

**Proposal for Developing Countries:
To Cap and Trade Emissions Permits**

I. From an economic perspective, the best form of participation by developing countries in the Kyoto Protocol would be a) acceptance of binding caps at or slightly below business as usual and b) agreement to trade emission permits internationally. Therefore such participation should be our top priority in international negotiations.

A. The economic rationale for such participation includes

- **Greater cost savings to the U.S.:** Participation by developing countries in international permit markets would greatly lower the costs to the U.S. of meeting its Kyoto cap (as CEA testimony showed). In particular, costs would be lower than with trading among only Annex I countries.
- **Greater environmental benefits:** Caps slightly below business as usual would lower global emissions relative to a world with only Annex I caps.
- **Greater economic benefits to developing countries:** With targets slightly below BAU, developing countries would enjoy net gains of many billions of dollars through the international sale of emission reductions achieved at lower cost than the world price.
- **Cap and trade yields greater benefits than CDM:** While the Clean Development Mechanism will likely result in cost savings to the U.S. relative to a world with only Annex I trading, a system including cap and trade of developing countries' emissions would yield greater cost savings to the U.S. and greater gains to developing countries than CDM. Further, cap and trade could achieve environmental benefits not achievable by pursuing CDM, which only redistributes emissions geographically.

B. A non economic rationale includes the long-run benefits of including developing countries into global negotiations, for example, as recognized by the Byrd-Hagel resolution.

II. Problem: To persuade a developing country *voluntarily* to adopt a cap and then to trade permits internationally, international agreements must be structured to reduce the risk of inadvertent stringency and in particular to reduce the possibility of a cap so stringent as to cause economic losses to the developing country.

Proposed Solution: Negotiations should focus on slight reductions from the estimated business as usual emissions level, where this level is expressed in a way that depends on the *future* values of economic variables, such as GDP.

Rationale: Such caps would avoid the risk of inadvertent stringency associated with higher than projected economic growth between now and the beginning of the commitment period in 2008. Developing countries would face only the much smaller risk that emissions would be higher than expected, *given* the economic conditions realized in 2007.

Basic principles for implementing such an approach are:

- **Reasonable Forecasts:** The relationship between the cap (ignoring any real reductions in emissions) and the values of economic variables, when applied to emissions and such variables during recent years, should predict emissions reasonably well (and be without demonstrable statistical bias). Relationships that give reasonably reliable predictions reduce the risk of both inadvertent stringency and paper tons which could increase global emissions.
- **Predetermined Caps:** The cap should not depend on literally contemporaneous values of economic variables, so as to avoid uncertainty during the commitment period about the country's cap. For example, the cap should not vary with 2008 or 2010 GDP levels, but rather with 2007 GDP.
- **No Perverse Incentives:** The cap should depend on values of economic variables only indirectly related to emissions, to avoid creating perverse incentives for developing countries to increase emissions so as to have higher caps in the commitment periods. For example, the cap should not depend on energy consumption in 2007.

III. Illustration: One sensible way of implementing the solution is described below. Other ways of implementing the solution may work as well or better. The conclusions are stated below and the details of our work follow.

- Defining the business as usual level for a developing country as a function of its GDP and population in earlier years and setting the emissions cap at that level yields a negligible risk of leaving the developing country worse off under cap and trade because of inadvertent stringency. A cap slightly below BAU would also yield negligible risk of leaving the developing country worse off.
- Emissions caps for developing countries set below their business as usual emission level will result in gains from trade lower than with a BAU cap, but provide environmental benefits. The higher costs of a cap set below BAU are borne by both the developing countries and the Annex I countries.

There are significant gains from trade for large developing countries and large cost-savings to the U.S. if just one developing country accepts an emissions cap at BAU and participates in emissions trading. Table 1 and Charts 1 through 3 illustrate these gains from trade from a baseline of full Annex I trading.

Table 1. Illustrative Gains from Trade for Developing Countries that Cap and Trade

Trading Scenario	Country	Gains from Trade	Permit Price ¹ (1997\$/ton)
Annex I only	United States	not applicable	\$54
Annex I + China	China	\$3.6 billion/year	\$26
	United States	\$11.6 billion/year ²	
Annex I + India	India	\$1.6 billion/year	\$47
	United States	\$2.5 billion/year ²	
Annex I + Mexico	Mexico	\$0.9 billion/year	\$51
	United States	\$1.2 billion/year ²	

¹ These scenarios do not account for the cost savings available through the Clean Development mechanism and carbon sinks.

² Gains from trade for the U.S. are estimated as the change in the U.S. total cost of complying with the Kyoto Protocol relative to an Annex I only trading regime.

Chart 1. China's 2010 Marginal Abatement Cost Curve and Gains from Trade

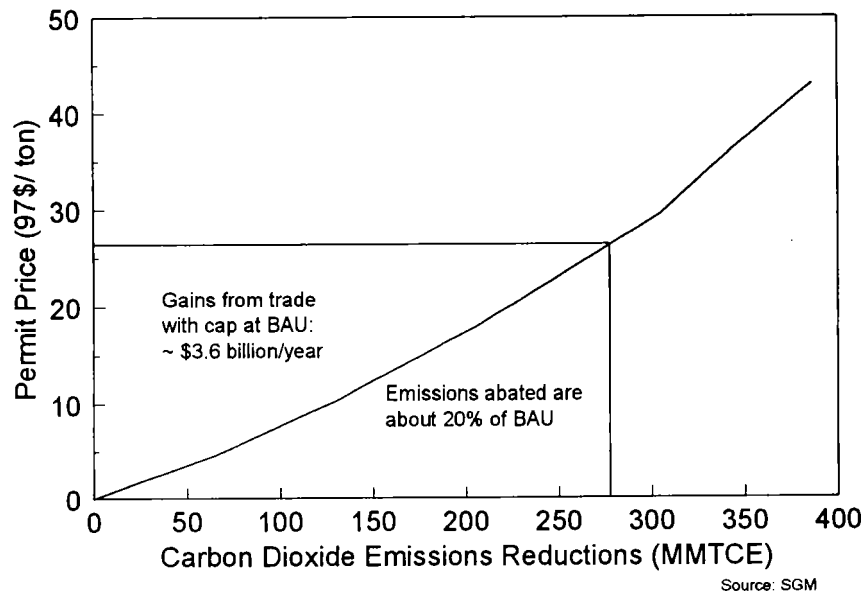


Chart 2. India's 2010 Marginal Abatement Cost Curve and Gains from Trade

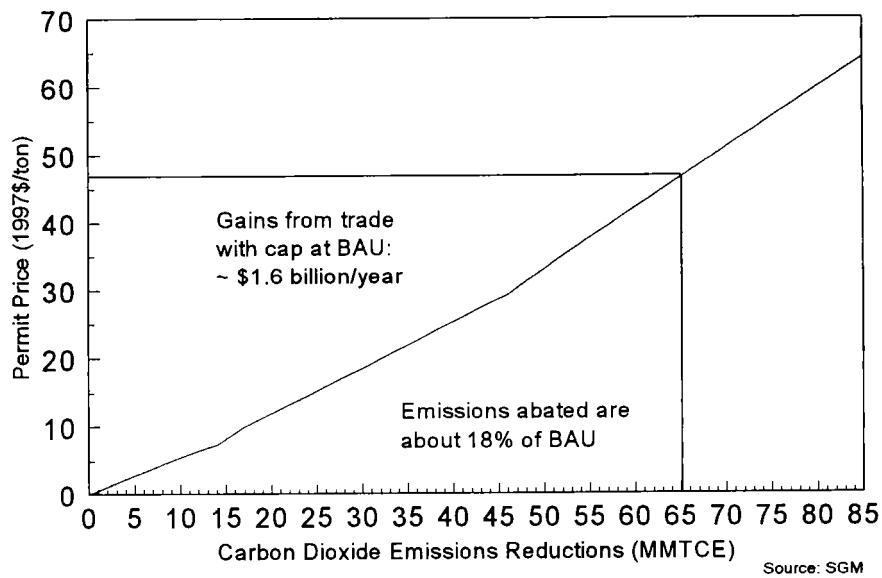
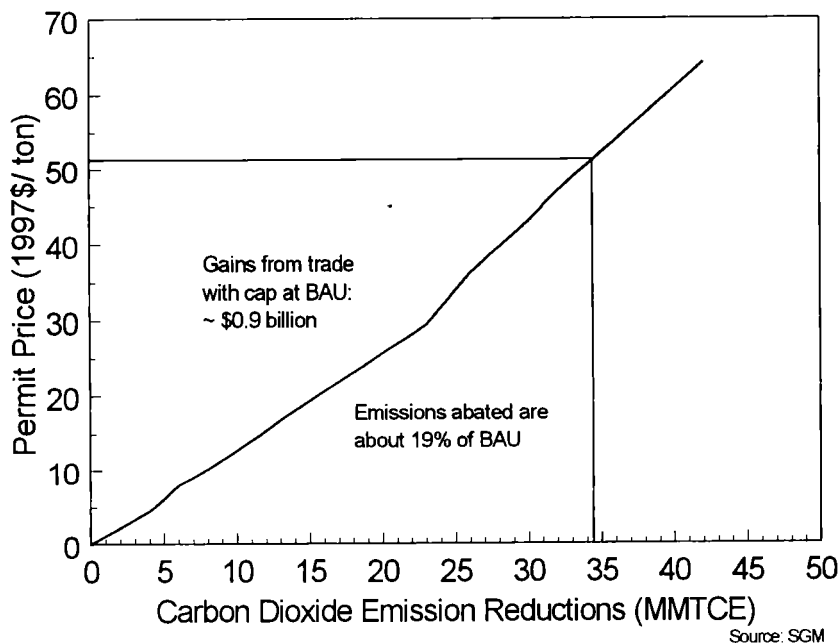


Chart 3. Mexico's 2010 Marginal Abatement Cost Curve and Gains from Trade

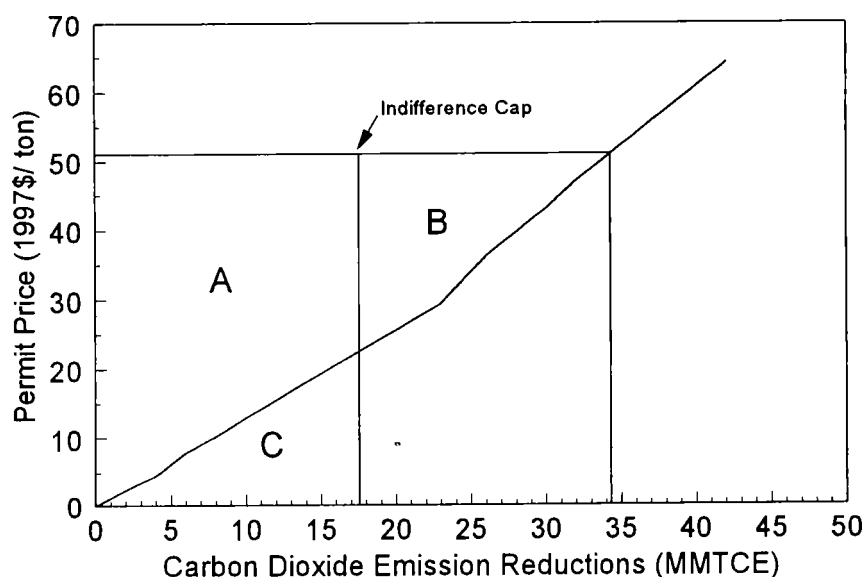


IV. How Far Below BAU Should the Developing Countries' Caps Be Set?

The answer to this question has many dimensions. Most commonly discussed is the issue of fairness: what commitments to reduce emissions should be made by countries whose economic resources differ substantially? Generally neglected but discussed below is the issue of efficiency. In particular, what are the implications for U.S. costs of increasingly more stringent caps on emissions from key developing countries?

More stringent developing country caps raise U.S. costs by restricting the supply of permits in world markets and so raising the price of permits. To assess the magnitude of this effect consider the cap which just leaves a country no better off than no cap at all. This "indifference" cap is where the costs of meeting the cap just equal the net gains from selling permits in world markets. Chart 4 illustrates gains from trade for a small country. For a cap that is equivalent to a reduction from BAU of 17 MMTC, net gains from foreign exports are B, and the cost of meeting the cap is C. Since $B = C$ in this example, the net gains from trade are nil.

Chart 4. Illustrative 2010 Marginal Abatement Cost Curve and Indifference Cap



Note: This indifference cap is illustrated for a country whose participation in world permit markets does not affect world permit prices.

Table 2 provides an illustration of the effects of emissions caps more stringent than BAU on China with Annex I plus China trading. Note that a small reduction below BAU has no real effect on the Annex I trading price, and thus no economic effects on the U.S. However, as the cap becomes more stringent, the Annex I trading price increases, resulting in higher total costs of compliance for the U.S. If China accepts a cap below BAU, the cost of this additional stringency to the U.S. -- essentially, the cost of supplying the environmental benefits associated with these emissions reductions -- can become significant. Thus developing country participation in the form of acceptance of caps more stringent than business as usual will raise costs to the U.S.

Table 2. Effects of Various Chinese Emissions Caps with Annex I Trading

Emissions Cap ¹	Permit Price (1997\$/ton)	Chinese Emissions Reductions (MMTC)	Chinese Emissions Sales (MMTC) ²	Total Cost to U.S. of Complying with Kyoto	Cost to U.S. of Additional Stringency
BAU	\$26	276	276	\$13.4 b	not applicable
BAU - 1%	\$26	276	262	\$13.4 b	~\$0
BAU - 5%	\$29	304	235	\$14.9 b	\$22/ton
Indifference	\$36	343	172	\$17.9 b	\$26/ton

¹ We employ the SGM BAU for China for the purposes of these calculations.

² Reductions in Chinese emissions less Chinese emissions sales yields net global reductions.

Imposing this "indifference" cap on China, given that its participation lowers world permit prices, leads to the following conclusions.

- An indifference cap for China increases annual U.S. costs by \$4.5 billion or 33% relative to a BAU cap for China.
- If China accepts an emissions cap requiring reductions of approximately 170 MMTC below BAU, the average cost to the U.S. would be \$26/ton. This is not the average cost of a ton of emissions purchased from China, but the average cost to the U.S. of the environmental benefits associated with China complying with a more stringent cap.

Summary of Analysis

A. Data

We have compiled data on 3 variables: emissions of carbon dioxide, GDP, and population for 117 countries for the time period 1970-1992. The carbon dioxide emissions data, measured in millions of metric tons of carbon, are from the Carbon Dioxide Information Analysis Center (Oak Ridge National Laboratory, DOE). The GDP data, measured in 1987 U.S. dollars, are from the World Bank. The population data, measured in thousands of individuals, are from the United Nations Population Division.

