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Global Climate Change Qs and As Talking Points [2]

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**PRELIMINARY AND INCOMPLETE: CLOSE HOLD
ECONOMIC Q&A
October 20, 1997, 8:30 pm**

OVERVIEW

Q: WHAT IS THE ECONOMIC LOGIC OF THE PRESIDENT'S PLAN?

- A:
- As the President has emphasized, the risks posed by global climate change are real and sensible preventive steps are justified. The effects of addressing this critical issue depend on whether we do it smart or we do it dumb. Doing it smart means using market mechanisms, recognizing the uncertainties involved, and avoiding all unnecessary costs in reaching our goal.
 - The President's three-stage program is therefore intended to ensure that we explore all possible avenues for low-cost carbon reductions. It includes a graduated, three-stage approach to reducing emissions, creates regular economic reviews, and emphasizes the importance of developing country participation in the global effort to address climate change.

Q: COULD YOU DESCRIBE THE THREE-STAGE PLAN IN MORE DETAIL, AND EXPLAIN HOW IT WORKS?

A: Yes:

- In the first stage, his package includes tax incentives and spending for R&D and energy efficiency, a set of Federal government energy initiatives, and industry-by-industry consultations to explore their best ideas on how to reduce emissions in a cost-effective manner.
- In the second stage, which would not take effect until 2005, the program introduces a trial market-based permit trading system for carbon emissions. Such a permit system is similar to, at least in concept, the one that currently applies to sulfur dioxide emissions -- although the scale of the carbon trading system would be significantly larger than the current sulfur dioxide program.
- Then, finally, in the third stage -- which would not take effect until [2008] and would continue through [2014] -- we would reduce emissions to 1990 levels. Before beginning this third stage, Congress and the President would review how the economy had responded to the first two stages. And a critical component of this third stage is

the inclusion of developing countries in an international system.

Q: HOW DOES THIS THREE-STAGE PLAN RECOGNIZE THE UNCERTAINTY INVOLVED IN CLIMATE CHANGE?

A: This three-stage program recognizes the uncertainty involved in the effort to address climate change in three ways:

- By adopting a graduated approach to emissions reductions, it allows us to grab the "low-hanging" fruit first.
- By adopting a system of regular economic reviews, to monitor our progress and re-assess how the economy is responding. Only after we have accumulated ten years of experience with the first two stages of the program would we enter the internationally binding period.
- By insisting that the United States will not adopt binding obligations until developing countries make adequate commitments in terms of their own obligations, and that developing countries must be included in the international permit trading system. This allows the U.S. to take advantage of low-cost reduction possibilities abroad. As a letter signed by 2500 economists -- including 8 Nobel prize-winners -- argues, "In order for the world to achieve its climatic objectives at least cost, a cooperative approach among nations is required -- such as an international emissions trading agreement."

Q: HOW DOES THIS PLAN RELATE TO LESSONS LEARNED FROM ECONOMIC MODELS?

A: The economics literature on climate change suggests several lessons, including:

- Efforts to address climate change involve substantial uncertainties, in terms of both the economy and the environment;
- A "cap and trade" system in which emission permits are issued and then traded among firms can substantially reduce the cost of meeting an emissions target by creating incentives for emissions to be reduced by those firms and in those activities where costs are lowest;
- International emission permit trading substantially lowers costs by applying the same cost-minimizing principle globally; and
- Joint implementation, whereby US firms would receive credit for

undertaking emission reductions in countries with low abatement costs, would also lower the domestic burden.

The President's plan reflects these crucial lessons:

- It reflects the underlying uncertainties involved by adopting a graduated approach to reducing emissions and instituting regular economic reviews.
- It includes a market-based emissions trading system that can substantially reduce costs relative to command-and-control approaches.
- It emphasizes international permit trading, and
- It conditions U.S. binding obligations on the participation of developing countries in the international system.

ECONOMIC COSTS OF CLIMATE CHANGE ITSELF

Q: WHAT ARE THE ECONOMIC COSTS OF CLIMATE CHANGE ITSELF? IS THERE AN ECONOMIC BENEFIT TO REDUCING CARBON EMISSIONS?

new answer
A: Yes. Several prominent economists, including Bill Cline and Bill Nordhaus, have examined the economic impact of *not* acting at all. They study the costs of climate change in terms of agriculture, sea-level increases, life and morbidity, hurricane damage, and other factors. Their general conclusion is that the cost of allowing climate change to continue unabated could amount to losses of about 1 percent of GDP -- equivalent to about \$8 billion -- in the United States. [Nordhaus, *Managing the Global Commons*, Table 4.1; Cline, *The Economics of Global Warming*, Table 3.4.] Other analysts believe that the effects could be even larger.

[Note: By itself, reducing emissions to 1990 levels would not avert all -- or even most -- of the damages. So the partial benefit to reducing emissions to 1990 levels is *much* smaller than the figures listed above.]

TARGET AND TIMETABLE

Q: HOW DID YOU CHOOSE 1990 BY 2008 TO 2014, RATHER THAN ANY OTHER ALTERNATIVE?

A: The President carefully weighed a wide variety of different targets and timetables. Because of the multitude of economic, environmental, and diplomatic factors involved in each approach, this decision was very difficult.

He decided that the best balancing of all these factors, and one that would represent a credible first step in addressing climate change, would be to set a target and timetable of reducing emissions to 1990 levels by 2008 to 2014. That is the proposal we will be bringing to Kyoto. The President feels that his graduated approach strikes the proper balance between those who wish to do more, at the possible risk of imposing significant costs on the economy, and those who wish to do less, at the possible risk of imposing significant costs on the environment.

Q: HOW EXACTLY IS THE TIMETABLE MEASURED? WHAT DOES 2008 TO 2014 MEAN?

A: The proposal means that the objective is to reduce average greenhouse gas emissions between 2008 and 2014 to their level in 1990. In 1990, *net* U.S. emissions of all greenhouse gases -- CO₂, methane, nitrogen oxide, etc. -- amounted to 1.46 billion metric tons of carbon equivalent. Total CO₂ (carbon dioxide) emissions amounted to 1.34 billion metric tons, and *net* carbon dioxide emissions amounted to 1.23 billion of this total. (Net means gross emissions minus sinks, such as forests.)

