) US firms often build state-of-the art facilities abroad regardless of the host nation's environmental regulations (this behavior makes sense if firms believe that tighter standards in developing countries are inevitable, and that better technology reduces the risks of major accidents like Bhopal).⁴
- Esty notes that "empirical studies have shown little propensity of pollution-intensive industries to move to 'pollution havens'...Even in industries with high pollution control costs, companies often face other deterrents to relocations, including high fixed costs and sensitivity to transportation expenses."⁵
- Dean writes that "More stringent regulations in one country are thought to result in loss of competitiveness, and perhaps industrial flight and the development of pollution havens. The many empirical studies which have attempted to test these hypotheses have shown no evidence to support them."⁶
- Summers reaches the same conclusion: "costs of compliance with environmental regulations are generally not a sufficiently high fraction of total cost to be a crucial determinant of location...there is very little evidence of footloose polluting industries."⁷

Studies of plant location decisions at the state level similarly conclude that "there is little direct evidence of a relationship between stringency of environmental regulations and plant location choices."⁸ For example, separate studies by Bartik and Levinson both conclude that plant location is not significantly affected by state-level environmental regulations.⁹

refs: Yue (1994)
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Australian report

[Leaves out polluting activities that have moved from J to SE Asia & Australia.]

Some have taken the argument even further, arguing that more rigorous environmental standards make domestic firms *more* competitive because the regulations spur innovation.¹⁰ Many who find this extreme position unconvincing are nevertheless willing to accept that environmental regulations have little effect on firm location decisions.¹¹

Trade flows

Even if firms do not move or build plants abroad, trade flows could still shift in response to environmental policies. But existing studies have generally concluded that environmental regulations have little effect on trade. For example, Grossman and Krueger conclude that pollution abatement costs in the United States have had little effect on imports from Mexico or activity in the maquiladora sector.¹² Consistent with the lack of a significant negative relationship at the national level, states with higher-than-average pollution abatement spending apparently do not export less than other states.¹³

U.S. Investment in Mexico

Recall some people argued against Nafta because they feared US industries would move to Mexico because of its laxer environmental standards. To better understand what has actually happened to US investment in Mexico pre- and post-Nafta, consider Mexico's share of U.S. Foreign direct investment (FDI) with other countries, and also compare "historical cost" growth rates. The historical cost data is collected by the Bureau of Economic Analysis and broken out by country and industry, relying primarily on book value.

Mexico share of U.S. FDI Pre-Nafta (1993)	Mexico share of U.S. FDI Post-Nafta (1996)
2.7%	2.4%

Overall, U.S. direct investment in Mexico from 1993 to 1996 grew about 14.5 percent. The share in Mexico peaked in 1994 at about 2.7 percent, but then the actual level of U.S. direct investment into Mexico fell in 1995. This fall suggests that the measurement method did not sufficiently adjust U.S. assets denominated in pesos. But adjusting the 1996 historical cost data upwards for Mexico by 30% (roughly the value of the real depreciation) only raises Mexico's share to 3% compared to 2.7% pre-Nafta. Hardly a giant sucking sound.

The share of U.S. investment in Europe has remained relatively constant (about half) in the post-NAFTA period, and the share of U.S. investment in Asia and the Pacific has remained stable at about 18%. The top destination for U.S. FDI is still the United Kingdom, and its share remains at about 18 percent (the same as the whole of Latin America and Asia and the Pacific), while Canada has maintained 11-12%.

shares

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The data show growth in U.S. direct investment into Mexico over the post NAFTA period, particularly in manufacturing (where growth has been about 22%). But this growth has not differed dramatically from the world as a whole where manufacturing grew 23% over the same period. Even if the Mexico numbers are understated because of the devaluation, a generous upward adjustment doesn't change much. Finally, not only is Mexico's share changing little, but it has only a small share of total U.S. direct investment to begin with.

