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DRAFT

April 6, 1992

MEMORANDUM FOR CLAYTON YEUTTER

FROM: MICHAEL J. BOSKIN

SUBJECT: Climate Change Policy Issues

Certain key economic aspects of the climate change policy choices seem to me to have received insufficient attention to date:

1. Stabilization of greenhouse gases at 1990 levels, even if achievable in the year 2000, is likely to be very costly, and increasingly so over time beyond that date.
2. There is a high degree of uncertainty about the economics as well as the science related to climate change.
3. Whatever the ultimate necessity of limiting greenhouse gasses, country-by-country limits based on any historical standard (such as "stabilization") certainly not the least-cost approach. ^{is}

Taking account these factors suggests to me that it is less important to avoid committing ourselves to some arbitrary goal in the short or intermediate run than it is a) to promote vigorously a collaborative approach to dealing with a worldwide problem in a way that seeks to minimize worldwide costs, and b), as a corollary, to make very explicit our expectation that any cost-minimizing strategy will not involve country-by-country stabilization.

1. Stabilization Will Be Costly

Estimates of the cost of stabilization of greenhouse gas emissions depend strongly on assumptions about how the economy works and upon the future course of energy prices and of economic growth. The Energy Modelling Forum (EMF) at Stanford has organized cost estimates by several analysts on the basis of uniform sets of assumptions about energy prices

and economic growth. The EMF figures relate to the stabilization of carbon emissions, but they give an idea of what would be involved in stabilizing greenhouse gases on a comprehensive basis.¹

The following table gives the reduction in the level of real GDP that would follow from maintaining carbon emissions at 1990 levels, as estimated using several different models.

<u>Model Name</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>	<u>2030</u>
Global2100 (Manne)	0.5%	0.6%	1.1%	1.7%
Edmonds-Reilly	0.2%	0.3%	0.5%	0.6%
Green (OECD)	0.1%	0.2%	0.3%	0.3%
DGEM (Jorgenson)			0.5%	
Goulder			1.0%	

The three models providing figures for stabilization in 2000 indicate a cost range from 0.1% to 0.5% of GNP. Because projected growth in output exceeds the projected rates of increase in the efficiency with which energy is used, these costs increase the farther into the future one looks. In 2020, the estimated sacrifice of GNP ranges from .2% to 1.1%; in 2030 the sacrifice ranges from .3 to 1.7%.

To put these figures in perspective, EPA estimates the cost of environmental regulation (exclusive of the new Clean Air Act and of Superfund) this year at \$115 billion, or about 2 percent of GDP. The cost of the 1990 amendments to the Clean Air Act, when fully implemented, are expected to run between \$25-\$30 billion, or about .3% of GDP.

¹ As a first approximation, carbon stabilization is a reasonable proxy for stabilization of all greenhouse gases in that 1) net methane emissions are expected to be about flat at least until 2010; 2) because of new scientific evidence about the net warming effect of CFCs, they are not likely to be counted at all in any international protocol; and 3) the other gases will show only minor changes from today's levels. [Check on effect of taking account of forest sinks.]

2. Uncertainty in the Projections

The uncertainty involved in the science related to global climate change has been much discussed. (Many scientists are unpersuaded there is yet a convincing case that global warming is likely, and it there is further question about how costly it would be to adapt to global warming if it occurred.) There is also significant uncertainty about the likely path of greenhouse gas emissions, especially because of the difficulty of predicting economic growth, which has a major influence on carbon emissions. The EMF estimates discussed above assume economic growth a bit below the CEA's long-term growth projections. We should not at all rule out achieving considerably higher growth. The attached chart shows how wide are the bands around projected carbon emissions associated with "higher" and "lower" economic growth.

Working from the EMF estimates described above, we estimate that if the Nation succeeds in reaching CEA's "higher growth" path the cost of maintaining the 1990 carbon emission level would increase to 1.3% to 2.4% of GDP in 2020 and 1.4% to 3.2% in 2030.²

3. Country-by-Country Emissions Limits

We have focussed a great deal of attention on the degree to which we should commit ourselves to a goal of stabilization, and by when. Unless we take a clear (and positive) position otherwise, we risk backing into a vague "nonbinding" commitment to stabilization some time in the future. In my view, this will be the wrong result. This is not because we may not wish to limit emissions significantly -- perhaps we will be persuaded it is necessary. It is

² The cited figures are our own rough estimates, as summarized in the following table:

<u>Model Name</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>	<u>2030</u>
Global2100 (Manne)		1.5%	2.4%	3.2%
Edmonds-Reilly		0.9%	1.3%	1.6%
Green (OECD)		0.8%	1.3%	1.4%

rather because country-by-country stabilization is a bad long-term approach to whatever may be the required limitation of worldwide emissions. To reduce emissions worldwide in a cost-efficient manner requires making the reductions where it is cheapest. This will certainly not imply any simple country-by-country formula, but will require a much more flexible system (perhaps along the lines of the SO₂ allowance trading scheme in the CAAA).