B. Methods

We have estimated a fixed effects linear regression on the logs of these variables, for the countries in our data set, excluding those listed in Annex I. Our regression uses four non-overlapping 5 year intervals for each country. Our forecasts include the country specific constants.

C. Results

The fixed effects regression we estimated is

$$\text{Emissions} = a \text{ GDP}_{t-1} + b \text{ GDP}_{t-2} + c \text{ Population}_{t-1} + \gamma \text{ trend}$$

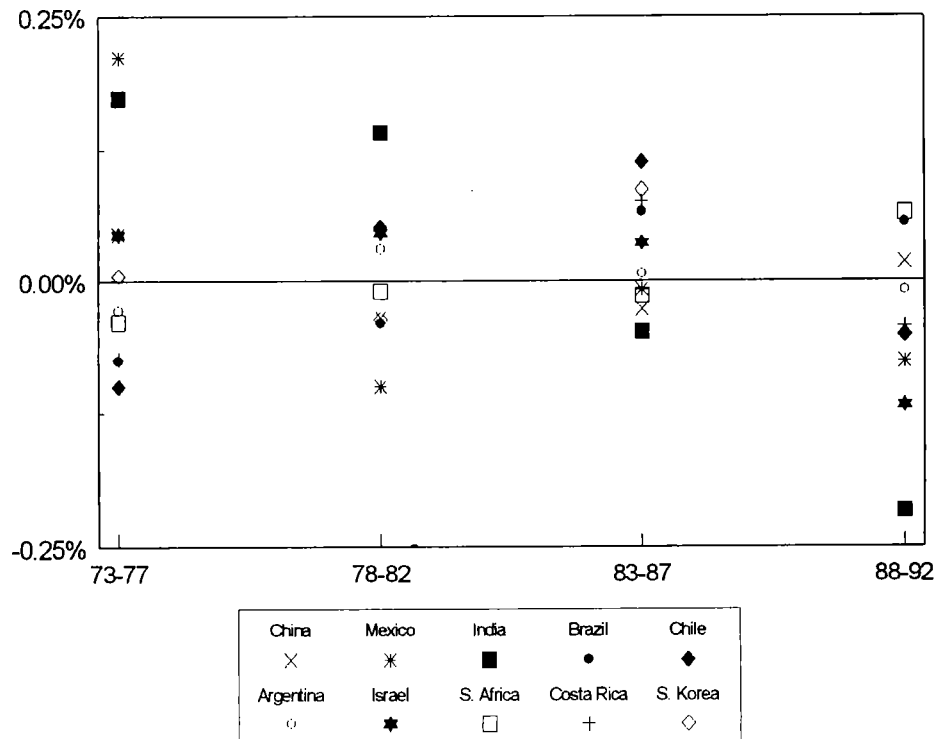
Emissions are the natural logarithm of the five year non-overlapping average of carbon emissions. All independent variables are lagged. GDP_{t-1} is the log of the gross domestic product in the year prior to the first year in the emissions variable, GDP_{t-2} is GDP in the year two years prior to the first year included in the emissions variable, and population_{t-1} is the country's population in the year prior to first year included in the emissions variable. Trend is one in the first 5 year period, and 2, 3, and 4 respectively in the subsequent 5 year periods. The useable data included 376 cross-section time series observations. The fixed effects regression used 98 degrees of freedom. The R squared was in excess of 0.99.

Table 3. Model I Results

Variable Name	Coefficient Estimate	Standard Error
GDP _{t-1}	0.9501823	0.2443047
GDP _{t-2}	-0.411297	0.23894
Population _{t-1}	0.4836006	0.2055439
trend	0.0073712	0.0310638

As one illustration of the model's accuracy in predicting emissions, consider the chart below that maps actual and predicted emissions using within sample data for ten selected developing countries. The predicted value is never more than 1/4 of one percent away from the actual emissions average for any of the five year intervals.

Chart 5. Error in Model I Prediction as a Fraction of Actual Emissions



To forecast emissions for the five year period beginning in 2008 using the results of this regression we input the World Bank forecasts of GDP for the years 2007 and 2006, and the United Nations forecasts of 2007 population. The forecasts of emissions for the budget period and the confidence intervals around these forecasts conditional on the assumed 2006 and 2007 values are described in the table below.

Table 4. Predicted Average Emissions, 2008-2012

Country	2006 GDP (1987\$, billions)	2007 GDP (1987\$, billions)	2007 Population	Predicted Average Emissions, 2008-2012
China	1,385.8	1,493.5	1,357,627,000	2092 MMTC SE: 1.37 MMTC
India	752.1	799.7	1,140,563,000	345 MMTC SE: 1.34 MMTC
Mexico	268.2	282.7	113,385,000	157 MMTC SE: 1.33 MMTC

The 95 percent confidence interval around the predicted emissions is approximately $\pm$ two standard errors. As shown in figure 1, these developing countries would incur net costs of a cap and trade only if the cap were about half the reduction needed to raise the marginal cost of abatement to the world price. Given figures 2-4, these levels are about 9 to 10 percent below BAU. Since such reductions from BAU are more than 10 times greater than the standard error, the risk of net costs is negligible, given the model.

perspective the

**Proposal for Developing Countries:
To Cap and Trade Carbon Emissions Permits**

From an economic perspective

I. The best form of participation by developing countries in the Kyoto Protocol would be a) acceptance of binding caps slightly below business as usual and b) agreement to trade emission permits internationally. Therefore such participation should be our top priority in international negotiations.

A. The economic rationale for such participation includes

- **Greater cost savings to the U.S.:** Participation by developing countries in international permit markets would greatly lower the costs to the U.S. of meeting the Kyoto cap (as CEA testimony showed). In particular, costs would be lower than with trading among only Annex I countries, and even lower than with such trading and the intrinsically less efficient project-by-project approach of CDM.
 - **Greater environmental benefits:** Caps slightly below business as usual would lower global emissions, and provide environmental benefits not achievable by pursuing CDM, which only redistributes emissions geographically.
 - **Greater economic benefits to developing countries:** With targets slightly below BAU, developing countries would enjoy net gains of many billions of dollars through the international sale of emission reductions achieved at lower cost than the world price. Moreover, an emissions permit market would yield greater gains than are available through CDM.
- would likely be.*

B. Non economic rationales include the long-run benefits of including developing countries into global negotiations, ~~and greater compliance with the~~ Byrd-Hagel resolution.

- for example, as required by the

- model uncertainty
- residual uncertainty

$$\hat{Y}_{2010} / Y_{2010} > Y_{2010}$$

- infrastructure ^{Year} time frame

II. Problem: To persuade a developing country *voluntarily* to adopt a cap and then to trade permits internationally, international agreements must be structured to reduce the risk of inadvertent stringency and in particular to reduce the possibility of a cap so stringent as to cause economic losses to the developing country.

Proposed Solution: Negotiations should focus on slight reductions from the business as usual emissions level, where this level is expressed in a way that depends on the *future* values of economic variables.

Rationale: Such caps would avoid the risk of inadvertent stringency associated with higher than projected economic growth between now and the beginning of the commitment period in 2008. Developing countries would face only the much smaller risk that emissions would be higher than expected, *given* the economic conditions realized in 2007, *(although)*

Basic principles for implementing such an approach are:

- **Reasonable Forecasts:** The relationship between the cap (ignoring any real reductions in emissions) and the values of economic variables, when applied to emissions and such variables during recent years, should predict emissions reasonably well (and be without demonstrable statistical bias). Relationships that give reasonably precise predictions reduce the risk of both inadvertent stringency and paper tons which could increase global emissions.
- **Predetermined Caps:** The cap should not depend on contemporaneous values of economic variables, so as to avoid uncertainty during the commitment period about the country's cap. For example, the cap should not vary with 2008 or 2010 GDP levels, although it may vary with 2007 GDP.
- **No Perverse Incentives:** The cap should depend on values of economic variables only indirectly related to emissions, to avoid creating perverse incentives for developing countries to increase emissions so as to have higher caps in the commitment periods. For example, the cap should not depend on energy consumption in 2007.

Illustration: One sensible way of implementing the solution is described below. Other ways of implementing the solution may work as well or better. The conclusions are stated below and the details of our work follows.

- Defining the business as usual level for a developing country as a function of its lagged GDP and lagged population and setting the emissions cap at that level yields a negligible risk of leaving the developing country worse off under cap and trade because of inadvertent stringency. A cap slightly below BAU would also yield negligible risk of leaving the developing country worse off. *in earlier years*
- Emissions caps for developing countries set below their business as usual emission level will result in lower gains from trade but provide environmental benefits. The higher costs of a cap set below BAU are borne by both the developing countries and the Annex I countries. *than with a BAU cap*

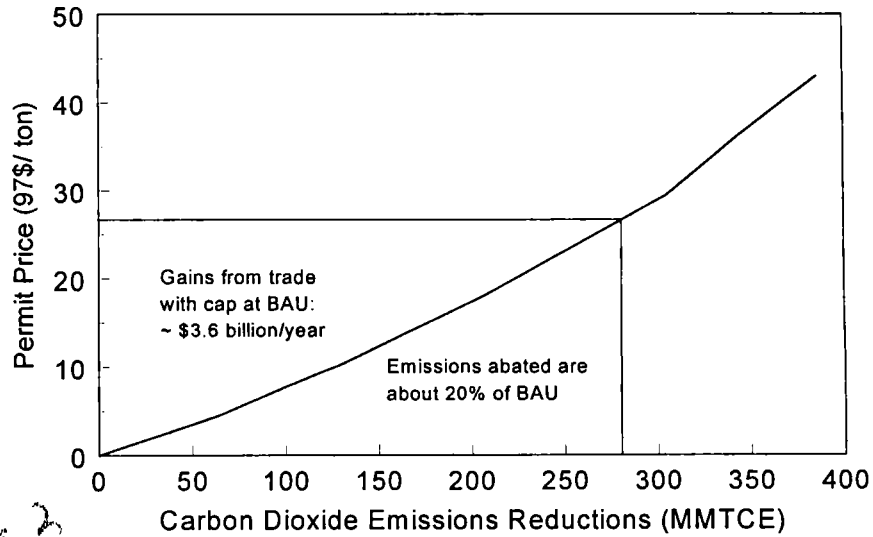
There are significant gains from trade for large developing countries and large cost-savings to the U.S. if just one developing country accepts an emissions cap at BAU and participates in emissions trading. The following table illustrates these gains from trade from a baseline of full Annex I trading.

Trading Scenario	Country	Permit Price ² (97\$/ton)	Gains from Trade
Annex I only	United States	\$54	not applicable
Annex I + China	China	\$26	\$3.6 billion/year
Annex I + China	United States		\$11.6 billion/year ¹
Annex I + India	India	\$47	\$1.6 billion/year
Annex I + India	United States		\$2.5 billion/year ¹
Annex I + Mexico	Mexico	\$51	\$0.9 billion/year
Annex I + Mexico	United States		\$1.2 billion/year ¹

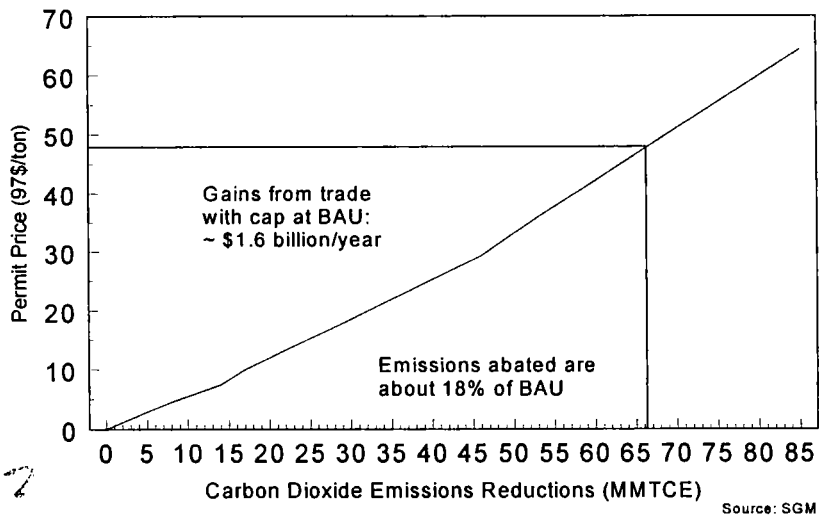
¹ Gains from trade for the U.S. are estimated as the change in the U.S. total cost of complying with the Kyoto Protocol relative to an Annex I only trading regime.

² Estimated ignore COM and sink

China's 2010 Marginal Abatement Cost Curve



India's 2010 Marginal Abatement Cost Curve



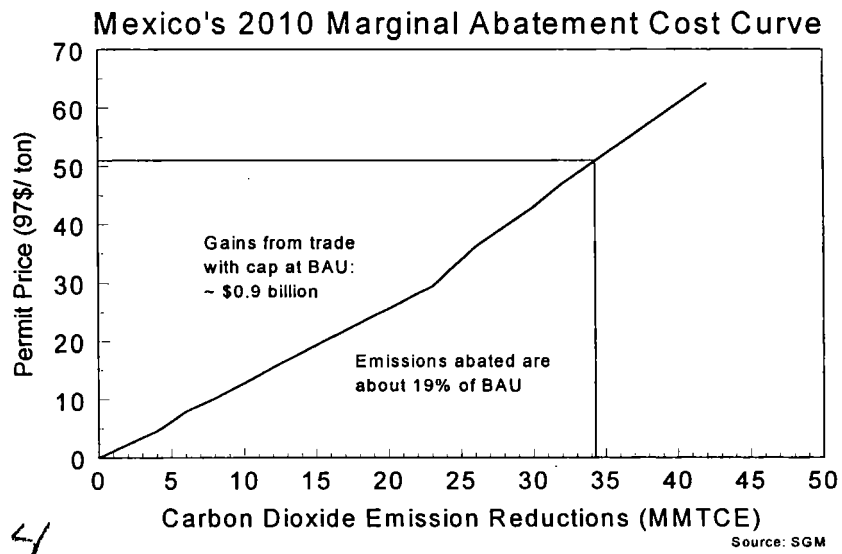


Fig 4

Summary of Analysis

A. Data

We have compiled data on 3 variables: emissions of carbon dioxide, GDP, and population for 117 countries for the time period 1970-1992. The carbon dioxide emissions data, measured in millions of metric tons of carbon, are from the Carbon Dioxide Information Analysis Center (Oak Ridge National Laboratory, DOE). The GDP data, measured in 1987 U.S. dollars, are from the World Bank. The population data, measured in thousands of individuals, are from the United Nations Population Division.