[The U.S. position is that the international agreement should be stated in terms of total net emissions.]

Q: WHAT WILL U.S. EMISSIONS BE IN 2008-2014 UNDER BUSINESS-AS-USUAL? HOW ABOUT OTHER COUNTRIES?

A: We don't have a precise answer for 2008-2014, but we do have estimates for 2010 -- which is likely to be close to the average for 2008 to 2014. According to projections from DOE's Energy Information Administration, U.S. CO₂ emissions under business-as-usual are expected to increase from 1.34 billion metric tons in 1990 to 1.72 billion in 2010 -- an increase of 29 percent.

Western Europe CO₂ emissions are projected to rise from 1.02 billion metric tons in 1990 to 1.21 billion in 2010 -- an increase of 19 percent.

[Japanese emissions are expected to rise from 308 million metric tons to 466 million -- an increase of 51 percent. That estimate, however, does not fully reflect the recent slow-down in growth in Japan, and may therefore be substantially overstated.]

World emissions are expected to rise by 46 percent, from 6.0 billion metric tons in 1990 to 8.8 billion metric tons in 2010.

Q: WHY DID YOU CHOOSE A MULTI-YEAR TIMETABLE?

1.62
these are
only
energy-related
CO₂ not
total CO₂
total CO₂ in
1990
= 1374
metric

A: As press reports earlier this week indicated, carbon emissions often fluctuate significantly from year to year, based on economic growth, the weather, and other variables. The purpose of the multi-year timetable is to average over several years and thus minimize the impact of year-to-year fluctuations on meeting our international obligation.

comment about rates of Δ

Q: **DOESN'T RESEARCH (BY MANNE AND RICHELIS) SHOW THAT THE PRESIDENT'S TARGET AND TIMETABLE IMPOSES SUBSTANTIALLY HIGHER ECONOMIC COSTS FOR NO ADDITIONAL ENVIRONMENTAL BENEFIT, RELATIVE TO A MORE GRADUAL ADJUSTMENT PATH?**

A: Some economic research does suggest that relative to the plan proposed by the President, a more backloaded approach to emissions reductions could reduce the costs involved, even while resulting in the same ultimate concentration of carbon in the atmosphere. But the emissions paths called for under such a plan rely on very steep -- and perhaps implausible -- declines in the out-years to ensure that the same concentration goal is met. [If we had proposed such a path, we would undoubtedly have been criticized for proposing a plan that was too backloaded.]

The President feels that his graduated, three-stage approach strikes the proper balance between those who wish to do more, at the possible risk of imposing significant costs on the economy, and those who wish to do less, at the possible risk of imposing significant costs on the environment.

GDP AND EMPLOYMENT

Q: **WHAT IS THE EFFECT ON GDP?**

- A:
- The precise effect on GDP is very difficult to assess. To provide some perspective: as you all know, it is difficult to gauge exactly what impact the balanced budget agreement will have on the U.S. economy's growth rate, levels of employment, interest rates and consumption over the next five years. But with global climate change, it is orders of magnitude more difficult to gauge the effects on the economy. Global climate change involves not just the next five years and not just the American economy, but, rather economic and physical processes that operate globally and over decades.
 - To reflect this uncertainty, the President has proposed a graduated, three-stage approach to emissions reductions -- starting with a period of voluntary action, tax incentives, R&D, and Federal efficiency improvements, and then followed by a trial permit trading system. He has also proposed regular economic reviews, to ensure that the

economic costs are not excessive. Only after we have accumulated ten years of experience with the first two stages of the program would we enter the internationally binding period.

- President Clinton's top priority, since his first days in office, has been revitalizing the U.S. economy, creating jobs and investing in people and technology to enhance long-term growth. We have made tremendous progress, and the President is not going to jeopardize that progress. Nor would we expect any future President or Congress to do so.
- As for specific estimates of the impact on GDP -- which again are highly uncertain -- I would emphasize that two key components of the President's plan are that developing countries adopt binding targets and participate in an international permit trading system. As 2500 economists -- including 8 Nobel prize-winners -- have argued, "In order for the world to achieve its climatic objectives at least cost, a cooperative approach among nations is required -- such as an international emissions trading agreement."
- With these two components -- developing country participation and international trading -- economic analysis suggests that the effect on GDP is likely to be minimal -- and much less than the typical variation in growth from quarter to quarter or year to year. [With worldwide trading, economic models suggest that the effect on GDP in 2010 is likely to amount to less than 0.1 percent of GDP.]

*Do we want
to say this?*

FOLLOW: BUT DON'T SOME MODELS SHOW DECLINES IN GDP OF 1 TO 2 PERCENT? IS THAT "MINIMAL"?

(A: Some models do indeed show declines of those amounts, but they ignore several key issues:

- First, there is much uncertainty over cost projections that are 13 or more years into the future -- 13 years ago, we could never have predicted that we would now have an unemployment rate below 5 percent, core inflation below 2.5 percent, and a budget deficit substantially under \$50 billion.
- Second, to reflect the uncertainty involved in addressing climate change, the President has proposed a graduated, three-stage approach to emissions reductions -- starting with a period of voluntary action, tax incentives, R&D, and Federal efficiency improvements, and then followed by a trial permit trading system. He has also proposed

regular economic reviews, to ensure that the economic costs are not excessive. Only after we have accumulated ten years of experience with the first two stages of the program would we enter the internationally binding period.

- Third, most models ignore the economic costs associated with climate change itself -- increased flooding, sea-level rise, and other dislocation. So looking just at the impact of reducing emissions on GDP is misleading.
- Finally, those estimates are based on model runs that assume that developing countries do *not* adopt binding targets and that there is no international permit trading -- even though both are key components of the President's plan. When those components are included in the analysis, the effects on GDP are predicted to be substantially lower. [With worldwide trading, economic models suggest that the effect on GDP in 2010 is likely to amount to about 0.1 percent of GDP.]