Just as we were anxious not to limit SO₂ emissions under the CAAA by uniform reductions, source by source, we should try hard to avoid a situation of seeking to limit GHG emissions country by country. The cost of reducing carbon emissions, for example, varies among nations by a factor of 10. If global emissions are to be restricted it would be very unlikely that the cost-minimizing way to do so would be obtained by setting each nation's emissions at any fixed relationship to current levels, absolutely or relative to GNP or population. This is not just a technical nicety: The OECD estimates that a "Toronto-type" agreement to attain the stabilization described above would be more than twice as costly as a global cost-minimizing approach.

4. Implications for Our Policy

We have up to now consistently held out against demands that we commit to stabilization. The attached description of our negotiating position in the 3rd INC puts the policy well.

But we now appear to be dancing around commitments that pose a great risk of translation via domestic politics into an effort to attain long-term stabilization. It would be better to emphasize that attaining emissions levels at or near our 1990 levels is not a long-term objective but a short term place-holder. **The farther out one goes beyond 2000, the larger the cost of achieving 1990 levels.**

The negotiating position seems to me still to be the right one. Our policy should be to continue to work with other nations to determine the nature and seriousness of global climate change induced by human activity, to seek the lowest cost way of dealing with the problems that are identified, and to seek an acceptable distribution of the costs that are implied. It should be our announced expectation that, whatever the degree of problems may be identified, its solution will not involve a simple country-by-country stabilization of greenhouse gas emissions, and that we therefore accept no presumption that the emissions of greenhouse gases by the United States in the further future will bear any relationship presently identified present

levels. Any acceptance of stabilization by the United States should be explicitly identified as a goal for the short- or intermediate term, during which we will continue to work on the problem.

5. Avoid Commitment to Stabilization of U.S. Emissions

There is huge momentum to the idea of stabilization. If we do not announce in no uncertain terms that we do not accept the desirability of mutual commitments to country-by-country stabilization as the basis for long-term policy, we are very likely to find ourselves compelled to stabilize, probably even to stabilize CO₂.

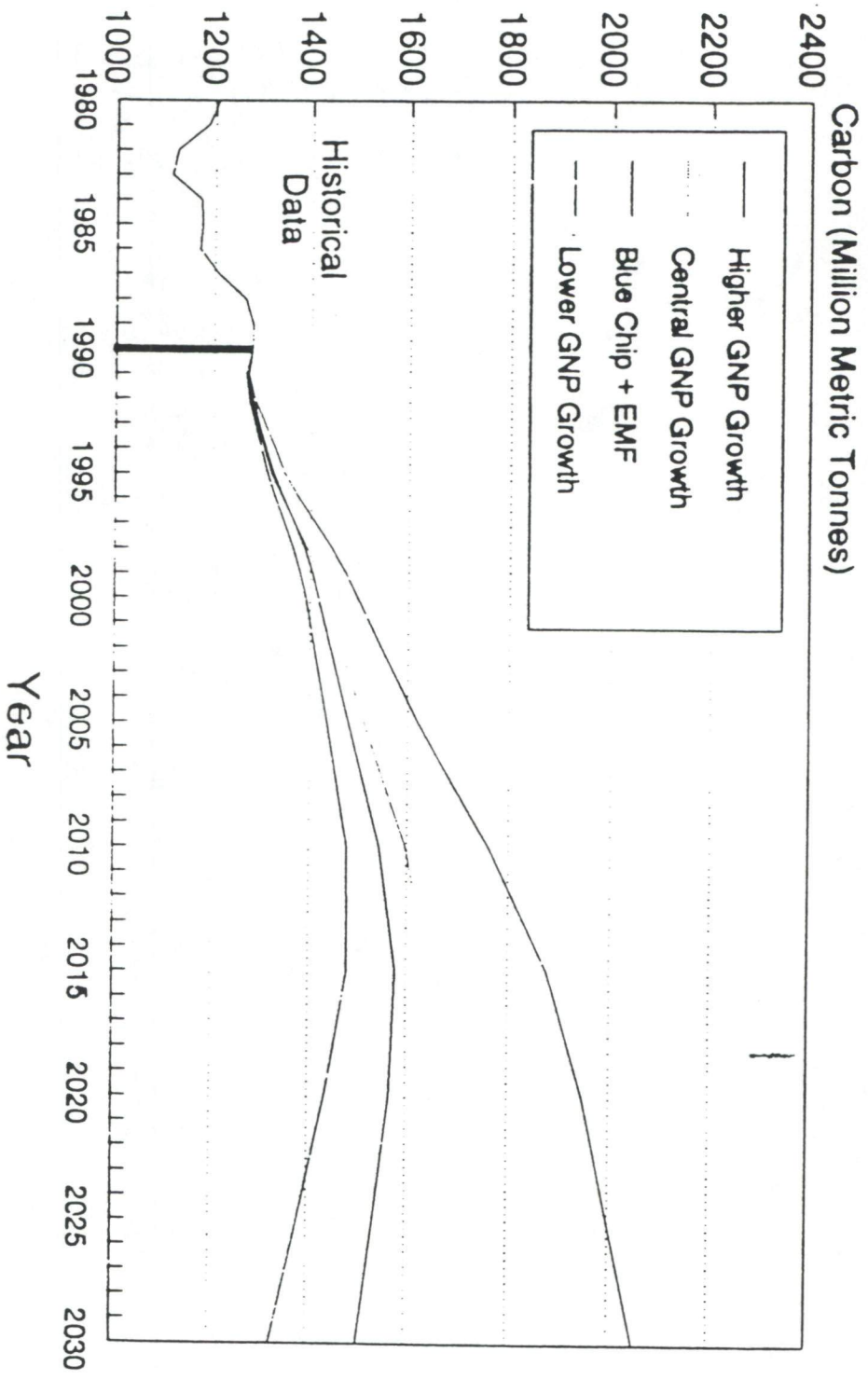
As far as even the nearer future is concerned, based on what we now know and on what we have pretty well committed to as a matter of policy, we are not likely to stabilize U.S. greenhouse gas emissions in the foreseeable future, and we are very unlikely to stabilize CO₂ emissions. But we might be able to stabilize greenhouse gases in 2000 if we are able to leave both CFCs and their substitutes out of the calculation and if we count forest growth resulting from our new planting but ignore natural forest growth in doing the calculations.