Climate change studies

Few studies have examined the specific impact of climate change policies. One study by McKibbin and Wilcoxon examined how a carbon tax of \$15 per ton applied in the United States alone, and in the United States and the OECD together, affected trade flows. They conclude that "our results suggest that a carbon tax would produce little redistribution of trade in either the short or long run."¹⁴

A related literature has studied the magnitude of "leakage effects" -- that is, to what extent cuts in domestic emissions would be offset by shifts in production and therefore increases in emissions abroad. This literature has not reached any firm conclusions: Repetto and Austin report that studies of unilateral emissions reduction policies in OECD countries predict leakage rates of between 3.5 and 70 percent.¹⁵ Based on a review of the recent modeling efforts that produced dramatically different results, Thomas Rutherford's (University of Colorado) best guess is that carbon leakage is probably larger than 10 percent and less than 50 percent.¹⁶

Among non-Annex I nations, the Australian government projects that South Korea and China will experience economic benefits under medium-term carbon policies.¹⁷ South Korea is a net exporter in fossil fuel intensive products (mainly iron and steel) to Annex I nations. Their exports contribute around 28 percent of GDP. Producers in South Korea could gain a comparative advantage in these markets given an Annex I-only policy.¹⁸ A similar story is projected for China. India and Brazil, are not predicted to gain because the availability of capital is reduced as income in Annex I nations falls, and it becomes more costly to import from Annex I nations the key capital goods that promote growth (e.g., machinery and transportation equipment).

Caveat

In sum, the related literatures suggest that carbon policies are unlikely to effect a massive shift of energy-intensive production abroad. At the same time, the empirical literature on the specific impact of carbon policies is sparse. And an important caveat to the general findings above is that for several industries, energy costs are a significant share of total costs. These industries ~~may be~~ are vulnerable, and there may be substantial adjustment costs. For example, in primary aluminum production (SIC 3334), energy accounts for 21.4 percent of total costs. In hydraulic cement (SIC 3241), energy accounts for 20.5 percent of total costs, while in inorganic chemicals (SIC 281), the share is 13.7 percent. And in other industries -- including the pulp and

paper industry, and the steel industry -- energy is a significant input. In these industries, which account for perhaps 2 to 3 percent of total industrial output, the effects ~~may~~ be more significant than those outlined above.

are expected to

DOE's Argonne Study

The Department of Energy commissioned a study by the Argonne National Laboratory to study the potential impact of these restrictions on energy intensive industries.¹⁹ The study focused on six sectors: chemicals, petroleum refining, paper and allied products, iron and steel, aluminum, and cement. The study assumed that the price of fossil fuels ~~are~~ increased based on their carbon content: boosting electricity rates by slightly more than 50 percent from the year 2000 to 2010, tripling coal prices, increasing natural gas charges by about 80 percent, and increasing fuel oil costs between 70 and 90 percent.

The Argonne lab set up six working groups, one for each of the sectors, consisting of eight or nine experts, including representatives from the industry, trade associations, environmental groups, academe, the financial community, labor unions, and the government. The general conclusion of the study was that "the policy constraints placed on these six large industries in developed countries, but not on their less developed trading partners, would result in significant adverse impacts on the affected industries."

Need to emphasize that
it is important to have LDCs
in, for other reasons.

(As in earlier notes from July, but more so.)

Trade balance effects

A decrease in the availability of energy would have an adverse impact on exports of energy-intensive manufactures (from the U.S., as from other Annex I countries). While this effect is likely to be greater if one category of producers (developing countries) are exempted from emissions restrictions, it would be incorrect to expect the effect to show up as a deterioration in the U.S. trade balance. This is true for several reasons.

- Reductions in U.S. energy-intensive exports would be partially offset in other ways.
- There would be a fall in oil imports. (Reduced dependence on Mideastern oil has both economic and political advantages.)
- Trade theory says that there would actually be a *positive* effect on U.S. exports of goods that are *not* intensive in energy. The reason is that the contraction of the first sector frees up resources that eventually move to the second sector.