Q: WHAT IS THE EFFECT ON OVERALL EMPLOYMENT?

Where is this from?
A: Same as answer to GDP question above, but substituting "employment" for "GDP." [With worldwide trading, the effect on employment is likely to be about 75,000 jobs -- about one-third the average *monthly* job creation since President Clinton took office.]

Q: DIDN'T AN EPI REPORT SHOW THAT OVERALL EMPLOYMENT WOULD FALL BY MORE THAN 1.5 MILLION UNDER THE PRESIDENT'S PLAN?

A: No. The EPI report assumed no international trading and no developing country participation -- key components of the President's plan. Other results suggest that such omissions produce grossly misleading results. The President's plan also includes regular economic reviews, precisely to ensure that the economic costs are not excessive.

After all, President Clinton's top priority, since his first days in office, has been revitalizing the economy, creating jobs and investing in people and technology to enhance long-term growth. And we have made tremendous progress: growth is strong, unemployment is down to 4.9 percent, and over 13 million jobs have been created since January 1993. He is not going to jeopardize that progress.

Q: WHAT ABOUT EMPLOYMENT IN SPECIFIC SECTORS?

A: President Clinton's top priority, since his first days in office, has been

revitalizing the economy, creating jobs and investing in people and technology to enhance long-term growth. And we have made tremendous progress: growth is strong, unemployment is down to 4.9 percent, and over 13 million jobs have been created since January 1993. He is not going to jeopardize that progress.

As the President has emphasized, the risks posed by global climate change are real and sensible preventive steps are justified. It is likely that in the effort to address this substantial challenge, some sectors will gain and some will lose. The regular economic reviews that are a critical part of the President's plan, and his commitment to developing a system of transition assistance for any affected workers, are intended to minimize any costs.

FOLLOW: WHICH SPECIFIC SECTORS WILL BE HURT?

- [A: We would expect that the impact would be more significant in carbon-intensive and energy-intensive sectors. But we do not have precise modeling results, showing which industries will gain and which will be hurt. I should note, however, that the President has expressed his commitment to working with interested parties to develop a system of transition assistance, to reduce the burden on workers in affected industries.]

PERMIT PRICES AND ENERGY PRICE INCREASES

Q: DON'T MOST MODELS SUGGEST THAT CARBON PRICES WILL HAVE TO RISE BY \$100 TO \$200 PER TON TO REDUCE EMISSIONS TO 1990 LEVELS BY 2010?

- A: Many models have concluded that permit prices would need to be in that range to reduce emissions to 1990 levels by 2010 with no international trading. But such trading, including with developing countries, is a key component of the President's plan. The economics literature suggests that if international trading were to develop, the costs involved would be substantially reduced.

I should also note that there is much uncertainty over cost projections that are 13 or more years into the future -- 13 years ago, we could never have predicted that we would now have an unemployment rate below 5 percent, core inflation below 2.5 percent, and a budget deficit substantially under \$50 billion.

To reflect the uncertainty involved in addressing climate change, the President has proposed a graduated, three-stage approach to emissions reductions -- starting with a period of voluntary action, tax incentives, R&D,

and Federal efficiency improvements, and then followed by a trial permit trading system. He has also proposed regular economic reviews, to ensure that the economic costs are not excessive. Only after we have accumulated ten years of experience with the first two stages of the program would we enter the internationally binding period.

FOLLOW: HOW MUCH OF A DIFFERENCE DOES INTERNATIONAL TRADING REALLY MAKE?

A:

- I hesitate to give a precise answer because of the substantial uncertainties involved in the analytical effort, and because of the institutional difficulties in making international trading a reality. But many reports suggest that international trading *could* substantially reduce the cost.
- The World Bank is already working on designing a system for international trade in permits. Some experiments have already been conducted -- including one in the Nordic countries that suggested that international trading "can be an important means of reducing the costs to achieve a greenhouse gas objective." [Peter Bohm, "A Joint Implementation as Emission Quota Trade: An Experiment Among Four Nordic Countries," Nordic Council of Ministers, February 7, 1997.]
- Over 2500 economists -- including 8 Nobel prize-winners -- have signed a letter emphasizing that "In order for the world to achieve its climatic objectives at least cost, a cooperative approach among nations is required -- such as an international emissions trading agreement."
- A recent report written by several leading climate change economists and published by the Pacific Northwest National Laboratory this month suggests that worldwide permit trading would allow us to reach 1990 levels by 2010 for a permit price of approximately \$25 per ton in 2010 -- or an increase of about 6 cents per gallon of gasoline after 13 years. [JA Edmonds, SH Kim, CN MacCracken, RD Sands, MA Wise, "Return to 1990: The Cost of Mitigating United States Carbon Emissions in the Post-2000 Period," Battelle, October 1997.]

Q:

DIDN'T THE 5-LABS STUDY CONCLUDE THAT CARBON PRICES WOULD HAVE TO RISE BY \$50 TO REACH 1990 LEVELS BY 2010, AND ISN'T THAT ON THE OPTIMISTIC SIDE?

A:

The 5-Labs study examined a scenario in which there was no international trading, and concluded that the permit price would have to be \$50 to reduce

emissions to 1990 levels by 2010 with no such trading. But the President's plan emphasizes international trading, including with developing countries, and the economics literature suggests that worldwide trading substantially reduces the costs involved.

[The Department of Energy has released an analysis that combines international permit trading with the results of the 5-Labs study, and concluded that a permit price of \$25 or lower in 2010 would allow the country to meet its target and timetable.]

Q: ISN'T \$25 PER TON OF CARBON STILL A SUBSTANTIAL INCREASE IN ENERGY COSTS?

A: As the President has emphasized, the risks posed by global climate change are real and sensible preventive steps are justified. Some increase in the relative price of energy is necessary to address climate change. Under the President's plan, any relative price shifts involved would not take effect until 2005 or later.

[Note: \$25 per ton translates into about 6 cents per gallon of gasoline, and approximately \$200 per year for the average family.]