B. Methods

We have estimated a fixed effects linear regression on the logs of these variables, for the countries in our data set, excluding those listed in Annex I. Our regression uses four non-overlapping 5 year intervals for each country. The residuals exhibit slight serial correlation (estimated first order serial correlation $\approx .15$). Our forecasts include the country specific constants.

C. Results

The fixed effects regression we estimated is

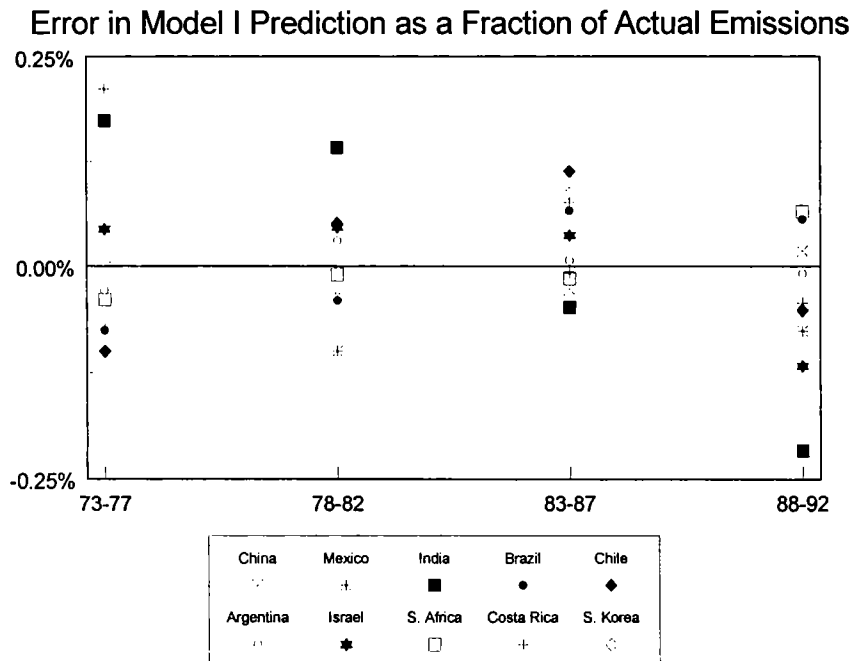
$$\text{Emissions} = a \text{ GDP}_{t-1} + b \text{ GDP}_{t-2} + c \text{ Population}_{t-1} + \gamma \text{ trend}$$

Emissions are the natural logarithm of the five year non-overlapping average of carbon emissions. All independent variables are lagged. GDP_{t-1} is the log of the gross domestic product in the year prior to the first year in the emissions variable, GDP_{t-2} is GDP in the year two years prior to the first year included in the emissions variable, and population_{t-1} is the country's population in the year prior to first year included in the emissions variable. Trend is one in the first 5 year period, and 2, 3 and 4 respectively in the subsequent 5 year periods. The useable data included 376 cross-section time series observations. The fixed effects regression used 98 degrees of freedom. The R squared was in excess of 0.99.

Model I Results

Variable Name	Coefficient Estimate	Standard Error
GDP_{t-1}	0.9501823	0.2443047
GDP_{t-2}	-0.411297	0.23894
$Population_{t-1}$	0.4836006	0.2055439
trend	0.0073712	0.0310638

As one illustration of the model's accuracy in predicting emissions, consider the chart below that maps actual and predicted emissions using within sample data for ten selected developing countries. The predicted value is never more than 1/4 of one percent away from the actual emissions average for any of the five year intervals.



To forecast emissions for the five year period beginning in 2008 using the results of this regression we input the World Bank forecasts of GDP for the years 2007 and 2006, and the United Nations forecasts of 2007 population. The forecasts of emissions for the budget period and the confidence intervals around these forecasts conditional on the assumed 2006 and 2007 values are described in the table below.

Country	2006 GDP (1987\$, billions)	2007 GDP (1987\$, billions)	2007 Population	Predicted Average Emissions, 2008-2012
China	1,385.8	1,493.5	1,357,627,000	2092 MMTC SE: 1.37 MMTC
India	752.1	799.7	1,140,563,000	345 MMTC SE: 1.34 MMTC
Mexico	268.2	282.7	113,385,000	157 MMTC SE: 1.33 MMTC

The 95 percent confidence interval around the predicted emissions is approximately $\pm$ two standard errors. As shown above, these developing countries would incur net costs of a cap and trade only if the cap were about 9 to 10 percent below BAU. Since such reductions from BAU are more than 10 times greater than the standard error, the risk of net costs is negligible.

given the model

in Figure 1
above, these
half the reductions
needed to raise
the MC of abatement
to the world price
Given Figure 1
are about 8-10, these levels

How Far Below BAU Should the Developing Countries' Caps Be Set?

The answer to this question has many dimensions. Most commonly discussed is the issue of fairness: what commitments to reduce emissions should be made by countries whose economic resources differ substantially? Generally neglected but discussed below is the issue of efficiency. In particular, what are the implications for U.S. costs of increasingly more stringent caps on emissions from key developing countries?

More stringent developing country caps raise U.S. costs by restricting the supply of permits in world markets and so raising the price of permits. To assess the magnitude of this effect consider the cap which just leaves a country no better off than no cap at all. This "indifference" cap is where the costs of meeting the cap just equal the net gains from selling permits in world markets. The figure on the next page illustrates gains from trade for a small country. For a cap that is equivalent to a reduction from BAU of 17 MMTC, net gains from foreign exports are B, and the cost of meeting the cap is C. Since $B = C$ in this example, the net gains from trade are nil.

Imposing this "indifference" cap on China, given that its participation lowers world permit prices leads to the following conclusions.

1) An indifference cap for China increases annual U.S. costs by \$4.5 billion or 33% relative to a BAU cap for China.

2) If China accepts an emissions cap requiring reductions of approximately 170 MMTC below BAU, the average cost to the U.S. would be \$26/ton. ~~(The marginal cost effectiveness is likely to be higher.)~~ This is not the average cost of a ton of emissions purchased from China, but the average cost to the U.S. of the environmental benefits associated with China complying with a more stringent cap.

The following table provides an illustration of the effects of emissions caps more stringent than BAU on China with Annex I plus China trading. Note that a small reduction below BAU has no real effect on the Annex I trading price, and thus no economic effects on the U.S. However, as the cap becomes more stringent, the Annex I trading price increases, resulting in higher total costs of compliance for the U.S. If China accepts a cap below BAU, the average cost of this additional stringency to the U.S. -- essentially, the average cost of supplying the environmental benefits associated with these emissions reductions -- can become significant. Thus developing country participation in the form of acceptance of caps more stringent than business as usual will raise costs to the U.S.

Effects of Various Chinese Emissions Caps with Annex I Trading

Emissions Cap ¹	Permit Price (\$/ton)	Chinese Emissions Reductions (MMTC)	Chinese Emissions Sales ² (MMTC)	Total Cost to U.S. of Complying with Kyoto	Average Cost to U.S. of Additional Stringency
BAU	\$26	276	276	\$13.4 b	not applicable
BAU - 1%	\$26	276	262	\$13.4 b	\$0/ton
BAU - 5%	\$29	304	235	\$14.9 b	\$22/ton
Indifference	\$36	343	172	\$17.9 b	\$26/ton

¹ We employ the SGM BAU for China for the purposes of these calculations.

² Reduction in Chinese emissions sales yields net global reduction ← A

Illustrative 2010 Marginal Abatement Cost Curve

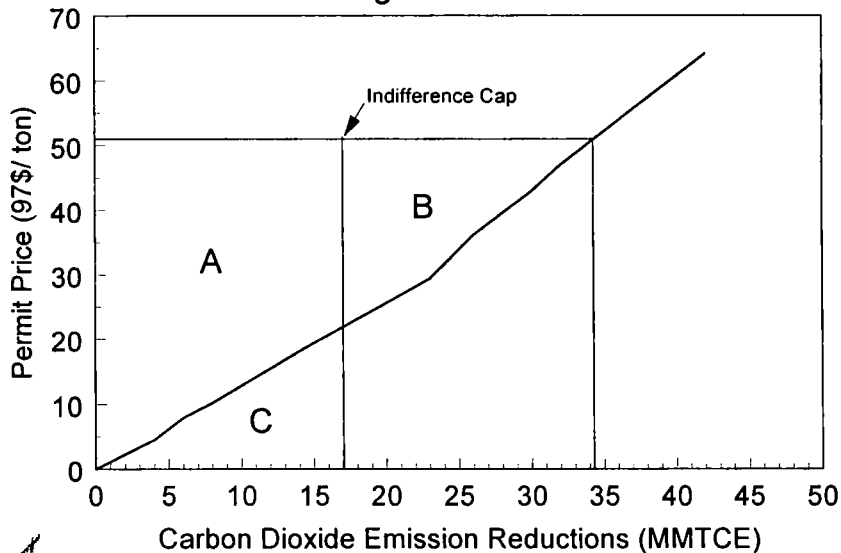


Figure 1

3 Note that ¹⁰ CDM,

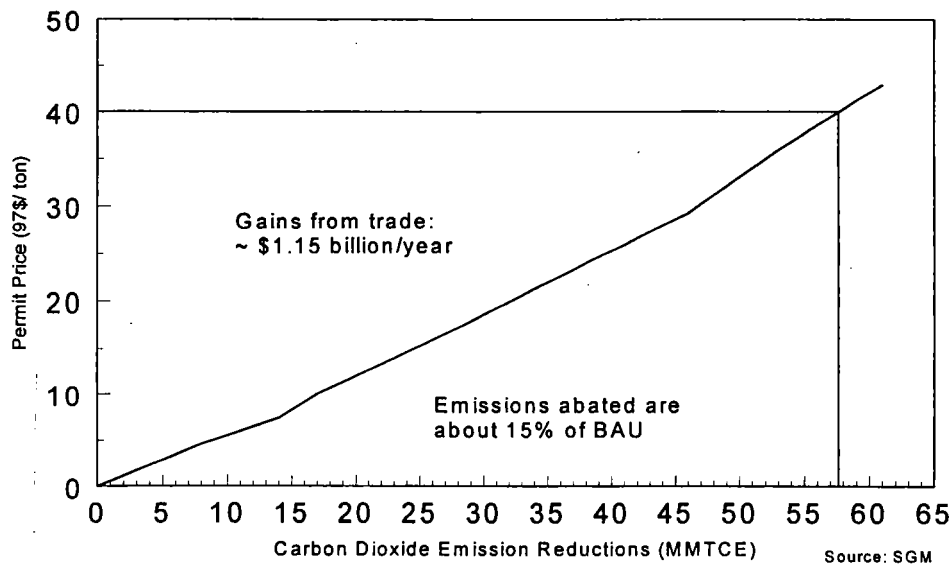
trading would require a monitoring + enforcement infrastructure

Actual and Predicted Emissions Average for 1988-1992 Using a Model Based on a Sample of 3 Non-Overlapping Periods from 1973-1987

Country	Predicted	Actual	SE	(Predicted-Actual)/ Actual
China	729	679	1.31	+0.073
India	142	188	1.30	-0.247
Mexico	82	88	1.30	-0.072
Brazil	63	57	1.30	+0.109
Chile	8.7	9.0	1.30	-0.029
Argentina	31.2	31	1.30	+0.0057
Israel	8.5	9.7	1.30	-0.126
South Africa	87	77	1.30	+0.139
Costa Rica	0.91	0.92	1.30	-0.0083
South Korea	66	68	1.32	-0.017

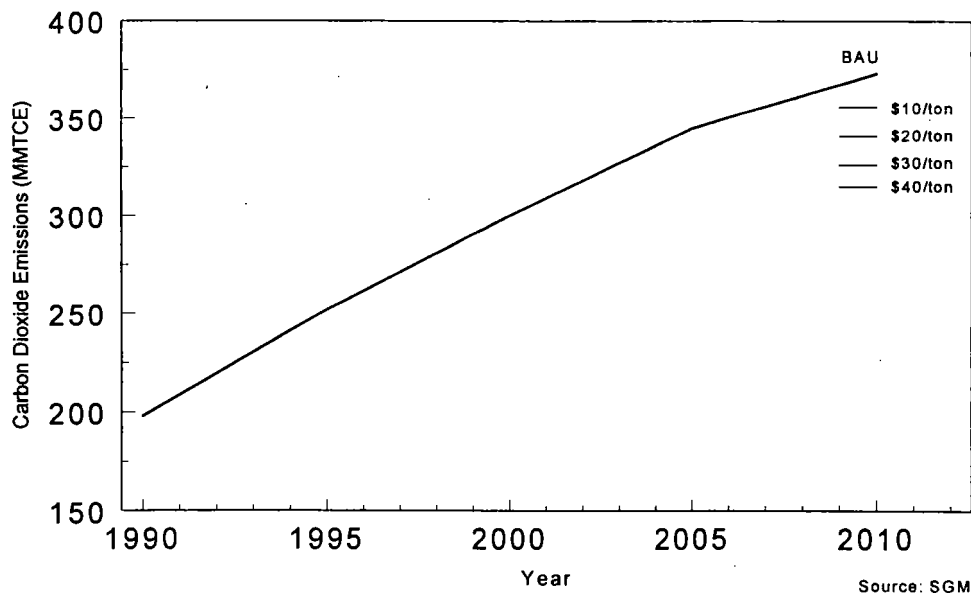
Indian Annual Gains from Trade in Emission Rights

India's 2010 Marginal Abatement Cost Curve



2/26/98
sent to
State

India Emissions



- By accepting an emissions cap at BAU, the government or private firms of India may sell emission rights to Annex I countries and gain from these exports. As an illustration, estimates from the SGM model indicate that, given permit trading among Annex I countries, India would sell approximately 58 million tons of carbon emissions at a price of \$40/ton. This would result in a net gain of more than \$1.15 billion per year during the first five year commitment period.
- Accepting an emissions cap at BAU, and with an international trading price of \$40/ton, India's emissions would still be allowed to grow above current levels. Thus, Indian emissions could still grow while the economy gains the benefits of sales of carbon permits.

3/6/98
Draft

Proposal for CEA position on targets for developing countries (i.e., the strong form of "developing country participation")¹

1. It would be useful to get LDCs to agree to binding limits, even if they involved no (or little) cuts below BAU. Reasons:

- We want to forestall increases over BAU, in response to Annex I cuts (leakage)
- The ability for Annex I countries to buy reductions from LDCs would greatly reduce the costs of meeting our targets (as CEA testimony showed).
- *With targets close to BAU, the LDCs would benefit from the ability to sell emission permits. This actually gives them a genuine economic incentive to join, which is otherwise lacking.*
- Agreement on modest targets in the nearer term is the first step to drawing LDCs into the system, where larger cuts relative to BAU may be possible in the longer term (in some proportion to the cuts made by richer countries that have gone before them).