There is also a technical reason why it may not be useful to look at the effect on the trade balance. The answer depends on the precise definition of the balance of payments: the current account balance or overall balance of payments could move in the opposite direction from the merchandise balance or the balance on goods and services. The merchandise trade balance could very well improve in a system of international permit trading. This is a likely outcome if the U.S. and other industrialized countries buy emission permits from Russia, Ukraine, and other economically depressed countries. (If the U.S. turns out to be a net seller of permits, as is possible in the medium run if the Russian economy recovers, the effects would be reversed.) Imports of permits from Russia would not be counted as imports of merchandise, but would be counted on the broader measures of the balance of payments. Economists often term such transactions international transfers. But the transfer reduces disposable income in the United States or other permit-buying countries, and raises disposable income in Russia. The first effect leads to a fall in imports from Russia, and the second effect leads to a rise in exports to Russia. Thus both effects clearly work to increase the trade balance of the United States, and to decrease the trade balance of Russia. This illustrates the general principle that the effect on the trade balance is a highly misleading indicator of the effect on U.S. income or economic welfare.

Public attention tends to be more focussed on the trade balance, as it is the measure associated with output and employment. But it leaves out the outward transfers themselves. The effect on the overall current account, which adds in the transfers along with the balance on goods and services, would be more likely to be negative (as compared to the effect on the trade balance). This might in turn require a real depreciation of the dollar. But even the current account might improve, if federal revenues were used to raise public saving, or if there were a flow of capital from the United States to developing countries.

In short, to assess competitiveness concerns, it is probably more meaningful to talk about adverse effects on some individual energy-intensive export sectors, than to look at the impact on the trade balance or current account balance.

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A decrease in the availability of energy would have ^{an} ~~something of an~~ adverse impact on exports of energy-intensive manufactures (from the U.S., as from other Annex I countries). ^{while it} ~~is true that~~ this effect is likely to be ~~some~~ ^{greater} if one category of producers (developing countries) are exempted from emissions restrictions, ~~But, quite aside from the issue of the magnitude of this "loss in competitiveness,"~~ it would be incorrect to expect the effect to show up as a deterioration in the U.S. trade balance. This is true for several reasons.

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1. Tech
2. Misleading
3. Example

2 reasons?

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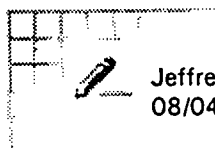
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Just focus on US

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08/04/97 03:10:41 PM

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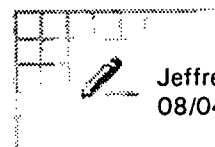
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into
Mex?

The data show growth in U.S. direct investment into Mexico over the post NAFTA period, particularly in manufacturing (where growth has been about 22%). But this growth has not differed dramatically from the world as a whole where manufacturing grew 23% over the same period. Even if the Mexico numbers are understated because of the devaluation, a generous upward adjustment doesn't change much. Finally, not only is Mexico's share changing little, but it has only a small share of total U.S. direct investment to begin with.

Climate change studies

Few studies have examined the specific impact of climate change policies. One study by McKibbin and Wilcoxon examined how a carbon tax of \$15 per ton applied in the United States alone, and in the United States and the OECD together, affected trade flows. They conclude that "our results suggest that a carbon tax would produce little redistribution of trade in either the short or long run."¹⁴

A related literature has studied the magnitude of "leakage effects" -- that is, to what extent cuts in domestic emissions would be offset by shifts in production and therefore increases in emissions abroad. This literature has not reached any firm conclusions: Repetto and Austin report that studies of unilateral emissions reduction policies in OECD countries predict leakage rates of between 3.5 and 70 percent.¹⁵ Based on a review of the recent modeling efforts that produced dramatically different results, Thomas Rutherford's (University of Colorado) best guess is that carbon leakage is probably larger than 10 percent and less than 50 percent.¹⁶