Q: DON'T SOME ADS SUGGEST THAT GAS PRICES WOULD HAVE TO RISE BY 50 CENTS?

A: Those ads are misleading. They seem to be based on especially pessimistic views about what could happen if we attempted to reduce emissions to 1990 levels without international trading. But such trading, including with developing countries, is a key component of the President's plan. Since the economics literature suggests that worldwide trading substantially reduces the costs involved, those ads are misleading.

CREDIBILITY

Q: HOW CAN YOU POSSIBLY REDUCE EMISSIONS TO 1990 LEVELS BY [2010] WITHOUT IMPOSING EXCESSIVE COSTS ON THE ECONOMY?

A:

- Climate change is a critical challenge facing the country, but there is substantial uncertainty surrounding how costly it will be to address. Given this uncertainty, it would be irresponsible not to explore all possible avenues for low-cost emissions reductions before undertaking any effort that would be excessively costly.

- The President's graduated, three-stage approach therefore recognizes that there is substantial uncertainty over any project that is 13 or more years into the future -- 13 years ago, we could never have predicted that we would now have an unemployment rate below 5 percent, core inflation below 2.5 percent, and a budget deficit substantially under \$50 billion.
- To reflect the uncertainty involved in addressing climate change, the President has proposed a graduated, three-stage approach to emissions reductions -- starting with a period of voluntary action, tax incentives, R&D, and Federal efficiency improvements, and then followed by a trial permit trading system. He has also proposed regular economic reviews, to ensure that the economic costs are not excessive. Only after we have accumulated ten years of experience with the first two stages of the program would we enter the internationally binding period.
- I don't know for sure that we can succeed in this effort, but I'll tell you one thing: After the first two stages of the President's program, we will have made a credible first step and we'll know a lot more than we do now about both the science and economics of climate change.

SAFETY VALVE, ECONOMIC REVIEWS, AND "BINDING" TARGET

Q: IS THE TARGET AND TIMETABLE BINDING?

A: Yes, but it would not be reasonable to expect this President, or any future President or Congress, to impose excessive costs on the economy to meet that target.

Q: THEN HOW CAN YOU CLAIM THAT THE TARGET AND TIMETABLE IS BINDING, WHEN MOST ECONOMIC MODELS SUGGEST THAT YOU CAN'T REDUCE EMISSIONS THAT MUCH WITHOUT INCURRING EXCESSIVE COSTS?

- A:**
- First, there is much uncertainty over any cost projections that are 13 or more years into the future -- 13 years ago, we could never have predicted that we would now have an unemployment rate below 5 percent, core inflation below 2.5 percent, and a budget deficit substantially under \$50 billion.
 - Second, the models to which you refer assume no worldwide permit trading. But such trading, including with developing countries, is a key

component of the President's plan. The economics literature suggests that worldwide trading substantially reduces the costs involved.

- Finally, all we are saying is that it is unreasonable to ignore the reality that future Congresses will always have the option to protect the economy or to undertake more environmental action. We should therefore recognize that decisions about whether the United States was willing to bear the costs that could be necessary to meet the target and timetable goal will, in a sense, have to be made at that time.

Q:

HOW CAN YOU ENSURE THAT THE COSTS ARE NOT EXCESSIVE?

- To ensure that the costs are not excessive, the President has proposed a graduated, three-stage approach to emissions reductions -- starting with a period of voluntary action, tax incentives, R&D, and Federal efficiency improvements, and then followed by a trial permit trading system. He has also proposed regular economic reviews, precisely to ensure that the economic costs are not excessive. Only after we have accumulated ten years of experience with the first two stages of the program would we enter the internationally binding period.
- The President has also emphasized the participation of developing countries, and an international system of trading permits, as key components of his climate change plan. Such factors should substantially reduce the costs involved.

Q:

WILL THESE REVIEWS FORM PART OF THE INTERNATIONAL TREATY?

A: No, although the treaty already includes broad language that preserves a country's right to take protective action if the costs involved become excessive.

Q:

HOW CAN YOU SIGN AN INTERNATIONAL TREATY THAT DOESN'T REFLECT THE PROTECTIONS YOU ARE CLAIMING DOMESTICALLY?

A: No country would ever be expected to sacrifice its national interests -- including either its national security or its economic well-being -- on the basis of an international treaty. So let me put it this way: We would be just as committed to this treaty, if we get an adequate agreement, as any other we have ever adopted.

Q:

DO YOU INTEND TO MEET YOUR BINDING OBLIGATION?

A: We certainly intend to meet any binding obligation under the treaty, should

the terms of that treaty be adequately negotiated. The issue is a critical one, and the President feels strongly that we must begin to take corrective action. But there are understandably a host of imponderables involved in this undertaking -- which involves actions over a decade or more. So I am also confident that if the costs of action are excessively high, the Congress and the President will make appropriate adjustments.

Q: DOES YOUR PROPOSAL INCLUDE A "SAFETY VALVE"?

A: That term has unfortunately become a bit maligned. Our proposal includes a variety of mechanisms to ensure that the economic costs involved are not excessive -- including the graduated, three-step approach with regular economic reviews and the commitment to an international trading regime. You can call them what you want.

Q: DIDN'T THE ADMINISTRATION PROPOSE A "SAFETY VALVE" INVOLVING A MAXIMUM PERMIT PRICE?

A: The issue of whether it would make sense to impose a ceiling on the permit price in the internationally binding period (Stage 3) has been raised by researchers at Resources for the Future, and was discussed during the President's climate change conference.

FOLLOW: WHY DIDN'T THE ADMINISTRATION ADOPT SUCH AN APPROACH?

A: We felt it was unnecessary to impose a formal ceiling price during the internationally binding period at this time. We are confident that our graduated approach, with its regular economic reviews and scope for adjustments by future Presidents and Congresses, provides sufficient protection against excessive economic costs.

Q: WHO WILL CONDUCT THE ECONOMIC REVIEWS?

A: The reviews will be conducted by relevant experts and officials. It is possible that we would form a commission to conduct them.

Q: WHAT IMPACT WILL THE REVIEWS HAVE ON POLICY?