¹ There is no presumption that LDCs are likely to agree to this, or that the Administration would necessarily hold out for such an ambitious definition of meaningful participation before submitting the treaty. This is simply an alternative track to CDM, etc.. We think the U.S. should have an answer ready if some small country asks: "Suppose we were willing to consider a binding commitment. What emissions target does the U.S. think is fair?"

• JY: Have other countries propose their BAUs, or approaches to BAU. (Align thru IPCC)
- Need principles prior to formula.

pure time series
pure X-section

lagged emissions

2. It might be useful to phrase LDC targets as a formula (intended approximately to replicate BAU on an ex ante basis²). Reasons:

- It is hard to know what the right BAU estimate for a given small poor country is, ex ante.
- Even if we think we know, it will be hard to get agreement. It would require protracted self-serving negotiations with each country one-by-one. Simpler and fairer to agree on a uniform formula that generalizes.
- *Even an optimal forecast ex ante could turn out very poor ex post -- e.g. unintentionally stringent.* Ten years ago one would have predicted that Korean growth in the coming century would be far more rapid than Slovenia's growth; looking forward from today, the opposite could be true. If countries' future growth rates turn out to be very different from what was anticipated when a binding BAU path was established, they will simply refuse to abide by them.
- Such a formula would constitute tangible proof that we are not preventing them from growing rapidly
- Compared to pragmatic alternative approaches that determine future targets from past emissions, a formula that puts less weight on past emissions minimizes the incentive for countries to maximize emissions in the near term in order to have a higher base allocation in the future.

² An example of such a formula, which we have fit econometrically to actual data, expresses future emissions per capita as a log-linear combination of GDP per capita and current emissions per capita.

How does EIA do US (other countries) BAU

To: David Hales, USAID
From: Jeffrey Frankel, Member, Council of Economic Advisers
Subject: Definition of Meaningful Participation
Date: February 13, 1998

I would like to offer comments regarding the USAID discussion paper on defining "Meaningful Participation" for developing countries that you recirculated yesterday. The CEA has given quite a lot of thought to the question of the approach that the US might propose for developing country emission commitments.

While in general we concur with the concept of progressive differentiation, we believe that it is important to move beyond general principles to something more concrete. We propose an alternative definition, and present reasons why we believe it would be more in U.S. interests and in LDC interests than the approach your paper describes. We also discuss the implementation of our approach. We would be delighted to talk further with you about the merit of these suggestions. Since I am out of town next week you may contact Randy Lutter at 395-3142 with questions.

I. Specific Comments:

We have two specific comments.

1) The nine criteria necessary for meaningful participation are too many and too general to be helpful, at least without a separate refinement.

2) The distinctions drawn among the four categories enumerated on p. 3 appear to us not very useful. In particular category II (low emissions and low GDP/capita) and category III (high emissions and low GDP/capita) differ primarily because of population. A strategy of seeking agreement from the largest countries first may be more effective at lowering U.S. compliance costs through trading, and at getting larger emissions reductions than a strategy that ignores the size of LDCs. And we understand that to satisfy Senate constraints, the U.S. will be devoting its diplomatic time and capital heavily toward the larger countries. But this document should include a consideration of what explicit approach or formula we propose to ask all countries to sign up to. If such an approach or formula makes distinctions based on population it cannot be a fair basis for establishing differences in responsibilities, as is proposed on p. 3. Why should Nepal or

Bangladesh, which have a small fraction of India's population, have different responsibilities than India, given that on a per capita basis, they have more or less equivalent opportunities and responsibilities?

Thus our view on the first issue identified on p. 5 is definitely "no". Total net emissions is an inappropriate measure to identify different responsibilities; it would be rejected by developing countries. It could, however be used by State (along with diplomatic considerations) to identify which countries to approach first when State seeks "meaningful participation".

II. CEA Proposal

We instead would propose that meaningful participation be defined as

Accepting a binding commitment to a net emissions cap, plus permit trading, with a cap on net emissions that is forecasted to be slightly below the country's emissions under baseline as usual,

Before turning to how to implement this definition we make three points about why it is superior to other possible definitions.

A) Advantages

1) By focussing on trading, this definition will substantially lower U.S. compliance costs. Functioning markets in tradeable permits will lower U.S. costs by much more than joint implementation or the clean development mechanism. For such markets to exist, the LDC emissions must be capped. This definition focuses on this cap which is thus critical to lowering U.S. compliance costs and gaining acceptance of the Kyoto agreement in the U.S. .

2) It would give the LDCs an incentive to join: the opportunity to sell rights to further emissions reductions would leave them better off. To see this crucial point, consider a cap which is set *at* the level of business as usual. In this case the LDC would be better off by being able to participate in international markets in permits, for exactly the same reason that it is better off from participation in international markets in shoes, oil and other commodities. In particular it could profitably sell any emissions reductions for which the cost was less than the world price. (If it did not profit from such a trade, it would not make it; thus at worst it would be unaffected by the existence of the opportunity.) This essential point needs to be the cornerstone of our efforts to bring LDCs voluntarily into international agreements about permit trading. More importantly, this argument about being better off is also true for caps below business as usual, as long as they are only *slightly* below.

3) Requiring caps to be *slightly* below business as usual would not only leave the LDCs better off; it would also serve our interests both politically and economically. We could claim

politically that meaningful participation entailed real reductions by LDCs; and that as a result the Administration's efforts were fair to Americans. In addition, trading would lower costs to the U.S. relative to either the JI or CDM alternatives.

B) Implementation

To implement this definition requires the following steps:

- identification of a workable baseline (BAU level) and
- development of a U.S. negotiating position on the appropriate stringency of the cap relative to BAU, and how this might vary among countries in a way that preserves fairness among LDCs and with respect to Annex I countries.

1) Identification of a baseline: To ensure that the BAU is acceptable to the LDC, without whose voluntary participation this effort will fail, we believe that it needs to be formulated in such a way ex ante that even in the presence of unexpected developments, the commitment does not turn out ex post to impose huge unanticipated costs (or benefits) on the country. We therefore would propose that the baseline to which the LDC and we would agree would not be a number but instead a formula based in part on contemporaneous variables like GDP per capita. Such contemporaneous variables would reflect unexpected growth in income between the date the agreement is negotiated and the budget period, and thereby would lower the risk that the BAU is unintentionally too stringent. Any BAU projections done 10 years ago would have had incomes (and therefore emissions) in Thailand growing extremely rapidly from current levels, and in Estonia very slowly; whereas now something very different may be the case.) The preliminary econometric analysis that we have undertaken over the last six months suggests that a relatively simple formula might be adequately predictive. A second possible argument for using a formula is that it may be more difficult to agree on many different numerical caps than to agree on a single common formula.

We attach a memo from last fall, as a concrete illustration of what we have in mind.

2) Stringency of the cap: A consistent and fair negotiating position for the U.S. would be to advocate that the cap, relative to this baseline, at least in the first budget period satisfy one key condition:

- Richer LDCs should accept caps that are lower relative to their baselines than poorer LDCs.

In addition, over time, LDC caps in future budget periods should be adjusted to preserve this relationship. Further, they should be adjusted to ensure that countries that approach Annex I income levels make commitments that ultimately approach Annex I commitments, although this point need not be mentioned until negotiations for subsequent budget periods.

Jeffrey A. Frankel
02/12/98 08:07:06 PM

Record Type: Record

To: Joseph E. Aldy/CEA/EOP, Adele C. Morris/CEA/EOP

cc: Jonathan.Gruber @ treas.sprint.com @ inet, Randall W. Lutter/CEA/EOP

Subject: response to Hales by COB on LDC participation

Joe and Adele,

Please decide which of you two is going to draft a memo to Hales at USAID Friday. (I will be at the State Dept. in the a.m. and in Virginia in the early afternoon, but I will call in regularly to Lisa, who has my coordinates. I will be back in time to finalize a faxed memo to Hales in the late afternoon.)

My reaction so far to his memo: I don't see how we can rationalize treating large countries different from small ones. I think the key variables should be GDP/capita and emissions **per capita**, not the absolute level of emissions, which depends on country size. (I realize that a few large countries has more salience with Congress, and we could put more pressure on those. But I can't see writing the international rules in this way.) So let's advance our proposal that the emissions per capita target should be phrased as a linear combination of 1990 emissions per capita (or some other past year) and future GDP/capita. Refer back to our memo of the Fall for details. The exact weights don't matter (although we should definitely tell them, in an extensive and helpful-sounding way, that we have done a lot of econometrics on the relationship in the actual data -- by way of answer to the question that Hales lists as the 2nd unresolved issue on page 5. Send them the highlights of our charts and regressions.)

Perhaps also mention the idea of a threshold of one ton of carbon per capita, before a country must take binding obligations.

JF

I've marked a couple
of comments



U.S. AGENCY FOR
INTERNATIONAL
DEVELOPMENT

cc: AM
RL
SA

February 12, 1998

FAX - 10 pages

TO: Distribution

FROM: David Hales, USAID

SUBJECT: Request for Comments on USAID's Discussion Paper on
Defining "Meaningful Participation" for Developing
Countries

Attached is a discussion paper that was circulated two weeks ago at David Sandalow's Assistant Secretaries' meeting. You may recall that EPA also circulated a paper on growth baselines at this meeting. At this morning's Sherman/Eizenstat level meeting, USAID and EPA were tasked with updating these papers with Agency comments and integrating them into one discussion paper for next week's Sandalow meeting. It is with this in mind, that we ask for any additional comments that your agency may have so that we can provide the White House with the latest version of the paper. Because of the holiday next week, we must ask for comments by COB Friday, 13th.

Please contact Leslie Black Cordes or Carla Koppell with questions or comments at 712-0552.

DISTRIBUTION:

State, Melinda Kimble
Commerce, Jeffrey Hunker
CEA, Jeff Frankel
Treasury, Jon Gruber
Justice, Lois Schiffer
Interior, Brooks Yeager
OMB, T. J. Glauthier
USTR, Jennifer Haverkamp
USDA, Charlie Rawls
DOE, Mark Mazur
DOE, David Doniger
DOE, David Gardiner
PCSD, Marty Spitzer
DOD, Sherri Goodman
NEC, Peter Orszag

Discussion Paper on Defining "Meaningful Participation" by Developing Countries: "Progressive Differentiation"

Summary

In his announcement of USG climate change policy, the President called for meaningful participation by developing countries. In later testimony before Congress, Administration witnesses refined the concept to focus on those developing countries that are significant emitters of greenhouse gases (GHGs).

Developing country participation is critical to the success of the Framework Convention on Climate Change (FCCC) in reducing the climate change threat; the majority of annual global emissions are expected to come from developing nations by the middle of the next century. This will largely be the result of economic development and increased demand for energy.

This paper outlines a framework for defining meaningful participation. It proposes USG support for an approach to defining developing country commitments that differentiates among nations based upon total equivalent GHG emissions and per capita GDP. The proposed approach is consistent with the precedent for differentiation among Annex 1 countries that was set in Kyoto. Additionally, it guarantees flexibility by ensuring that nations' obligations will increase as their economies develop and grow.

Background

The further definition of "meaningful participation by developing countries" will be critical to the success of the FCCC. It will determine whether or not the Framework Convention on Climate Change will help reduce sufficiently the rate of growth in GHG emissions in order to reverse the expected negative consequences of climate change. It also will be central in determining whether the Protocol is acceptable to the United States. Ratification of the Kyoto Protocol by the Senate will require a practical, consistent, understandable and rational definition of "meaningful participation".

To be viable, strategic and fair, the U.S. approach to defining "meaningful participation" should meet a range of criteria. It must:

- promote the fundamental goal of greenhouse gas stabilization at a safe level;
- advance the USG goal of legally binding commitments for all Parties;
- remain reasonable and fair from the viewpoint of future adherents, even if their growth rates turn out to be unexpectedly rapid or unexpectedly slow in the future.

- reinforce the comprehensive USG strategy for strengthening the Protocol;
- reinforce and remain consistent with USG development assistance policy;
- advance and strengthen the full and effective implementation of environmental standards for bilateral and multilateral investment in developing countries;
- promote reliance on market mechanisms, and advance opportunities for U.S. trade and investment;
- incorporate and advance the use of "win-win" or "no-regrets" approaches;
- clearly include the concept of advancement, or "evolution" for all Parties; and,
- be premised on data that ~~is~~ reliable and verifiable.

The Proposed Approach

There is substantial consensus within the USG that Parties should develop a flexible definition of "meaningful participation" that is based upon differentiated indicators. USAID proposes the concept of *Progressive Differentiation* as one such approach.

The underlying philosophy of *Progressive Differentiation* is that the responsibilities of all Parties will evolve and progress over time, and that their efforts will decelerate GHG emissions, ultimately reducing the consequences of climate change. (In some discussions in Kyoto, we referred to this as "co-evolution".)

The definition of obligations under *Progressive Differentiation* is premised on the assumption that those nations that are relatively wealthier and those that have the highest level of annual net greenhouse gas emissions have a greater capacity and a greater obligation to contribute to GHG mitigation efforts. This obligation must be complemented by a recognition that there are significant economic, social and political differences among nations; to be effective in the long run, each country must be given the flexibility to determine the most appropriate approach for its contribution within a target.

For example, if countries are arrayed graphically based upon their per capita gross domestic product (GDP) (x-axis) and their level of net greenhouse gas emissions (y-axis), the relative position of nations with regard to emissions and GDP per capita can be viewed (see Attachment A). Countries roughly fall into four categories: high emissions and high per capita GDP (Category I--predominantly Annex I countries); low emissions and low per capita GDP (Category II--such as many African nations); high emissions and low per capita GDP (Category III--such as India and

China); and low emissions and high per capita GDP (Category IV-- such as Singapore and Israel) (see Attachment B).

- Category I includes most Annex I countries. All countries in this Category have accepted legally binding limits on GHG emissions.
- Category II contains the majority of the Parties to the FCCC. These countries contribute relatively little to global anthropogenic GHG emissions and have limited financial resources. As a result, these countries are least responsible for increasing concentrations, least capable of changing the course of events, and often most vulnerable to the impact of climate change.
- Category III contains those rapidly developing countries that will, in a later budget period of the Protocol, contribute a majority of global net GHG emissions each year. Countries in Category III must control their emissions if the FCCC is to achieve its goals. These countries should be urged to take paths to climate-friendly development that are in their economic and social interest so that climate change is not the cost of their economic development.
- Category IV includes countries that do not directly contribute significantly to increasing emissions, but which, because of their wealth, consumption and investment patterns, as well as their regional influence, may have important direct and indirect impacts on emission patterns.