Among non-Annex I nations, the Australian government projects that South Korea and China will experience economic benefits under medium-term carbon policies.¹⁷ South Korea is a net exporter in fossil fuel intensive products (mainly iron and steel) to Annex I nations. Their exports contribute around 28 percent of GDP. Producers in South Korea could gain a comparative advantage in these markets given an Annex I-only policy.¹⁸ A similar story is projected for China. India and Brazil, are not predicted to gain because the availability of capital is reduced as income in Annex I nations falls, and it becomes more costly to import from Annex I nations the key capital goods that promote growth (e.g., machinery and transportation equipment).

Caveat

In sum, the related literatures suggest that carbon policies are unlikely to effect a massive shift of energy-intensive production abroad. At the same time, the empirical literature on the specific impact of carbon policies is sparse. And an important caveat to the general findings above is that for several industries, energy costs are a significant share of total costs. These industries may be vulnerable, and there may be substantial adjustment costs. For example, in primary aluminum production (SIC 3334), energy accounts for 21.4 percent of total costs. In hydraulic cement (SIC 3241), energy accounts for 20.5 percent of total costs, while in inorganic chemicals (SIC 281), the share is 13.7 percent. And in other industries -- including the pulp and

paper industry, and the steel industry -- energy is a significant input. In these industries, which account for perhaps 2 to 3 percent of total industrial output, the effects ~~may~~ be more significant than those outlined above.

are expected to

DOE's Argonne Study

The Department of Energy commissioned a study by the Argonne National Laboratory to study the potential impact of these restrictions on energy intensive industries.¹⁹ The study focused on six sectors: chemicals, petroleum refining, paper and allied products, ~~iron and steel, aluminum, and cement.~~ The study assumed that the prices of fossil fuels ~~are~~ increased based on their carbon content: boosting electricity rates by slightly more than 50 percent from the year 2000 to 2010, tripling coal prices, increasing natural gas charges by about 80 percent, and increasing fuel oil costs between 70 and 90 percent.

The Argonne lab set up six working groups, one for each of the sectors, consisting of eight or nine experts, including representatives from the industry, trade associations, environmental groups, academe, the financial community, labor unions, and the government. The general conclusion of the study was that "the policy constraints placed on these six large industries in developed countries, but not on their less developed trading partners, would result in significant adverse impacts on the affected industries."

Need to emphasize that
it is important to have LDCs
in, for other reasons.

(As in earlier notes from study, but more so.)



DEPARTMENT OF THE TREASURY
WASHINGTON

cc: DM
JTF
JS

JUL 24 1997

MEMORANDUM FOR DANIEL REIFSNYDER
DIRECTOR, OFFICE OF GLOBAL CHANGE

FROM:

Mark Rentschler *MR*
Assistant Director for Sustainable Development
Office of Multilateral Development Banks

SUBJECT:

Proposed Changes to Draft U.S./E.U. Composite Text on Advancing
Implementation of Article 4.1 of the Framework Convention

The attached changes to State's July 16 draft composite text have been cleared by Treasury Assistant Secretary David Lipton and Deputy Assistant Secretary Jonathan Gruber. They have asked me to inform you that Treasury withholds its clearance on the composite text until these issues have been resolved satisfactorily.

The proposed revisions reflect Treasury's view that sensible policy changes, such as the removal of energy subsidies, should be central to the U.S. approach to developing country participation in a climate change protocol. Protocol language on implementation of Article 4.1 of the Climate Change Convention may be our best vehicle for strengthening developing country commitments.