A: The reviews will help to ensure that policy-makers, both in the Administration and in Congress, have the best possible information on how the economy is responding to the effort to address climate change, how other countries are performing relative to their own commitments, and how the climate is changing in response to human activities. That information will then undoubtedly be used to make any adjustments that seem appropriate to

policy-makers in the future. It doesn't seem wise for me to speculate about what form such adjustments would take -- whether in terms of more aggressive environmental action, or less aggressive.

STANDARDS

Q: ARE YOU PROPOSING ANY INCREASE IN CAFE STANDARDS TO IMPROVE FUEL EFFICIENCY AND REDUCE EMISSIONS?

A: In the DOT appropriations bill that was just passed and signed into law, Congress precluded any change in CAFE standards for FY 1998. So we do not currently have the authority to change CAFE standards.

Q: ARE YOU PROPOSING ANY OTHER STANDARDS AS PART OF YOUR PACKAGE?

A: [Wait for DOE input. Building codes.]

TAX INCREASES

Q: DOESN'T THE PRESIDENT'S PLAN AMOUNT TO THE LARGEST ENERGY TAX INCREASE IN HISTORY -- \$200 BILLION A YEAR OR MORE?

A: Not at all. The President's plan includes tax *cuts*, not tax increases. It does not involve tax increases at all. *~slim*

FOLLOW: BUT ISN'T A PERMIT SYSTEM JUST LIKE A TAX?

A: No. There are several critical differences between a permit system and a tax. For example, a permit system provides insurance that a given quantitative target will be met, whereas a tax does not.

FOLLOW: BUT IF YOU AUCTION THE PERMITS, ISN'T THAT A TAX?

A: First, we have not decided to auction the permits. Second, just for the record, there are still several critical differences between such an auctioned permit system and a tax. For example, the permit system provides insurance that a given quantitative target will be met, whereas a tax does not. And any revenue from the auctions could be used to *reduce* other taxes -- so that the entire effort would be revenue-neutral.

Q: WON'T ENERGY PRICES INCREASE, JUST AS IF YOU IMPOSED A TAX?

A: Climate change is a critical issue, and some increase in the relative price of

energy will ultimately be necessary to address it. But it would be irresponsible not to explore all possible alternatives before resorting to moderate relative price change. The President has therefore proposed a graduated, three-stage approach to emissions reductions -- starting with a period of voluntary action, tax incentives, R&D, and Federal efficiency improvements, and then followed by a trial permit trading system. He has also proposed regular economic reviews, to ensure that the costs are not excessive. Only after we have accumulated ten years of experience with the first two stages of the program would we enter the internationally binding period. The President has also emphasized the participation of developing countries, and an international system of trading permits, as key components of his climate change plan. Such factors should substantially reduce the costs involved.

Q: HOW DOES THIS EFFORT COMPARE TO THE BTU TAX?

A: This effort is not a tax, so it is not directly comparable. And energy price increases would not occur for eight years or more -- in 2005 or later. But in terms of oil prices, the effect of a \$25 carbon permit price is approximately the same. Remember, however, that the increase would not occur until 2005.

[A \$25 permit price is equivalent to approximately 60 to 70 cents per million BTUs. In 1993, the Administration proposed a tax of 26 cents per million BTUs plus a 34 cents per million BTUs tax on oil.]

DETAILS OF PERMIT SYSTEM, INCLUDING GRANDFATHERING VERSUS AUCTIONING

Q: HAVE YOU DECIDED WHETHER THE PERMITS WOULD BE AUCTIONED OR GRANDFATHERED?

A: No. That is a very important issue that we will explore with Congress and other interested parties when the time comes for developing domestic implementation legislation.

Q: WHERE WOULD THE PERMIT REQUIREMENTS BE IMPOSED?

A: That is a very important issue that we will explore with Congress and other interested parties when the time comes for developing domestic implementation legislation.

COMPETITIVENESS

Q: WON'T THIS PLAN LEAD TO MASSIVE SHIFTS OF U.S. INDUSTRY AND JOBS ABROAD?

- A:
- No. The President has made very clear that we will not assume binding obligations until the developing countries make adequate commitments in terms of their own obligations.
 - I would also note that non-tradeable sectors account for a substantial share of carbon emissions. Transportation and buildings, for example, account for roughly two-thirds of U.S. emissions. For these sectors, the "competitiveness" argument seems largely irrelevant.
 - In most manufacturing sectors, furthermore, energy costs are a small percentage of total costs. According to the 1995 Annual Census of Manufactures, energy costs for manufacturing industries averaged just 2.2 percent of total costs.

DEVELOPING COUNTRIES AND INTERNATIONAL TRADING

Q: WHAT SPECIFIC MODELS SHOW THAT WORLDWIDE INTERNATIONAL TRADING ALLOWS RELATIVELY LOW-COST REDUCTIONS?

- A:
- According to JA Edmonds, SH Kim, CN MacCracken, RD Sands, MA Wise, "Return to 1990: The Cost of Mitigating United States Carbon Emissions in the Post-2000 Period," Battelle, October 1997, the cost of reaching 1990 levels by 2010 with worldwide trading would be a permit price of \$26 per ton in 2010.
 - The models used by the Interagency Analytical Team to produce its draft report suggest that the permit price needed to reduce emissions to 1990 levels by 2010 would be between \$9 and \$20 in 2010.

need
to
explain
this

Q: DOESN'T INTERNATIONAL TRADING MEAN THAT WE ARE ESCAPING OUR OBLIGATION TO REDUCE EMISSIONS?

- A:
- No. A ton of carbon emitted from Argentina is just as damaging to the global climate system as a ton of carbon emitted from the United States. So we are contributing just as much to the effort to address global climate change if we facilitate reductions abroad as if we reduce here. The U.S. position has therefore always emphasized the efficiency of allowing least-cost reductions wherever they occur in the world.

Q: WON'T INTERNATIONAL TRADING MEAN THAT WE ARE SENDING BILLIONS OF DOLLARS ABROAD, AND EXPANDING OUT TRADE DEFICIT?