Using *Progressive Differentiation*, each category would have different obligations under the FCCC. Depending upon the category within which a nation fell, its responsibilities would vary.

- Category I- In addition to existing commitments to "quantified emissions limitation or reduction obligations" (QELROS), nations in Category I could develop and fund aggressive research and development efforts, commit to and promote flexible, market-based incentives to implementation, promote domestic energy efficiency measures, expand use of renewable energy, and provide financial and technical assistance to nations in the other three categories. These nations could also be asked to ensure that their overseas investment programs are fully consistent with GHG emissions reductions goals, and use their influence

with multilateral lenders to ensure that international lending policies and practices are consistent with international goals. Countries in category I should serve as models of what needs to be done.

Category II- For nations in Category II, the implementation of actions to which they have already committed under the FCCC would represent meaningful participation. Nonetheless, there are strategies these countries could pursue that would promote their national interests and contribute to the stabilization of GHG concentrations. Many of these countries might also find it in their interests to accept QELROS in order to participate in emissions trading. Their participation could benefit industries in countries with emissions reduction targets, and provide funds to phase-out economically marginal GHG-producing industries, replacing them with more environmentally and economically sustainable activities. In ways that are fully consistent with their current obligations, these nations could commit to undertaking an analysis that would lead to development of national climate change strategies with timeframes for implementation.

Category III - For countries in Category III, movement toward QELROS would be essential. "Meaningful participation" at this time could be defined as:

- commitment to move toward a QELRO as they "graduate" into Category I;
- commitment to a growth baseline reduction and implementation schedule;
- commitment to develop a national strategy for introducing specific programs and actions that includes a detailed implementation schedule; and,
- commitment to commit, under the auspices of the FCCC, to an implementation schedule for a growth baseline and a national strategy.

Because of the vast differences among countries in Category III, substantial flexibility and differentiation of strategies would be needed to allow the approach of each country to be tailored to meet local opportunities and constraints.

Category IV- For countries in this category "meaningful participation" would include the same measures as for those in Category III, as well as additional commitments. These could include:

- an analysis that identifies the impacts of domestic consumption and investment patterns on emissions in other countries, and the development of strategies for reducing those impacts; and
- an obligation to provide financial and technical assistance to other countries via contributions to multilateral assistance efforts.

By categorizing countries based upon this matrix and assigning each category different obligations under the FCCC, the Protocol could differentiate among Parties in an objective manner, and create a framework through which countries could progressively "graduate" from one level of obligations to another, as their per capita GDP and level of net emissions changed.

This flexibility and differentiation should not imply anarchy. It should be structured to ensure verifiability and some degree of commonality among Parties. It would recognize that there are national conditions that will determine the appropriate paths to reducing the rate of growth in net GHG emissions.

This is an outline of one approach, providing a basis for further development and discussion. The Department of State has suggested the formation of a "meaningful participation task force" to which we might like to refer this outline for follow-up. If the premise of this paper is correct, that reducing emissions and stabilizing concentrations of GHGs, and ratification of the Kyoto Protocol require a practical, consistent, understandable and rational definition of "meaningful participation", this concept may provide a starting point.

Issues

- Are "total net emissions" and "GDP per capita" the appropriate measures?
- Does a per capita figure for GDP capture per capita emissions? (That is, do per capita emissions rise in parallel with per capita GDP?)

*We have
statistical
results on
this*

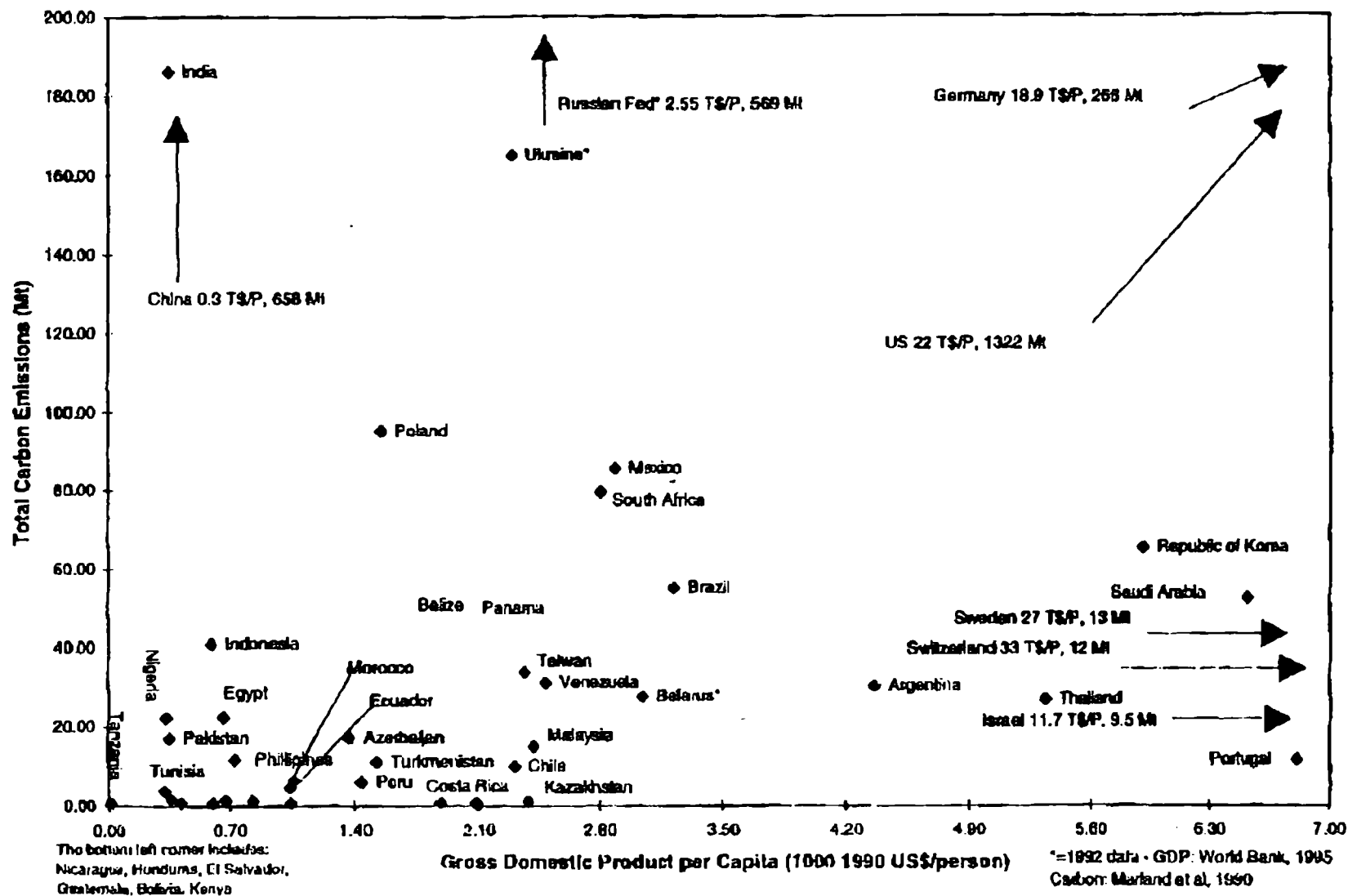
If not, how can we capture each of the three important dimensions-- total emissions, per capita emissions, and national wealth?

- How can the borders between categories be set? (We would advocate leaving them undefined as long as possible to provide flexibility in discussion and negotiation, and to let the concept mature and gain support.)

What is an alternative approach to presentation? Is the element of "progressive" commitments better captured in a different way? (See alternative diagram for discussion.)

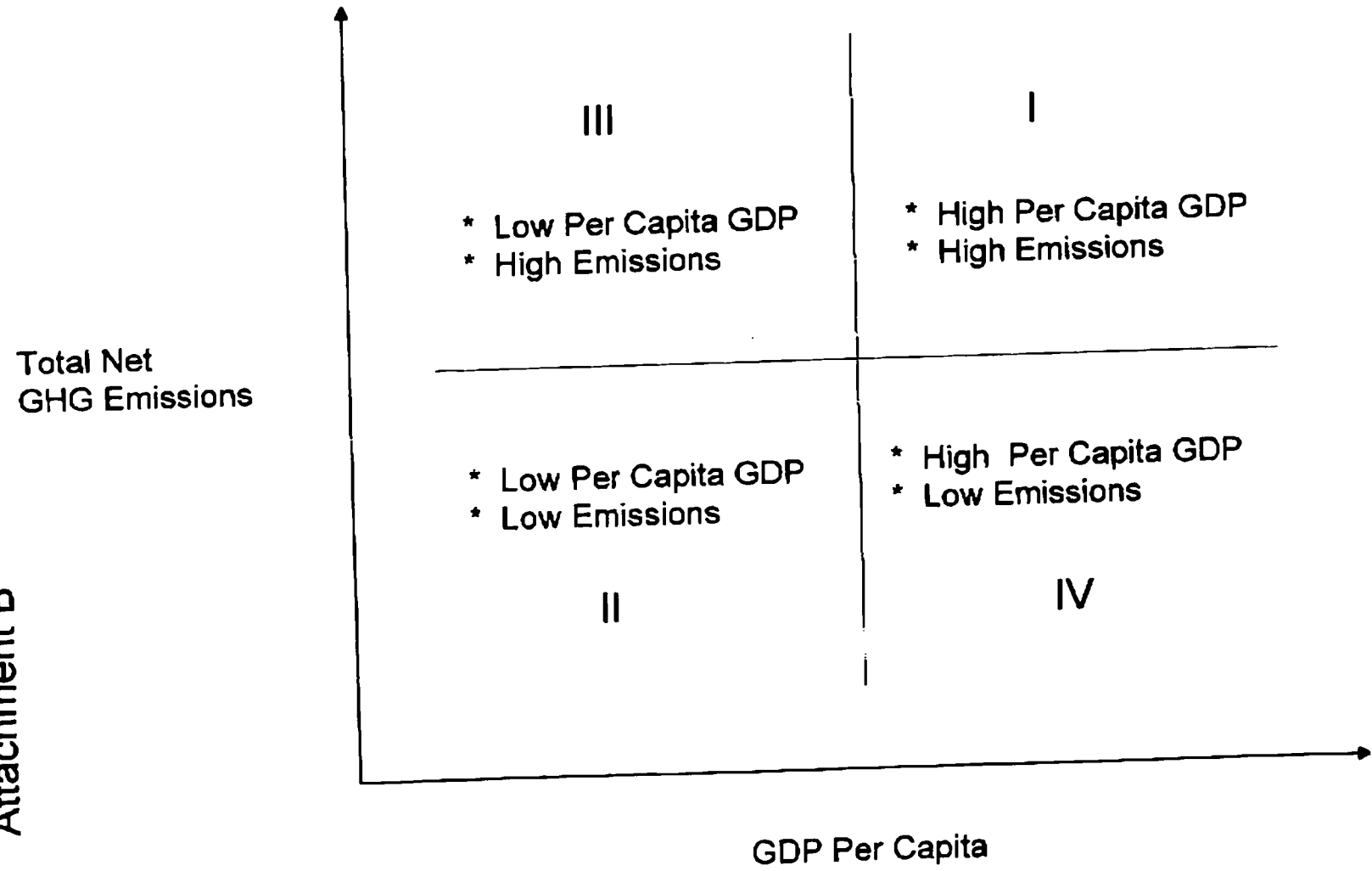
Data ^{are} is currently for emissions rather than net emissions. The division of countries/categories should be revisited and refined as data improves, and definitions for "sinks" are finalized.

Gross Domestic Product Per Capita vs. Total Carbon Emissions (1990)
DRAFT



Attachment B

- Progressive Differentiation -
Emissions & Income Categories





U.S. AGENCY FOR
INTERNATIONAL
DEVELOPMENT

cc: JAT
Am
PL
JH

January 28, 1998

TO: Distribution

FROM: David Hales, USAID *cc for*

SUBJECT: Discussion Paper on Defining "Meaningful Participation"
for Developing Countries

Attached is a discussion paper on defining meaningful participation for developing countries. The paper will be discussed at the meeting to be convened by David Sandalow this afternoon, January 28, at 4:00pm in the Truman Room of the White House Conference Center.

Attachment: as stated.

**Discussion Paper on Defining "Meaningful Participation" by
Developing Countries: "Progressive Differentiation"**

Summary

In his announcement of USG climate change policy, the President called for meaningful participation by developing countries. In later testimony before Congress, Administration witnesses refined the concept to focus on those developing countries that are significant emitters of greenhouse gases (GHGs).

Developing country participation is critical to the success of the Framework Convention on Climate Change (FCCC) in reducing the climate change threat; the majority of annual global emissions are expected to come from developing nations by the middle of the next century. This will largely be the result of economic development and increased demand for energy.

This paper outlines a framework for defining meaningful participation. It proposes USG support for an approach to defining developing country commitments that differentiates among nations based upon total equivalent GHG emissions and per capita GDP. The proposed approach is consistent with the precedent for differentiation among Annex 1 countries that was set in Kyoto. Additionally, it guarantees flexibility by ensuring that nations' obligations will increase as their economies develop and grow.

Background

The further definition of "meaningful participation by developing countries" will be critical to the success of the FCCC. It will determine whether or not the Framework Convention on Climate Change will help reduce sufficiently the rate of growth in GHG emissions in order to reverse the expected negative consequences of climate change. It also will be central in determining whether the Protocol is acceptable to the United States. Ratification of the Kyoto Protocol by the Senate will require a practical, consistent, understandable and rational definition of "meaningful participation".

To be viable, strategic and fair, the U.S. approach to defining "meaningful participation" should meet a range of criteria. It must:

- promote the fundamental goal of greenhouse gas stabilization at a safe level;
- advance the USG goal of legally binding commitments for all Parties;

- reinforce the comprehensive USG strategy for strengthening the Protocol;
- reinforce and remain consistent with USG development assistance policy;
- advance and strengthen the full and effective implementation of environmental standards for bilateral and multilateral investment in developing countries;
- promote reliance on market mechanisms, and advance opportunities for U.S. trade and investment;
- incorporate and advance the use of "win-win" or "no-regrets" approaches;
- clearly include the concept of advancement, or "evolution" for all Parties; and,
- be premised on data that is reliable and verifiable.

The Proposed Approach

There is substantial consensus within the USG that Parties should develop a flexible definition of "meaningful participation" that is based upon differentiated indicators. USAID proposes the concept of *Progressive Differentiation* as one such approach.