As you have emphasized, if we just wordsmith stabilization in a framework convention, we are headed down the slippery slope. If we don't buy into stabilization in a convention, the President is going to be bucking, or appear to be bucking, the rest of the world. **We should find a way to get off the stabilization train, but not off the train of seeking a global assessment and global response to the global climate change issue.**

Given the momentum, existing policy, the domestic and international political setting, the only way I can see to do this would be to make a clear and public distinction between our intermediate-term goals and our longer-term goals, **which would be the right position on the merits.** That distinction could be drawn in a way consistent with something like a mutual commitment with some large group of countries to "hold the line" on GHG emissions for the next few years through prudent actions while we assess the situation and develop the mechanisms for international cooperation for a more rational approach to whatever we determine the problem to be. This could be cast as a stabilization objective, but for the shorter term only (i.e., the exact opposite of a long-term stabilization goal with a vague and possibly distant horizon).

Gross CO2 Emissions

Sensitivity of NES+CAMA to GNP Rates



U.S. POSITIONS ON KEY CLIMATE CHANGE ISSUES

3RD INC

U.S. OBJECTIVE FOR NEGOTIATIONS

- The United States wants a framework convention that can be signed at the 1992 U.N. Conference on the Environment and Development by the largest possible number of countries.
- The United States will seek to have the convention contain the views, elements and language provided in the U.S. Submission to the INC dated March 15, 1991.

NATIONAL STRATEGIES

- The United States supports a convention that provides a framework and process for developing and periodically updating national strategies to address climate change with specific response measures suited to the unique characteristics of each country.
 - The strategies should address all relevant greenhouse gas sources and sinks comprehensively and quantify to the degree possible the results of actions committed.
 - The strategies should consider adaptation and limitation as an integrated package.
 - The convention should provide a process for periodic review of these national strategies by the Parties.
- The "Pledge and Review" process proposed by Japan and France at the Second INC is an interesting interpretation of such a process.
 - Because "Pledge and Review" has not been adequately defined as yet, the United States has not yet taken a position on it.

COMPREHENSIVE APPROACH

- The United States supports a comprehensive approach to climate change, addressing all sources and sinks of all greenhouse gases.
 - A focus on any one gas (e.g., carbon dioxide), or specific sources or sinks (e.g., forests, energy use) will limit the effectiveness of a convention and

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hamper the development of comprehensive national strategies by limiting the flexibility of nations to develop a strategy tailored to its own domestic circumstances.

- A comprehensive approach accounts for all greenhouse gases, insuring that choices do not reduce one gas but inadvertently increase another.

- The United States believes all gases should be covered by a convention, including those covered by the Montreal Protocol.