A: First, it is difficult to predict precisely how large the trade in these permits will be. Second, the estimates we do have suggest that such trade could amount to a few billion dollars a year -- a relatively modest amount. Third, our balance of payments statisticians have not determined whether such trade would show up in the trade deficit at all, or would be more appropriately handled in other parts of the balance of payments (e.g., other elements of the current account, or within the capital account). Finally, our oil imports should decline as a result of efforts to address climate change. Some estimates suggest that our trade deficit could therefore *narrow* as a result of the effort.

Q: IS INTERNATIONAL TRADING REALLY FEASIBLE, ESPECIALLY WITH DEVELOPING COUNTRIES?

- A:
- Creating a system of international trading will undoubtedly be a challenge for the United States and other parties to any climate change treaty. But the President is firmly committed to the concept, because it is an efficient, market-based approach to emissions reductions -- it substantially reduces the costs of meeting our target.
 - The World Bank has already begun work on how such an international trading system could function.
 - And some carbon trades are already occurring under our pilot Joint Implementation program.

Q: HOW CAN WE EXPECT COUNTRIES LIKE INDIA AND CHINA TO PARTICIPATE IN AN INTERNATIONAL TRADING REGIME?

A: Such countries already participate in international trade in other products. The President has made clear that we will not adopt binding obligations until the developing countries make adequate commitments in terms of their own obligations. And once they have made such commitments, there is no reason to suspect that they would be unwilling to be guided by economic incentives in deciding whether to sell carbon emissions permits on an international market.

PROCESS ON ECONOMIC MODELING AND ECONOMIC ANALYSIS

Q: WHAT ECONOMIC ANALYSIS AND MODELS DID YOU USE IN EVALUATING DIFFERENT POLICIES?

A: We relied on a wide variety of published analyses and outside experts, as

well as the professional judgment of the Administration's top economists. Given the uncertainties involved, it would have been imprudent to rely on one single model or set of models. So we wound up relying on a large number of analyses and views -- including the results from the Energy Modeling Forum at Stanford University, the Intergovernmental Panel on Climate Change, and others.

Q: WHAT IS THE INTERAGENCY ANALYTICAL TEAM? DOES ITS REPORT REFLECT THE ADMINISTRATION'S OFFICIAL ECONOMIC ANALYSIS?

- A:**
- When the Administration evaluates possible policies, it normally sets up a variety of staff-level working groups to inform the principals' discussions. The Interagency Analytical Team (IAT) was one such group -- an informal group of modelers from various agencies in the Federal government.
 - Once the relevant principals within the Administration looked over the staff work and the peer review comments on it, it was decided that further activity would be futile because of the difficulty of developing a model or set of models that can give us a definitive answer as to the economic impacts of a given climate change policy. So the IAT report is *not* the Administration's official economic analysis on this issue.
 - The working group's draft report, which was released on July 15, summarizes the preliminary results of the modeling effort. That modeling effort produced some useful lessons, but -- as illustrated by comments from peer reviewers -- it also suffered from shortcomings.
 - As Janet Yellen emphasized in her testimony on July 15, the lessons and the shortcomings of the exercise point to one clear conclusion: the effort to develop a model or set of models that can give us a definitive answer on the precise economic impact of a given climate change policy is futile. Rather, we are left with a set of parameters and relationships that influence estimates of the impacts. As she indicated, it is more productive to employ a broad set of economic tools to analyze policy options than to seek to develop a single definitive model. So that's what we did.

ECONOMIC TEAM RUMORS

Q: ISN'T IT TRUE THAT THE ECONOMIC TEAM OBJECTED TO THE PRESIDENT'S CHOICE OF EMISSIONS REDUCTIONS?

A: I'm sure that you can understand that the advice given by any Administration

officials to the President must remain confidential. But I can assure you that the economic team supports the President's package, especially its emphasis on a market-based approach and on international trading.

Q: BUT DOESN'T YOUR OWN ANALYSIS SHOW THAT REACHING 1990 BY 2010 WOULD INVOLVE SUBSTANTIAL COSTS?

A: It seems inappropriate for me to reveal the analysis and views that I have shared with the President. I can say that I have informed him of the results from conventional economic models available in the public domain, and discussed both the benefits and limitations of such models. Given the importance I attach to frank internal discussions, I would prefer not to elaborate beyond that -- except to note once again, that there is much uncertainty involved in the estimates and that worldwide international trading, a key component of the President's plan, reduces the costs involved significantly.

COMPONENTS OF STAGE 1

Q: WHAT DOES STAGE 1 OF THE PRESIDENT'S PLAN ENTAIL?

A: The first stage, which applies until 2005, includes:

- **\$5 billion for tax cuts and R&D:** A package of carbon-reducing tax incentives and other programs amounting to \$5 billion over 5 years. For example, the package may include tax credits for carbon-saving technologies such as renewable energy sources.
- **Federal energy efficiency improvement:** A Federal government energy efficiency initiative is being developed by the Department of Energy, in conjunction with the Department of Defense, OMB, and other relevant agencies. It includes expanding the use of Energy Savings Performance Contracts, reinventing federal procurement, taking a "sustainable design" approach to federal facilities, and developing more efficient military propulsion systems. The effort would also include a review of existing Executive Orders on purchases, and preparation of a new Executive Order to fill any gaps.
- **Industry-by-industry consultation:** We will encourage businesses, on an industry by industry basis, to prepare plans for reductions that they believe they could achieve on their own and how they could best achieve them. Each relevant industry would prepare a plan over the next 6-12 months.



Credit for early action: The President and Vice President strongly support appropriate rewards for those who promptly take early action to reduce emissions. The details of how such an early credit system would operate, however, are complex and can't be fully articulated until the details of an overall permit trading system are worked out. We should state our support for early action and indicate that early actors will be appropriately rewarded.



Electricity restructuring: The President has announced his support for restructuring the electricity industry, which -- if done properly -- could help to reduce carbon emissions, save consumers billions of dollars, and improve the efficiency of our economy.