The underlying philosophy of *Progressive Differentiation* is that the responsibilities of all Parties will evolve and progress over time, and that their efforts will decelerate GHG emissions, ultimately reducing the consequences of climate change. (In some discussions in Kyoto, we referred to this as "co-evolution".)

The definition of obligations under *Progressive Differentiation* is premised on the assumption that those nations that are relatively wealthier and those that have the highest level of annual net greenhouse gas emissions have a greater capacity and a greater obligation to contribute to GHG mitigation efforts. This obligation must be complemented by a recognition that there are significant economic, social and political differences among nations; to be effective in the long run, each country must be given the flexibility to determine the most appropriate approach for its contribution within a target.

For example, if countries are arrayed graphically based upon their per capita gross domestic product (GDP) (x-axis) and their level of net greenhouse gas emissions (y-axis), the relative position of nations with regard to emissions and GDP per capita can be viewed (see Attachment A). Countries roughly fall into four categories: high emissions and high per capita GDP (Category I--predominantly Annex I countries); low emissions and low per capita GDP (Category II--such as many African nations); high emissions and low per capita GDP (Category III--such as India and

China); and low emissions and high per capita GDP (Category IV-- such as Singapore and Israel) (see Attachment B).

- Category I includes most Annex I countries. All countries in this Category have accepted legally binding limits on GHG emissions.
- Category II contains the majority of the Parties to the FCCC. These countries contribute relatively little to global anthropogenic GHG emissions and have limited financial resources. As a result, these countries are least responsible for increasing concentrations, least capable of changing the course of events, and often most vulnerable to the impact of climate change.
- Category III contains those rapidly developing countries that will, in a later budget period of the Protocol, contribute a majority of global net GHG emissions each year. Countries in Category III must control their emissions if the FCCC is to achieve its goals. These countries should be urged to take paths to climate-friendly development that are in their economic and social interest so that climate change is not the cost of their economic development.
- Category IV includes countries that do not directly contribute significantly to increasing emissions, but which, because of their wealth, consumption and investment patterns, as well as their regional influence, may have important direct and indirect impacts on emission patterns.

Using *Progressive Differentiation*, each category would have different obligations under the FCCC. Depending upon the category within which a nation fell, its responsibilities would vary.

- Category I- In addition to existing commitments to "quantified emissions limitation or reduction obligations" (QELROS), nations in Category I could develop and fund aggressive research and development efforts, commit to and promote flexible, market-based incentives to implementation, promote domestic energy efficiency measures, expand use of renewable energy, and provide financial and technical assistance to nations in the other three categories. These nations could also be asked to ensure that their overseas investment programs are fully consistent with GHG emissions reductions goals, and use their influence

with multilateral lenders to ensure that international lending policies and practices are consistent with international goals. Countries in category I should serve as models of what needs to be done.

Category II- For nations in Category II, the implementation of actions to which they have already committed under the FCCC would represent meaningful participation. Nonetheless, there are strategies these countries could pursue that would promote their national interests and contribute to the stabilization of GHG concentrations. Many of these countries might also find it in their interests to accept QELROS in order to participate in emissions trading. Their participation could benefit industries in countries with emissions reduction targets, and provide funds to phase-out economically marginal GHG-producing industries, replacing them with more environmentally and economically sustainable activities. In ways that are fully consistent with their current obligations, these nations could commit to undertaking an analysis that would lead to development of national climate change strategies with timeframes for implementation.

Category III - For countries in Category III, movement toward QELROS would be essential. "Meaningful participation" at this time could be defined as:

- commitment to move toward a QELRO as they "graduate" into Category I;
- commitment to a growth baseline reduction and implementation schedule;
- commitment to develop a national strategy for introducing specific programs and actions that includes a detailed implementation schedule; and,
- commitment to commit, under the auspices of the FCCC, to an implementation schedule for a growth baseline and a national strategy.

Because of the vast differences among countries in Category III, substantial flexibility and differentiation of strategies would be needed to allow the approach of each country to be tailored to meet local opportunities and constraints.

Category IV- For countries in this category "meaningful participation" would include the same measures as for those in Category III, as well as additional commitments. These could include:

- an analysis that identifies the impacts of domestic consumption and investment patterns on emissions in other countries, and the development of strategies for reducing those impacts; and
- an obligation to provide financial and technical assistance to other countries via contributions to multilateral assistance efforts.

By categorizing countries based upon this matrix and assigning each category different obligations under the FCCC, the Protocol could differentiate among Parties in an objective manner, and create a framework through which countries could progressively "graduate" from one level of obligations to another, as their per capita GDP and level of net emissions changed.

This flexibility and differentiation should not imply anarchy. It should be structured to ensure verifiability and some degree of commonality among Parties. It would recognize that there are national conditions that will determine the appropriate paths to reducing the rate of growth in net GHG emissions.

This is an outline of one approach, providing a basis for further development and discussion. The Department of State has suggested the formation of a "meaningful participation task force" to which we might like to refer this outline for follow-up. If the premise of this paper is correct, that reducing emissions and stabilizing concentrations of GHGs, and ratification of the Kyoto Protocol require a practical, consistent, understandable and rational definition of "meaningful participation", this concept may provide a starting point.

Issues

- Are "total net emissions" and "GDP per capita" the appropriate measures?
- Does a per capita figure for GDP capture per capita emissions? (That is, do per capita emissions rise in parallel with per capita GDP?)

If not, how can we capture each of the three important dimensions-- total emissions, per capita emissions, and national wealth?
- How can the borders between categories be set? (We would advocate leaving them undefined as long as possible to provide flexibility in discussion and negotiation, and to let the concept mature and gain support.)

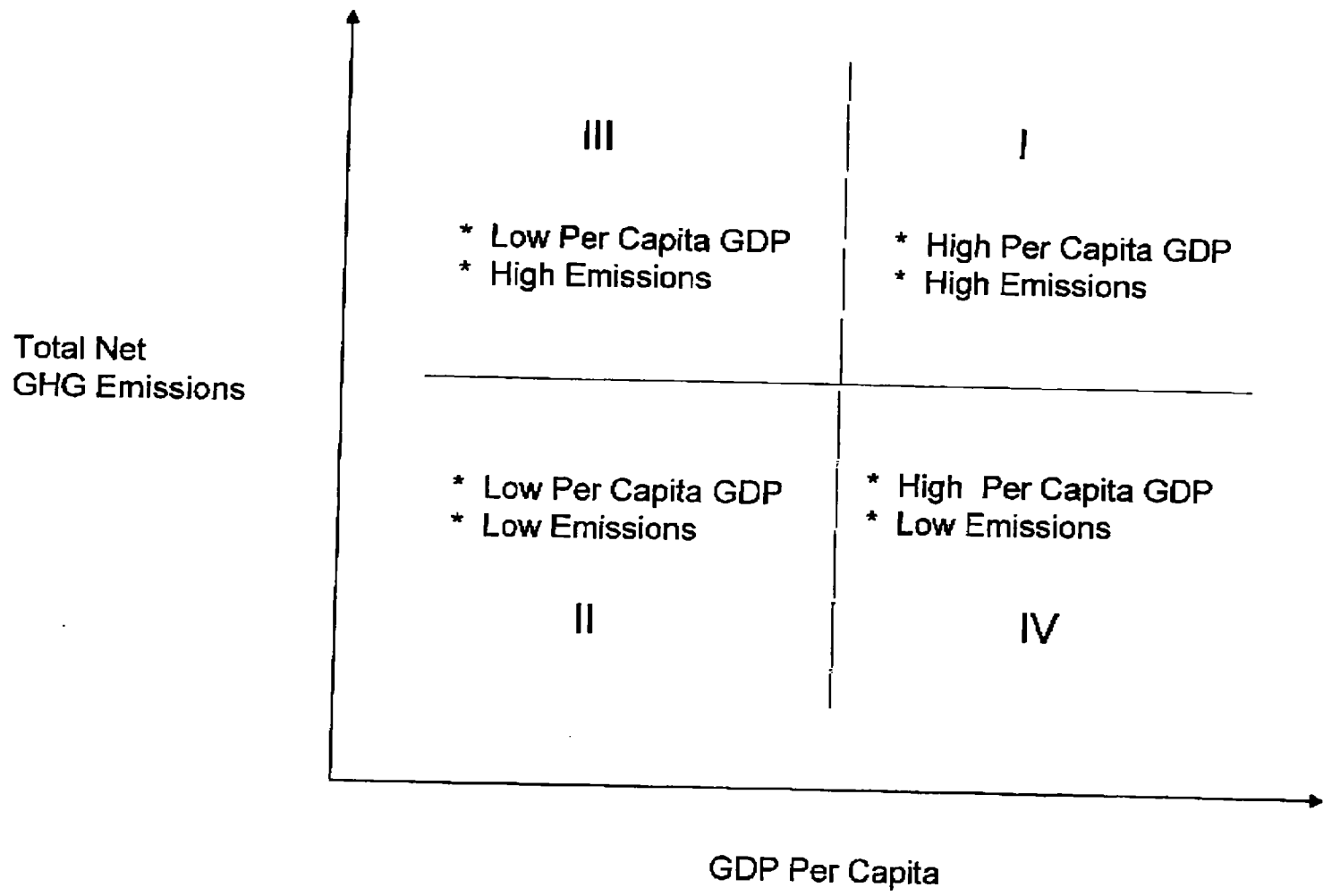
What is an alternative approach to presentation? Is the element of "progressive" commitments better captured in a different way? (See alternative diagram for discussion.)

Data is currently for emissions rather than net emissions. The division of countries/categories should be revisited and refined as data improves, and definitions for "sinks" are finalized.

January 27, 1998

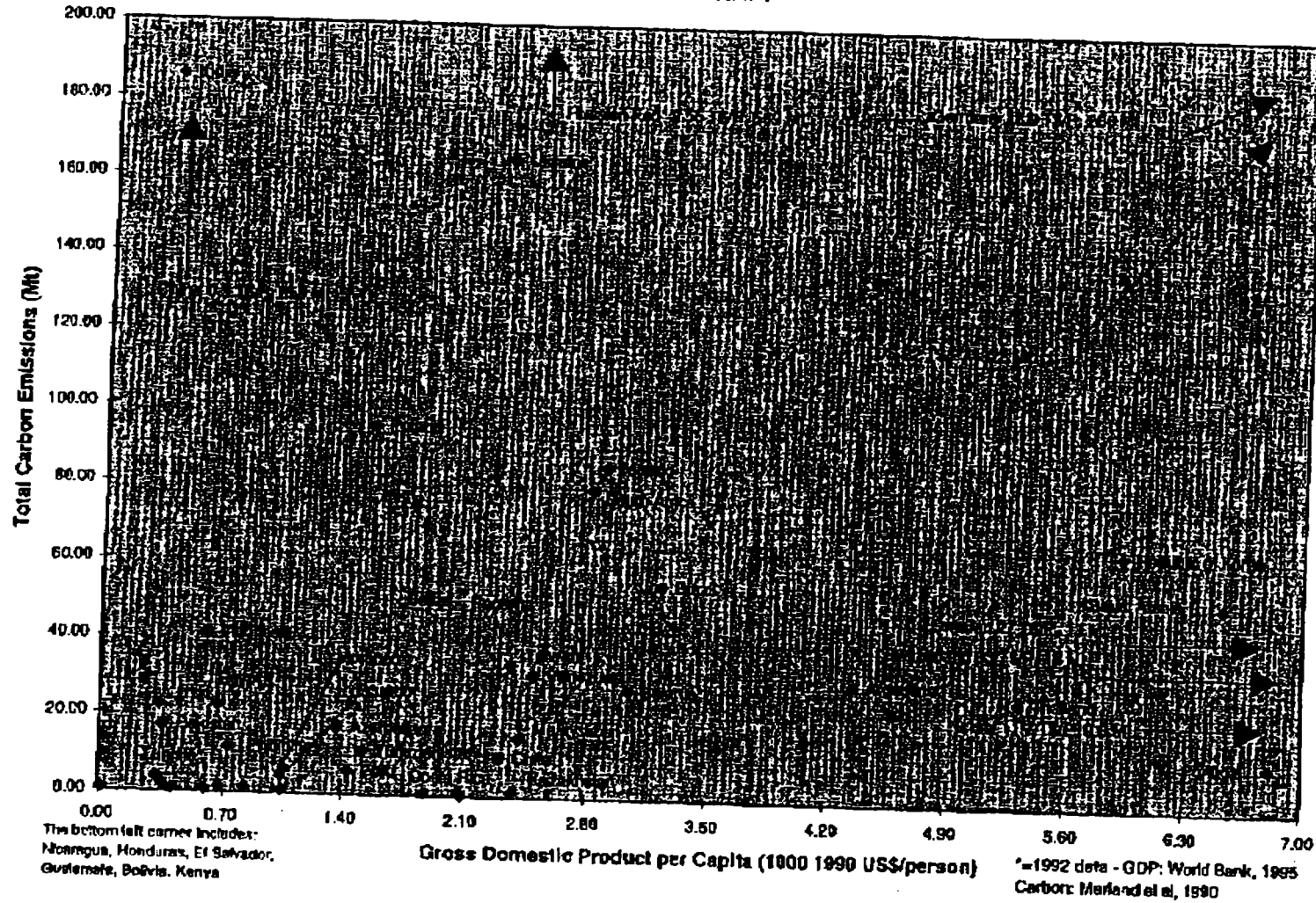
Attachment B

- Progressive Differentiation -
Emissions & Income Categories



ATTACHMENT A

Carbon vs. gdp Chart 3

Gross Domestic Product Per Capita vs. Total Carbon Emissions (1990)
DRAFT

Distribution

<u>ORGANIZATION</u>	<u>NAME</u>	<u>FAX</u>	<u>PHONE</u>
State	Melinda Kimble	647-0217	647-1554
	Rafe Pomerance	647-0217	647-2232
Commerce	Jeffrey Hunker	482-4636	482-6055
OSTP	Rosina Bierbaum	456-6025	456-6077
CEA	Jeff Frankel	395-6947	395-5046
Treasury	Jon Gruber	622-2633	622-0563
Justice	Lois Schiffer	514-0557	514-2701
	Jim Rubin	514-0557	514-2701
Interior	Brooks Yeager	208-4561	208-6182
	Brooke Shearer	208-1873	208-6291
OMB	T.J. Glauthier	395-4639	395-4561
USTR	Jennifer Haverkamp	395-4579	395-7320
USDA	Charlie Rawls	720-5437	720-6158
DOE	Dan Reicher	586-0148	586-9500
	Mark Mazur	586-9626	586-7700
EPA	David Doniger	260-5155	260-2865
	David Gardiner	260-0275	260-4332
DOT	John Lieber	366-7127	366-4544
OVP	Pete Jordan	456-9500	456-9513
PCSD	Marty Spitzer	408-1655	408-5296
CCTF	Dirk Forrister	343-1162	343-1060
	Steve Seidel	343-1162	343-1060
USAID	Sally Shelton-Colby	216-3235	712-1479
DOL	Ed Montgomery	219-4902	219-5108
DOD	Sherri Goodman	703-693-7011	703-695-6639
NEC	Peter Orszag	456-2223-1132	456-5358
	Bill Antholis	456-5334	456-2198
CEQ/NSC	David Sandalow	456-2710	456-6224

options for emissions targets and trajectories for LDC's.