- Exclusion of those covered by the Montreal Protocol would provide a disincentive for countries to join the Montreal Protocol, to control the use of existing supplies of ozone-depleting substances, and to take account of greenhouse-gas warming potential in choosing among CFC substitutes listed in the Protocol whose use is permitted after 2000.

- Not all greenhouse gases covered by the Montreal Protocol are scheduled for complete phase-out and will continue to be important factors in potential climate change.

- The inclusion of gases covered by the Montreal Protocol, including potential substitutes, is necessary for scientific and analytical purposes if comprehensive understanding of radiative forcing is to be achieved.

TARGETS AND TIMETABLES

- The United States cannot support emissions targets or timetables for achieving them in a framework convention.

- Insufficient knowledge exists of potential climate change, its impacts, and the environmental, economic, and social impacts of potential response strategies to support establishing targets and timetables.

- Setting fixed emissions targets for a point in the distant future presents an open-ended economic risk that is unacceptable given the great uncertainties inherent in projecting the costs of reaching such targets.

- Given that emissions targets will affect the United States more than many other countries, the United States cannot agree to a convention that significantly disadvantages the U.S. economy in the short term to the benefit of others.

- Targets and timetables, which will attract low rates of global participation, shift energy-intensive activities to non-participating countries, and promote increased emissions of non-covered greenhouse gases, are likely to yield lesser benefits than alternative policies that are also less economically disruptive.
- A focus on emissions targets will tend to split the Parties along north-south lines.
- Developing countries whose economic growth prospects are linked to the growth of industrialized economies will suffer rather than benefit from climate policies that adversely affect growth in the industrialized region.
- Targets and timetables are not necessary for the development of a framework convention or the creation of national strategies to address climate change.
- The United States believes the convention and all countries should take a comprehensive approach that includes consideration of all sources and sinks of greenhouse gases and that, in the short term, build on actions that have broad-ranging benefits and that help curb net greenhouse gas emissions.

PROTOCOLS

- The United States believes discussion of specific protocols is premature at this time.
 - The United States believes a framework convention, without explicit links to protocols, will garner the greatest number of signatory countries.

HARMONIZATION OF MEASURES

- The United States questions the practicality of harmonizing response measures as proposed by several countries.
 - Each country will need to determine for itself a strategy to address climate change that takes into account its unique circumstances.
 - Harmonization of response measures may compromise the ability of each state to choose the most cost-effective mix of measures for its situation.
 - While harmonizing response measures is not practical, harmonizing standards and methodologies for assessing needs and developing national strategies is considered both feasible and desirable.

MARKET MECHANISMS

- The United States supports the development of a convention that allows for the cooperative agreements among the parties to meet the obligations of the convention.
- The United States supports the development of a convention that does not preclude the use of market-oriented approaches to meet any preset or future obligations to which such approaches might be applied.

FINANCIAL ASSISTANCE

- The United States recognizes that developing countries will require financial and technical assistance to meet obligations under a convention on climate change.
 - It will be necessary to quantify the costs associated with any actions in this area before consideration of additional funds can be justified.
 - The United States believes that existing resources and mechanisms, such as the GEF, must be fully utilized before additional monies can be considered.
 - The United States will not commit to providing new funding that increases the overall budget.
 - The United States interprets "additional" to mean funds for environmental purposes redirected from total resources, rather than an increase in overall development assistance.

TECHNOLOGY COOPERATION

- The United States recognized the need for technology cooperation with developing countries.
 - The United States supports the development of a process for technology cooperation that encourages the development of action plans and assesses the needs of developing countries to implement them.
- The United States cannot support calls for preferential, noncommercial transfers of technologies to developing countries.
 - In market economies, governments cannot compel the transfer of privately-owned technologies or dictate the terms of transfer.
 - Any arrangements for technology cooperation must respect intellectual property rights and permit reasonable rates of return on investments.

THE PRECAUTIONARY PRINCIPLE

- The United States can support the following language concerning a "Precautionary Principle," as proposed in its submission to the INC:
 - "lack of full scientific certainty should not be used as a reason for postponing measures that are commensurate with the expected extent and likelihood of any adverse impact of climate change, that reflect the costs and benefits of such measures, and that are directed, as appropriate, towards understanding, limiting, reducing, facilitating adaptation to and preventing such adverse impacts."
 - The United States does not support use of the term "precautionary principle" without clear definition such as that contained in the submission to the INC.

RESEARCH

- The United States supports a convention that provides a strong program of research, systematic observation and information exchange.
 - the convention should promote internationally coordinated systematic observation and research to improve capabilities to observe, model, and understand the global climate system.
 - the convention should promote scientific, economic and social research, and the Parties should consider both the social and economic costs and benefits of changes to the global climate and of potential responses to those changes.