Transition Assistance. We will work cooperatively with labor and Congress to insure that we give proper assistance to any workers who are dislocated by the changes in energy usage inherent in any climate change plan.

Q: WHAT ARE THE PAY-FORS ON THE \$5 BILLION IN TAX INCENTIVES AND R&D?

A: We will be developing the detail of that package as part of the FY 1999 budget process. The proposals will clearly be fully paid for, but we are still working out the details of what will be included in the package itself. It doesn't make sense to identify precisely the pay-fors before identifying the items themselves.

Q: WHAT IS THE SHARE OF TAX CUTS IN THE \$5 BILLION?

A: That will be decided as part of the FY 1999 budget process.

Q: HOW MUCH DO WE CURRENTLY SPEND ON ACTIVITIES LIKE THIS?

A: [CHECK WITH CLIMATE CHANGE TASK FORCE.]

COMPONENTS OF STAGE 2

Q: WHAT DOES STAGE 2 OF THE PRESIDENT'S PLAN ENTAIL?

A: In stage 2, which begins in 2005, the emissions trading system would begin as a trial project that would allow us to learn how the system operates before entering the period in which our binding international obligations would hold. [ADD MORE DETAIL HERE.]

ELECTRICITY RESTRUCTURING

Q: WHAT EFFECT DOES ELECTRICITY RESTRUCTURING HAVE ON CARBON EMISSIONS?

A: If done properly, electricity restructuring has the potential to reduce carbon emissions by rewarding pursuit of greater efficiency in the generation and use of electricity. According to conservative estimates, restructuring could save U.S. residential and industrial consumers \$20 billion per year. A well-crafted restructuring package could also produce significant carbon emissions reductions. As we heard at the President's climate change conference, we currently waste two-thirds of the energy used to produce electricity -- and restructuring could help to reduce that waste. Other potential elements of a restructuring package, including a renewables portfolio standard and green labeling, could also reduce carbon emissions.

Q: WHAT IS THE PRESIDENT'S PLAN FOR ELECTRICITY RESTRUCTURING? WHEN WILL THE DETAILS BE AVAILABLE?

A: We will be refining our own thinking on this issue over the coming months, and look forward to working with all interested parties to ensure that we can craft a restructuring package that saves American consumers money and is good for the environment.

— Q: IS IT TRUE THAT, EVERYTHING ELSE BEING EQUAL, THE FASTER OUR GREENHOUSE GAS EMISSIONS GROW, THE MORE COSTLY IT WILL BE TO ACHIEVE THE GOAL OF 1990 EMISSIONS?

DOE RECENTLY RELEASED A REPORT THAT INDICATES THAT GREENHOUSE GAS EMISSIONS INCREASED SUBSTANTIALLY LAST YEAR. THIS APPEARS TO BE A RESULT OF THE STRONG U.S. ECONOMY. DOES THAT MEAN THAT IF OUR ECONOMY CONTINUES TO GROW, THAT THE PRESIDENT'S PLAN WILL RESULT IN MORE COSTLY MITIGATION EFFORTS?

A: • We have learned from our nation's experiences and from our modeling efforts that, roughly speaking, two factors drive greenhouse gas emissions. First, as the economy grows, emissions increase. This is because our economy is still quite reliant on fossil fuels. Second, as the economy becomes more efficient at using energy, emissions decrease. Last year, the economy grew faster than the rate of energy efficiency improvement -- hence, greenhouse gas emissions increased. However, under the President's plan, we will support actions to make the economy more energy efficient through tax incentives and R&D programs. These efforts will allow us to continue to grow the economy while meeting our climate change goals at reasonable costs.

Q: THE COUNTRIES OF THE WORLD ARE MEETING IN KYOTO BECAUSE GOALS SET IN RIO (1990 IN 2000) WILL NOT BE ACHIEVED BY MOST COUNTRIES, INCLUDING THE U.S. IN THE U.S., WE ATTEMPTED VOLUNTARY MEASURES THROUGH CCAP. DO YOU CONSIDER CCAP A SUCCESS? AREN'T THE PRESIDENT'S PROPOSALS ON R&D AND TAX INCENTIVES JUST MORE OF CCAP?

A: CCAP didn't work because of low funding
President's proposals involve a binding target, a carbon permit system in the

Q: SOME HAVE COMPARED 1990 BY 2010 TO THE OIL SHOCKS OF THE 1970s. DO YOU THINK THE PRESIDENT'S PROPOSAL WILL HIT THE ECONOMY THAT HARD? WHY/WHY NOT? *future, + much higher funding*

A: No — intl trading
anticipate w/ R&D + tax incentives

Q: WE HAVE HEARD ABOUT HOW GREAT THE SO2 PERMIT TRADING SYSTEM HAS BEEN AND THAT IT WILL SERVE AS THE MODEL FOR THE CO2 PERMIT SYSTEM? DOES THAT MEAN THAT THE U.S. WILL GRANDFATHER PERMITS? TO WHOM?

A: Permit system undecided.

Q: DO WE HAVE ANY EXAMPLES OF AN INTERNATIONAL PERMIT TRADING SYSTEM? WOULD THIS BE A DIFFICULT TASK TO DO? HOW DO WE ENFORCE SUCH A SYSTEM? ISN'T THIS LIKE CREATING A NEW GLOBAL CURRENCY? HOW WILL A PERMIT SYSTEM WORK WITH COUNTRIES THAT DECIDE TO ACHIEVE GREENHOUSE GAS EMISSIONS REDUCTIONS THROUGH CARBON TAXES OR COMMAND AND CONTROL?

A: We are confident we can work this out - the details will be resolved in Ky.to and in follow-up meetings.

Q: HOW DO WE MAKE JOINT IMPLEMENTATION WORK? HOW WILL PROJECTS BE APPROVED? WHO WILL HAVE THE AUTHORITY TO APPROVE THESE PROJECTS? WILL A U.N. AGENCY BE SET UP TO INSPECT ALL PROJECTS?

A: TBD, Already have examples of JI working (Treasury)

Q: WHO DO WE BUY OUR PERMITS FROM? WHO WILL WE LIKELY ENTER INTO JI AGREEMENTS WITH?