Possible Triggers

Large-emitting countries (China, India, Brazil...)

High-income countries (Singapore, Hong Kong, Korea, Chile...)

Countries that cross threshold of 1 M ton per person

Possible Targets-and-timetables

Nordhaus: targets are continuously re-benchmarked to past emissions

Problem: gives countries an incentive to let emissions keep growing in early years.

*review literature: McKibbin + Usterman
others*

Other proposals...

Cuts from projected BAU paths, in proportion to Annex I cuts already agreed to

Problems: (1) impossible to agree on an ex ante BAU path

(2) ex post, any given ex ante path will turn out to have been wrong. E.g., forecasts of Asian GDP in 2040 are now being radically downgraded. A country that grows unexpectedly rapidly would be called upon, in 2040, to transfer huge amounts of money to others, and most likely would not agree to do so; similar, a country that collapses economically, would be eligible to receive huge transfers for doing nothing (future "paper tons"), and others would probably be reluctant to follow through. What one wants is a baseline that comes closer to forecasting what the path would be, absent policy changes in response to climate change (but *with* all the other exogenous influences on economies that come along).

Per capita emissions to be a linear combination of 1990 levels and income per capita

Problems with putting all the weight on one variable or the other:

Omitting income per capita would give the LDCs no room to grow, and impose huge penalties for acceding;

Omitting 1990 levels would be inconsistent with the targets assigned Annex I.

Omitting both variables (leaving only a constant target for emissions per capita across countries) would be very welcome by the LDCs, but would result in unacceptably huge transfers from the industrialized world.

Cost issue is one of indexation

Developing Country Approach

cc: JAF
RL
JA

Background

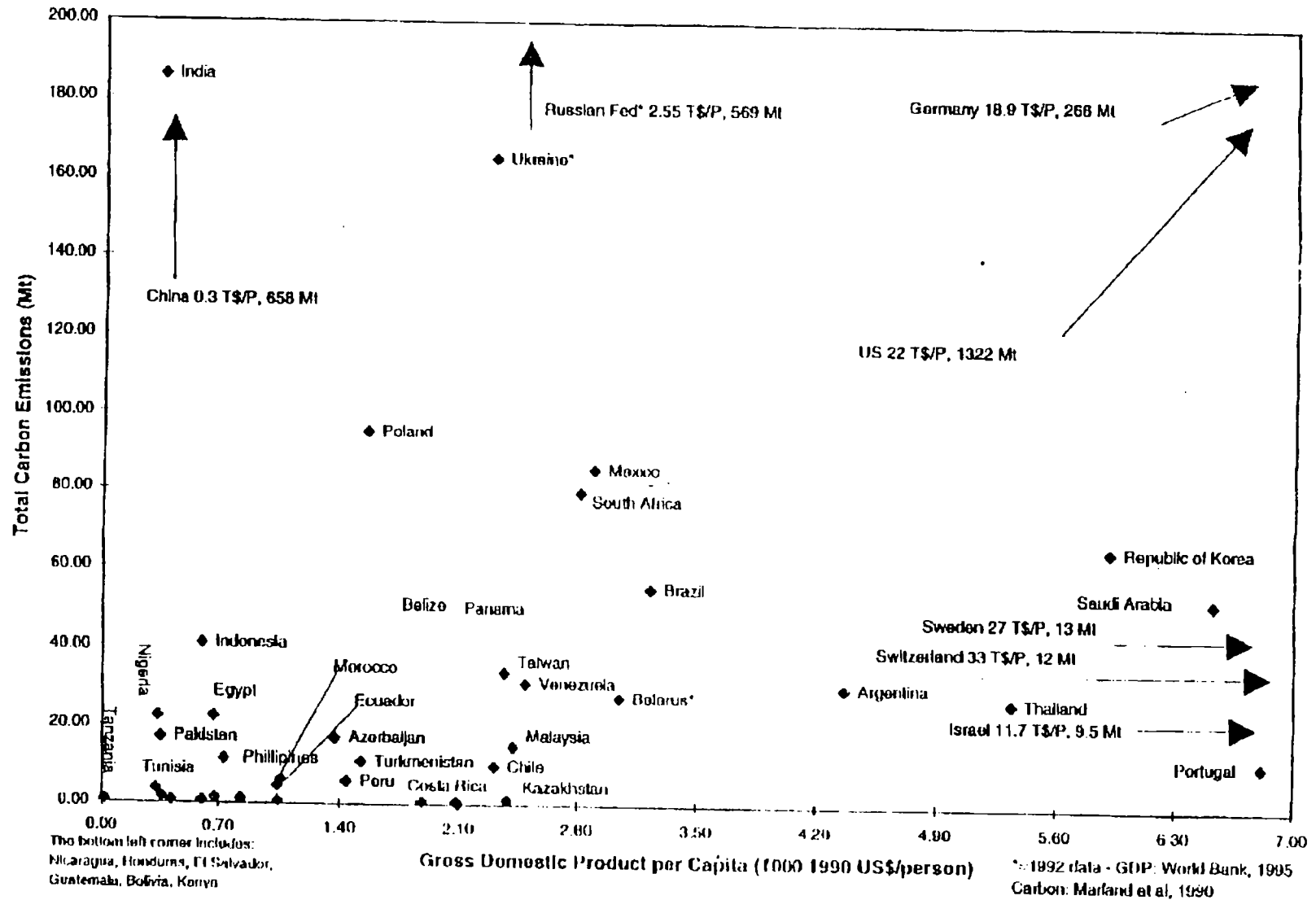
- Of the four major components of the U.S. strategy going into Kyoto, three were met in whole or in part:
 - The advancement of the implementation of commitments under Article 4.1 was addressed in the new protocol text, with new specifics added as to how all countries—including developing countries – should comply with the agreement.
 - The inclusion of joint implementation (JI) (in this case through the Clean Development Mechanism (CDM)) is included in a form that fully incorporates all of the initial U.S. substantive proposals.
 - A procedure for voluntary opt-in (in the original text of the U.S. proposal from January, referred to as Annex B) is not formally part of the process as a separate article, but provisions for voluntary acceptance with approval of the Parties is accommodated through the procedures for amending Annex B (the list of national commitments) of the Protocol. While the threshold is higher than originally envisioned by the U.S. (with both a decision and subsequent ratification by $\frac{3}{4}$ of the Protocol Parties required), it is encompassed in the text.
- However, an obligation – either in the agreement or in a separate decision – to negotiate legally binding commitments for all Parties was not achieved.
- We were most successful in bringing countries along through bottom-up programs (such as country studies and even through policy-based activities such as advancing commitments in Article 4.1).
 - In the Protocol, the existing commitments were reaffirmed and their implementation advanced through: expanding Convention provisions on emission inventories to call for the formulation of programs to improve the quality of local emission factors and activity data and/or models; spelling out specific sectors in which action should be considered in order to develop mitigation and adaptation programs (no such specificity under 4.1); and calling for the provision of more specific information in national communications (improves upon previously general reporting requirements).
- We were ultimately successful in bringing developing countries on board with the programmatic equivalent of JI through the CDM – but only after we convinced a developing country (Brazil) to take on the burden of persuasion.

Diplomatic Strategy

- Our diplomatic efforts will be well-served with a strong domestic implementation plan as we demonstrate to developing countries that we are taking action to mitigate climate change before the first commitment period. This credibility will help U.S. work with skeptical interlocutors.
- Given the extremely weak economic position of many of the Asian economies, those affected by the crisis may not be good targets of opportunity for diplomatic efforts between now and November's COP-4; similarly, African levels of development make most countries ineligible for significant obligations with respect to emissions mitigation.
- Latin America remains a pivotal player in the international system, and using activities such as the Summit of the Americas and regional and bilateral efforts – as well as the fact the COP-4 will be in the Western Hemisphere could make a strategy targeting this region the best option for success.
- A strategy that would bring support (and pressure) for developing country participation from our Annex I colleagues will also be critical.
- We may wish to constitute a “Meaningful Participation Task Force” to ensure coordination across many USG players, including the formation of a formal interagency working group on this issue and consultations with private sector representatives with technical, energy and financial expertise.
 - The “Task Force” would assess and monitor 25-30 key developing countries in order to collect data on these countries’ climate change mitigation efforts, drawing from U.S. bilateral assistance programs, other countries’ ODA programs, U.S. Country Studies Program and USIJI, relevant IFI activities, OECD and IEA activities, and other sources.
 - The data could then be used to develop a comprehensive picture of what these countries are doing or not doing to address climate change, thereby demonstrating how these countries are participating meaningfully in the global effort to combat global warming and to identify areas in which further improvement could be made, perhaps with bilateral or multilateral assistance.

CONF
RL
J A
A M

Gross Domestic Product Per Capita vs. Total Carbon Emissions (1990)
DRAFT





UNITED STATES DEPARTMENT OF COMMERCE
Office of the Secretary
Washington, D.C. 20230

JAN 14 1998

MEMORANDUM FOR DISTRIBUTION

FROM: JEFFREY HUNKER 
SUBJECT: Developing Country Participation Paper

Attached is the Commerce/AID/State discussion paper on developing country participation for the Friday, January 16 climate change meeting.

Handwritten notes and signatures:
C. J. H. F.
J. H.
R. L.
J. H.

DISTRIBUTION:

Organization	Name	Fax	Phone
State	Melinda Kimble	647-0217	647-1554
	Rafe Pomerance	647-0217	647-2232
Commerce	Jeffrey Hunker	482-4636	482-6055
OSTP	Rosina Bierbaum	456-6025	456-6077
CEA	Jeff Frankel	395-6947	395-5046
Treasury	Jon Gruber	622-2633	622-0563
Justice	Lois Schiffer	514-0557	514-2701
	Jim Rubin	514-0557	514-2701
Interior	Brooks Yeager	208-4561	208-6182
	Brooke Shearer	208-1873	208-6291
OMB	T.J. Glauthier	395-4639	395-4561
USTR	Jennifer Haverkamp	395-4579	395-7320
USDA	Charlie Rawls	720-5437	720-6158
DOE	Dan Reicher	586-0148	586-9500
	Mark Mazur	586-9626	586-7700
EPA	David Doniger	260-5155	260-2865
	David Gardiner	260-0275	260-4332
DOT	John Lieber	366-7127	366-4544
OVP	Pete Jordan	456-9500	456-9513
PCSD	Marty Spitzer	408-1655	408-5296
CCTF	Dirk Forrister	343-1162	343-1060
	Steve Seidel	343-1060	343-1162
USAID	Sally Shelton-Colby	216-3235	712-1479
	David Hales	216-3174	712-1750
DOL	Ed Montgomery	219-4902	219-5108
DOD	Sherri Goodman	703-693-7011	703-695-6639
NEC	Peter Orszag	456-2223	456-5358
	Bill Antholis	456-5334	456-2198
CEQ/NSC	David Sandalow	456-2710	456-6224

DRAFT -- January 13, 1998

ADDITIONAL ELEMENTS OF A POST-KYOTO PROCESS TO ENGAGE DEVELOPING COUNTRIES

The premise of this proposal is that a comprehensive multifaceted and evolutionary approach -- one that goes beyond the negotiating process of the Kyoto Protocol and the Framework Convention -- will be necessary to move major developing countries towards the 'meaningful participation' to limit greenhouse gas emissions that the President has called for.

Furthermore, to be successful such a multi-faceted approach must meet the following criteria:

- Accommodating -- and ideally enhancing -- developing country economic growth;
- Perceived to be in the best interests of developing countries; and
- Producing real results in reducing greenhouse gas emissions compared to business-as-usual.

An interagency group (State, AID, Commerce, Treasury, EPA, Energy, Ex-Im) has been working over the past several months on such an approach, which is summarized here.

Such an approach might include the following four major elements:

1) Growth Baselines and Technology Cooperation

Developing country participation must rest on a mutually acceptable economic/environmental framework. The concept of 'growth baselines' meets this test.

Key elements of an initiative to promote the use of growth baselines includes:

- a) Build a consensus on 'growth baselines' among key developing country governments, business and NGO's as the preferred approach to commitments. This would allow developing country emissions to rise above current levels but would be capped below 'business as usual' -- as opposed to industrialized nations which in general are capped at below 1990 levels.

could start cap @ BAU & then constrain it to BAU - no regrets

- b) Establish cooperative programs with key developing countries (e.g., China, India, Brazil, Indonesia and Mexico) to identify approaches to growth baseline targets. This would require identifying 'business as usual' emissions growth trends; and less carbon-intensive options for meeting the same energy demand (e.g.: increased boiler efficiency, demand-side management, increased use of natural gas). The intent would be to identify a 'no-regrets' baseline as the growth target.

- c) Initiate enhanced efforts by donor nations under Article 4.5 technology cooperation commitments to assist developing countries to meet the 'no regrets' emission target. AID's "Technology Cooperation Agreement" pilot program could be used as an organizing

*be careful about oil price index Δ in BAU
→ put Kyoto
for Kyoto
could be used*

mechanism to channel public and private resources to meet the growth baseline target.

d) Build support of key developing country governments, business, and NGO's for this approach;

e) Coordinate with other bilateral and multilateral donors and the private sector in shaping the pilot Technology Cooperation Agreements and in their implementation (see also below);

f) Create a working group (perhaps a goal of COP 4) with the mandate to elaborate this approach to evolutionary commitments.

2) Enhanced role for MDB's and IFI's

While the share of international capital flows accounted for by MDB's is shrinking in comparison to private capital flows, in most LDC's MDB standards/policies have substantial leverage in shaping investment. For example, in many countries MDB standards constitute best practice.