The attached changes set out specific policy actions that are consistent with the general commitments all countries have accepted under Article 4.1. These revisions strengthen both developed and developing country commitments by directly addressing energy subsidies and related issues.

cc: Climate Change Assistant Secretaries Group

Proposed Changes to July 16 draft U.S./E.U. Composite Article X Text
on Advancing Implementation of Article 4.1

(suggested additions double-underlined; suggested deletions struck out)

Paragraph 2(e) chapeau. Suggest the changes shown below. These changes would make it binding for Parties to "have programs to phase out energy subsidies and incorporate other policies and measures to promote the limitation of greenhouse gas emissions and the enhancement of sinks." The text preserves flexibility regarding particular policies and measures (other than the phasing out of subsidies) by retaining the "for example" language.

Each Party shall have programs to phase out energy subsidies and incorporate, as appropriate, other policies and measures to promote the limitation of greenhouse gas emissions and the enhancement of sinks, for example by:

Paragraph 2(e)(i). Suggest adding the following language, which is taken practically verbatim from the Summit of the Americas Action Plan (signed by President Clinton and 33 other heads of State, it presumably does not raise any unacceptable issues for the U.S.):

(i) increasing energy efficiency and emphasizing market-oriented energy pricing, which discourages wasteful energy use;

Paragraph 2(f)(iii). Add the double-underlined text. The point here is to push developing countries as far as possible toward creating detailed national action plans that lead to the elimination of subsidies and the establishment of market-driven energy sectors.

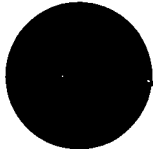
Report to the Secretariat, as part of its communication under the Convention, on policies and measures it has implemented; measures it plans to implement; including time frames for removal of energy subsidies, adoption of market pricing of energy, establishment of effective and efficient energy sector regulatory structures and capacity, and energy sector privatization plans; and barriers to adoption of potential policies and measures.

Para 4, new sub-paragraph (c). Add the double-underlined text below. The purpose is to push developing countries to mainstream their Article 4.1 commitments into MDB lending strategies.

(c) the multilateral development banks and other international development finance institutions, in addressing through assistance strategies how best to support policies and measures under paragraph 2(e), together with other economic development objectives, and in establishing appropriate climate change programs at these institutions.

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	Mark Chupka	586-0861	586-5523
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DOD	Sherri Goodman	703-693-7011	703-695-6639



United States Department of State

*Bureau of Oceans and International
Environmental and Scientific Affairs*

Washington, D.C. 20520

July 16, 1997

TO: *Distribution

FROM: OES - Rafe Pomerance *JAR for*

SUBJECT: Composite of U.S. & E.U. Texts on Article 4.1 (Continuing to Advance Implementation of Commitments), UN Framework Climate Convention

The U.S. and EU proposals on how to "continue to advance the existing commitments" under the Framework Convention are similar in many respects. To begin discussions with the EU on a possible joint approach toward developing countries, we have combined these texts in the attached composite. We need to provide the EU with a copy for consideration at their meeting in Brussels next Tuesday, July 22. Accordingly, we need your sign off on the composite no later than Noon, Friday, July 18.

At the last AGBM session, the EU (and others, including developing countries) criticized our proposal because it contained requirements of developing countries that would not apply, as does Article 4.1, to all Parties. For this reason, the composite would make its commitments applicable to all Parties, including the United States. We do not believe this is a significant change, since the United States is doing these things already.

In addition, there is much confusion internationally about what is meant by "no regrets" measures. Thus, we have used a narrative description in the composite, drawn almost verbatim from the preamble of the Convention, rather than the term itself. In making this change, the requirement to take measures is now broader than our proposal of January 17 (because it requires taking various kinds of measures to address climate change); at the same time, it is somewhat less stringent with respect to "no regrets" measures per se. The key change is in paragraph 2(e)(viii).

In going forward with the composite, it is important to understand both points above. Some at home may question them, arguing that the U.S., which will have an emissions budget, should not also have to take on such commitments. Some at home may also contend that the change with respect to "no regrets" measures is a softening of the U.S. position. On the other hand, we do not believe these represent significant changes, but they should go far to increase the likelihood of securing EU support and ultimately developing country acceptance.