Here we would propose initiatives to advance three goals:

a) First, to advance full and effective implementation of existing standards in MBD-financed or supervised projects;

b) Second, to advance the use of MBD standards in projects in which MDB's are not directly involved;

Elements which advance these first two goals might include:

- *Standards:* work with MDB's to further use of appropriate standards;

- *Loan approvals:* support on-going reforms to further use of these standards in MDB loan approval processes;

- *Sectoral policies:* support on-going work to promote, through lending and technical assistance, improved sectoral policies in areas such as pricing, cost recovery, regulation, privatization, and foreign investor access; and work on public finances to identify power sector subsidies and resource distortions, highlighting their larger economic costs;

- *Financial instruments:* more aggressive use of MDB guarantees for private sector investment, thereby encouraging host governments to adopt sound economic policies to protect investment value; preparation of comprehensive power sector development plans for individual countries to ensure that specific investments are least-cost, high-yield, and environmentally sound; and better coordination with the Global Environment Facility and the Carbon Trading Fund, especially in the introduction of renewable and non-traditional power technologies.

c) Finally, to continue ^{to} ~~the~~ advance the integration of climate-friendly policies in MDB and IFI decision-making, notional elements of which might include:

- supporting as needed the enhancement of MDB guidelines to advance greenhouse gas reduction objectives;
- development of special lending and programmatic support by MDB's for countries which have voluntarily agreed to greenhouse gas emissions targets, to assist their economic transition;
- inclusion of greenhouse gas reduction objectives in a broader set of MDB and IFI activities, as in IMF bailouts of developing country economies.

Obviously this agenda will require substantial work within the Administration. We believe, however, that there is a substantial long-term benefit from a more focused and strategic coordination of the many ways in which Administration actions influence MDB behavior.

3) Other Unilateral and Multilateral Actions by USG

Other possible elements of a USG agenda to advance 'meaningful participation' might include:

Advancing Multilateral Agendas:

- Vigorous support for a G-7 initiative on environmental policy for Export Credit Agencies (ECA's): During the past few years the US has made several efforts to harmonize export credit agency environmental standards within the OECD. Such an initiative offers the interesting possibility of limiting competition among different ECA's based on environmental standards (witness Three Gorges) while improving the environmental impact of private capital flows to the developing world.

- Support for developing common standards for banks in developing countries: Current standards for banks -- set by the Basel Capital Standards -- are weak. An incipient agenda would be to create a new global set of standards with more 'teeth.' Such an agenda would have potentially far reaching implications both for US capital markets and for the pattern of capital market development in other countries, and would need to be carefully coordinated with the financial sector.

Bilateral and Unilateral Actions:

- Working to incorporate environmental risk considerations into developing country capital markets: USAID, Comptroller of the Currency, and private sector groups (e.g. FASB) among others work extensively with developing countries on the framework and structure of their capital markets. Heightening the integration of environmental issues in capital markets would help ensure better investment decisions.

- Expanding bilateral assistance through a mechanism modeled on the 'International Executive Service Corps' that has been highly successful in the FSU/CEE. US retired executives and those seconded from the private sector could provide LDC's with technical assistance on environmentally sound and economical power sector choices.

4) Business Outreach and the Need for a Coordinated USG Approach

As noted, the premise underlying the elements outlined above is that a multifaceted agenda using a variety of fora and tools available to the USG is an important lever to advance developing country commitments. *Success in this strategy, however, requires coordination across many USG players that heretofore may not have seen the need for coordinated action.*

To advance coordination, it is recommended that:

- a formal interagency working group be created to advance this agenda; and that
- a USG and (US) private sector energy sector group meet at least quarterly to review progress and look for solutions to financial and technical problems of increasing power and industrial energy efficiency in developing countries. The group would be cross-cutting across the USG, and would include technical, energy, and financial industry representation.

We look forward to working with you, and would value your comments.

THIS SEARCH	THIS DOCUMENT	THIS CR ISSUE	GO TO
Next Hit	Forward	Next Document	New Search
Prev Hit	Back	Prev Document	HomePage
Hit List	Best Sections	Daily Digest	Help
	Doc Contents		

**SENATE RESOLUTION 98--EXPRESSING THE SENSE OF THE SENATE REGARDING
THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (Senate -
June 12, 1997)**

[Page: S5622]

Mr. BYRD (for himself, Mr. Hagel, Mr. Hollings, Mr. Craig, Mr. Inouye, Mr. Warner, Mr. Ford, Mr. Thomas, Mr. Dorgan, Mr. Helms, Mr. Levin, Mr. Roberts, Mr. Abraham, Mr. McConnell, Mr. Ashcroft, Mr. Brownback, Mr. Kempthorne, Mr. Thurmond, Mr. Burns, Mr. Conrad, Mr. Glenn, Mr. Enzi, Mr. Inhofe, Mr. Bond, Mr. Coverdell, Mr. DeWine, Mrs. Hutchison, Mr. Gorton, Mr. Hatch, Mr. Breaux, Mr. Cleland, Mr. Durbin, Mr. Hutchinson, Mr. Johnson, Ms. Landrieu, Ms. Mikulski, Mr. Nickles, Mr. Santorum, Mr. Shelby, Mr. Smith of Oregon, Mr. Bennett, Mr. Faircloth, Mr. Frist, Mr. Grassley, Mr. Allard, and Mr. Murkowski) submitted the following resolution; which was referred to the Committee on Foreign Relations:

S. Res. 98

Whereas the United Nations Framework Convention on Climate Change (in this resolution referred to as the 'Convention'), adopted in May 1992, entered into force in 1994 and is not yet fully implemented;

Whereas the Convention, intended to address climate change on a global basis, identifies the former Soviet Union and the countries of Eastern Europe and the Organization For Economic Co-operation and Development (OECD), including the United States, as 'Annex I Parties', and the remaining 129 countries, including China, Mexico, India, Brazil, and South Korea, as 'Developing Country Parties';

Whereas in April 1995, the Convention's 'Conference of the Parties' adopted the so-called 'Berlin Mandate';

Whereas the 'Berlin Mandate' calls for the adoption, as soon as December 1997, in Kyoto, Japan, of a protocol or another legal instrument that strengthens commitments to limit greenhouse gas emissions by Annex I Parties for the post-2000 period and establishes a negotiation process called the 'Ad Hoc Group on the Berlin Mandate';

Whereas the 'Berlin Mandate' specifically exempts all Developing Country Parties from any new commitments in such negotiation process for the post-2000 period;

Whereas although the Convention, approved by the United States Senate, called on all signatory parties to adopt policies and programs aimed at limiting their greenhouse gas (GHG) emissions, in July 1996 the Undersecretary of State for Global Affairs called for the first time for 'legally binding' emission limitation targets and time-tables for Annex I Parties, a position reiterated by the Secretary of State in testimony before the Committee on Foreign Relations of the Senate on January 8, 1997;

Whereas greenhouse gas emissions of Developing Country Parties are rapidly increasing and are expected to surpass emissions of the United States and other OECD countries as early as 2015;

Whereas the Department of State has declared that it is critical for the Parties to the Convention to include Developing Country Parties in the next steps for global action and, therefore, has proposed that

consideration of additional steps to include limitations on Developing Country Parties' greenhouse gas emissions would not begin until after a protocol or other legal instrument is adopted in Kyoto, Japan in December 1997;

Whereas the exemption for Developing Country Parties is inconsistent with the need for global action on climate change and is environmentally flawed; and

THIS SEARCH

Next Hit

Prev Hit

Hit List

THIS DOCUMENT

Forward

Back

Best Sections

Doc Contents

THIS CR ISSUE

Next Document

Prev Document

Daily Digest

GO TO

New Search

HomePage

Help

THIS SEARCH	THIS DOCUMENT	THIS CR ISSUE	GO TO
Next Hit	Forward	Next Document	New Search
Prev Hit	Back	Prev Document	HomePage
Hit List	Best Sections	Daily Digest	Help
	Doc Contents		

**SENATE RESOLUTION 98--EXPRESSING THE SENSE OF THE SENATE REGARDING
THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (Senate -
June 12, 1997)**

Whereas the Senate strongly believes that the proposals under negotiation, because of the disparity of treatment between Annex I Parties and Developing Countries and the level of required emission reductions, could result in serious harm to the United States economy, including significant job loss, trade disadvantages, increased energy and consumer costs, or any combination thereof: Now, therefore, be it

Resolved, That it is the sense of the Senate that--

(1) the United States 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, or

(B) would result in serious harm to the economy of the United States; and

(2) any such protocol or other agreement which would require the advice and consent of the Senate to ratification should be accompanied by a detailed explanation of any legislation or regulatory actions that may be required to implement the protocol or other agreement and should also be accompanied by an analysis of the detailed financial costs and other impacts on the economy of the United States which would be incurred by the implementation of the protocol or other agreement.

Sec. 2. The Secretary of the Senate shall transmit a copy of this resolution to the President.

[Page: S5623]

Mr. BYRD. Mr. President, I am submitting a sense-of-the-Senate resolution, and joining me in the introduction of this resolution are the following Senators: Mr. **Hagel**, Mr. **Hollings**, Mr. **Craig**, Mr. **Inouye**, Mr. **Warner**, Mr. **Ford**, Mr. **Thomas**, Mr. **Dorgan**, Mr. **Helms**, Mr. **Levin**, Mr. **Roberts**, Mr. **Abraham**, Mr. **McConnell**, Mr. **Ashcroft**, Mr. **Brownback**, Mr. **Kempthorne**, Mr. **Thurmond**, and Mr. **Burns**. As I say, Mr. President, I urge other Senators and their staffs to take note of this resolution and to consider joining as cosponsors within the next day or so because we welcome the support of Democrats and Republicans.

This resolution addresses some central issues regarding the conditions for U.S. agreement to revisions to the United Nations Framework Convention on Climate Change. In particular, it addresses the clear need for the participation of developing nations in the ongoing negotiations to undertake such revisions to the global climate change convention, first signed in Rio in 1992, at the so-called Earth Summit.

As my colleagues know, President Bush signed the United Nations Framework Convention on Climate Change in 1992, which was subsequently approved by the Senate and ratified. The treaty calls on all

signatories to adopt policies and programs to limit their greenhouse gas [GHG] emissions on a voluntary basis. The goal was to exhort industrialized nations to attempt to scale back their emissions to 1990 levels by the end of the present decade, a goal that has not been achieved by the U.S. nor by the vast majority of the developed nations. Those nations that have met the voluntary goals are those like Russia, whose economy has been in a free fall, its industries idle and its people hurting. This is not the way that anyone wants to meet an emissions reduction target.

This is an important negotiation attempting to address the fundamental issues of man-created climate changes and how to limit the adverse consequences that have been projected by recent scientific analysis. The perceived culprits in the warming of the globe--emissions of so-called greenhouse gases, including, particularly, carbon dioxide--are caused partly by fossil fuel combustion. Limiting and reducing such combustion and its resultant carbon dioxide are a principal objective of the treaty. It is an effort which has been led by Vice President **Al Gore** and he is to be highly commended for his sustained effort and achievement in moving this multinational negotiation along. The schedule for the negotiations to revise the Rio Pact is to culminate in meetings in Kyoto, Japan early this December.

THIS SEARCH

[Next Hit](#)

[Prev Hit](#)

[Hit List](#)

THIS DOCUMENT

[Forward](#)

[Back](#)

[Best Sections](#)

[Doc Contents](#)

THIS CR ISSUE

[Next Document](#)

[Prev Document](#)

[Daily Digest](#)

GO TO

[New Search](#)

[HomePage](#)

[Help](#)



"MacCracken, Chris" <c.maccracken @ pnl.gov>
03/13/98 08:54:01 AM

Record Type: Record

To: Joseph E. Aldy/CEA/EOP

cc:

Subject: RE: Questions ...

Joe -

sorry I didn't get back to you yesterday. We use 2 different methods for determining population - either we read the numbers in directly or we determine population endogenously based on fertility and death rates and such (if you can call that "endogenous"). For our IAT work, all of the regions but India had exogenously-supplied population paths, most likely from the World Bank projections. India used rates that were probably determined with the help of our India collaborators when we first created the India module. I can't say for certain what the sources were for the different regions because I was not involved in building the modules and Ron, who built most of them, is in India at the moment. We do not link population growth to GDP growth at all. There is a person that has done that with the MiniCAM, I believe, but I haven't seen any of the results. Here are the SGM population numbers:

Region - 2005 Pop - 2010 Pop (in thousands)

China - 1,301,519 - 1,347,517

India - 1,058,619 - 1,147,597

Korea - 48,396 - 49,874

Mexico - 106,718 - 114,021

ROW - 2,411,628 - 2,644,263

Hope this helps. Give me a call when you get a chance. I have to take off early today (around 2 or so), but I'll be around all morning.

Chris

-----Original Message-----

From: Joseph E. Aldy@cea.eop.gov [SMTP:Joseph_E._Aldy@cea.eop.gov]

Sent: Thursday, March 12, 1998 11:55 AM

To: MacCracken, Chris

Subject: Re: Questions ...

PHOTOCOPY
PRESERVATION

Chris,

We are playing with some data to develop an econometric model to predict BAU emissions for LDCs. Once we have refined the model, we would like to predict BAU emissions out to ~2010. Part of this exercise is also to compare our prediction with other BAUs (e.g., SGM, EIA, etc.). To help us understand why our prediction might differ from yours, it would be helpful to know some of your assumptions. Specifically, we need GDP and population (since we use these in some form in our model). I have the reference case GDP values for the 4 LDCs in SGM from model outputs you have previously supplied to us, but I don't have population. What is assumed about population (either explicitly as an input, or implicitly in other inputs such as GDP)? We would like the 2005 and 2010 pop values. Also, I would like to talk to you more generally about how we are approaching this issue.

Thanks.

Joe

{Embedded
image moved "MacCracken, Chris" <c.maccracken @ pnl.gov>
to file: 03/12/98 08:50:11 AM
PIC12417.PCX)

Record Type: Record

To: Joseph E. Aldy/CEA/EOP

cc:

Subject: Questions ...

Joe -

I'm going to be in and out of a conference here today, so it might be easier if

**PHOTOCOPY
PRESERVATION**

2010 IE097

- Linda Doman

	GDP	Pop
China	19716	1388.5 m
India	8876	1189.1 m
Mexico	5826 (90#)	117.7 m

GDP Deflator

90: .936 $\Rightarrow$.888
87: .831

GDP (87#)

China	1750.25
India	787.76
Mexico	516.85

2005 IE097

	GDP (90#)	Pop
China	14095	1337.3 m
India	6616	1107.2 m
Mexico	4655	110.4 m

Mich Rordan

Global Economic Prospects Report

thru 2006 for 120+ countries

CGE model in B.3.5 thru 2020

- based on several assumptions

2010 about

can get real GDP

World Bank into rules

→ can't be released into public domain

contact Joe Stiglitz

contact US Executive Director

Fax list of countries 522-2578

PHOTOCOPY
PRESERVATION