If we do not go forward with this effort, we may lose an important opportunity to forge some common ground with the EU and bolster our position vis-a-vis developing countries. If you have any questions, please contact Jonathan Pershing at: (202) 647-4069. Otherwise, please let me know NLT Noon, Friday, July 18, if you have any objection to this approach.

Attachment: As stated.

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Advancing Implementation of Article 4.1:
Composite U.S./EU Text

Article X
Advancement of the Implementation of
Article 4.1 of the Convention

1. The Parties shall, in accordance with Article 4.1 of the Convention and with the provisions of this Article, continue to advance the implementation of commitments in Article 4.1 of the Convention. Further, they shall strengthen their collaboration through bilateral and multilateral mechanisms so as to facilitate reaching the ultimate objective of the Convention.
2. National measures
 - (a) Each Party shall strengthen its legal and institutional framework to advance the implementation of its commitments under Article 4.1 of the Convention.
 - (b) Each Party shall take measures to facilitate investment in climate-friendly technologies.
 - (c) Each Party shall report, as part of its national communication, on how it is promoting public education and participation in the development of climate change policy.
 - (d) Each Party shall submit to the Secretariat, on an annual basis, inventory data for greenhouse gases. Such inventory shall be consistent with any guidelines adopted by the Parties.
 - (e) Each Party shall have programs to incorporate, as appropriate, policies and measures to promote the limitation of greenhouse gas emissions and the enhancement of sinks, for example by:
 - (i) increasing energy efficiency;
 - (ii) increasing the use of renewable energies;
 - (iii) making improvements in the transport sector;
 - (iv) improving efficiencies in industrial production processes;

-2-

- (v) promoting the development and sustainable management of sinks and reservoirs of greenhouse gases;
 - (vi) improving integration of climate change considerations into agriculture;
 - (vii) removing obstacles to the limitation of greenhouse gas emissions and to the enhancement of sinks;
 - (viii) taking actions to address climate change that can be justified economically in their own right and can also help in solving other environmental problems.
- (f) Each Party shall:
- (i) quantify the effects of the measures it implements, including those under subparagraph (e) above;
 - (ii) evaluate barriers to the adoption of potential measures; and
 - (iii) report to the Secretariat, as part of its communication under the Convention, on the measures it has implemented, measures it plans to implement, and barriers to the adoption of potential measures.
- (g) Each Party shall develop and implement indicators relevant to mitigation of, and adaptation to, climate change.
- (h) In respect of national communications:
- (i) in-depth reviews of [Annex A and B] [Annex I] Party communications shall take place in accordance with Article 4 (Review Process);
 - (ii) consideration of [non-Annex A and B] [non-Annex I] Parties communications shall take place in accordance with a process, to be established by the Parties, that is designed to:
 - (a) enable the review of the effects of individual measures;

- 3 -

- (b) assist Parties in identifying and implementing appropriate measures for mitigating net anthropogenic emissions of greenhouse gases;
- (c) identify key sectors and technological options within them;
- (d) consider possibilities for promoting voluntary arrangements with industry aimed at identifying and encouraging implementation of measures; and
- (e) explore various means through which Parties could obtain both the know-how and the technology needed to implement options identified.

3. Bilateral/multilateral cooperation

The Parties shall cooperate, bilaterally and multilaterally, in facilitating mitigation of and adaptation to climate change, including through:

- (a) development of national inventories of greenhouse gas emissions;
- (b) formulation and implementation of relevant programs of measures to mitigate and adapt to climate change, with a special consideration of measures which also favor the economic development of Parties;
- (c) development, application and diffusion, including transfer of, technologies, practices and processes that control, reduce or prevent greenhouse gas emissions.

4. Participation in work of international organizations

Parties shall, to the extent possible, support and/or participate in the work of:

- (a) relevant international bodies, in examining, elaborating, assessing, developing and implementing strategies for mitigation of and adaptation to climate change; and
- (b) international programs related to climate change.