A: Lowest cost emitters

— Q: DID YOU CONDUCT AN ECONOMIC ANALYSIS OF THE AVAILABLE
OPTIONS BEFORE THE PRESIDENT? IF SO, WHAT OTHER OPTIONS DID
YOU ASSESS? DID THE PRESIDENT'S PROPOSAL RANK #1? WHEN WILL
YOU RELEASE THIS ECONOMIC ANALYSIS?

A: weasel answer from Peter's Q+A

Q: WHAT ADVANTAGES/DISADVANTAGES MIGHT A TRADING SYSTEM HAVE OVER TAXES? WOULDN'T A TAX SYSTEM PROVIDE GREATER CERTAINTY TO INDUSTRY AND CONSUMERS? DON'T TAXES AND PERMITS HAVE THE SAME EFFECT ON ENERGY PRICES?

We need a price signal to Δ behavior and meet our goals. The President's position will achieve these goals at reasonable costs. By 20 ~~that~~ requiring global cooperation, we can achieve the goals thru a permit system so much cheaper than thru a tax system.

A:

— Q: THE ECONOMIC COSTS OF THE PRESIDENT'S PROPOSAL APPEARS TO RELY ON INTERNATIONAL PERMIT TRADING AND JOINT IMPLEMENTATION. WITHOUT THESE MECHANISMS, THE COSTS WOULD LIKELY INCREASE SUBSTANTIALLY FOR THE U.S. IF WE DON'T GET THESE ELEMENTS IN A KYOTO PROTOCOL, WOULD YOU, AS THE PRESIDENT'S ECONOMIC ADVISER, RECOMMEND THAT THE U.S. WALK AWAY FROM THE DEAL?

A:

Q: SECRETARY PENA STATED THAT DOE'S 5 LABS STUDY "...SHOWED THAT WHAT WAS GOOD FOR THE ENVIRONMENT WOULD BE GOOD FOR THE ECONOMY." IS IT THE ADMINISTRATION'S POSITION THAT A \$50/TON CARBON PRICE WOULD BE GOOD FOR THE ECONOMY?

A:

Q: ALL PUBLICLY RELEASED ECONOMIC ANALYSES OF CLIMATE CHANGE (IAT, 5 LABS) DO NOT CONSIDER THE COSTS ASSOCIATED WITH DEVELOPMENT, IMPLEMENTATION, AND MONITORING OF A TRADING PROGRAM. ARE THESE OMISSIONS VALID AND REALISTIC? SHOULD PEOPLE ASSUME THAT THE COSTS ARE MINIMAL? DOES THIS MEAN THAT AN INTERNATIONAL TRADING SYSTEM WILL BE INEXPENSIVE TO SET UP AND OPERATE? WHAT KIND OF TRANSACTION COSTS DO YOU EXPECT FOR AN INTERNATIONAL TRADING PROGRAM? FOR A JI PROGRAM?

A:

— Q: DOESN'T THE DOE 5 LABS STUDY PROVIDE A JUSTIFICATION FOR NOT RUSHING INTO LEGALLY BINDING EMISSIONS REDUCTION MANDATES IN KYOTO, BUT DELAYING -- EVEN FOR A FEW YEARS -- TO REAP THE BENEFITS OF THE KINDS OF R&D THE STUDY IS PROMOTING? CAN YOU QUANTIFY THE "COST" OF DELAYING 10 OR 20 YEARS?

A:

Q: WOULD STATE OR LOCAL GOVERNMENTS BE REQUIRED TO PURCHASE CARBON PERMITS? FEDERAL AGENCIES?

A:

Q: WHAT PENALTIES WOULD APPLY IF A DEVELOPING COUNTRY FAILED TO REDUCE ITS EMISSIONS AT AN AMOUNT COMMENSURATE WITH THE CARBON UNITS IT HAD SOLD?

A:

Q: CONGRESSMAN DINGELL SUGGESTED ON 6/19/97 THAT THE ADMINISTRATION'S ANALYSIS IS "TOO LATE TO INFORM THE PROCESS, AND LIKELY WILL BE USED TO JUSTIFY WHAT THE ADMINISTRATION HAS ALREADY DECIDED TO DO." WOULD YOU PLEASE COMMENT ON HIS CONCERNS.

A:

Q: MOST MODELING EFFORTS INDICATE THAT TO ACHIEVE 1990 BY 2010, U.S. CONSUMPTION OF COAL WOULD HAVE TO DECLINE SIGNIFICANTLY. DOES THIS MEAN THAT THE ADMINISTRATION'S POLICY IS ANTI-COAL? WHAT KIND OF IMPACT WILL THIS HAVE ON COAL MINERS?

A:

Peter R. Orszag

10/22/97 09:45:46

AM

Record Type: Record

To: Joseph E. Aldy/CEA/EOP

cc:

Subject:

Q: ARE YOU PROPOSING ANY OTHER STANDARDS AS PART OF YOUR PACKAGE?

A: As part of our industry-by-industry consultation process, we will be working with interested parties to explore all possible opportunities for reducing carbon emissions. That could include energy-efficiency standards if appropriate. But we are not putting out any specific proposals at this time. We want to elicit industry views on the subject.

Economic reasons to support the President's proposal.

- **Risk of catastrophic climate change:**

There is a small risk that climate change will lead to large-scale discrete catastrophes. Examples include

- 1) major surges of the West Antarctic ice sheets, leading to sea-level rises of 20 feet or more,
- 2) a runaway greenhouse effect in which warming melts tundras and releases large amounts of additional greenhouse gases like methane.
- 3) displacement of the Gulf Stream that warms western Europe. This is predicted by climate change models that suggest multiple equilibria and non-linearities.

Nordhaus' survey of experts indicates that there is a nonnegligible probability of a large impact (i.e., a discrete large-scale catastrophe) at 3° C warming. Aversion to risk of catastrophic climate change is reasonable, and a good reason to advocate a more stringent policy.

- **Developing country participation will lower costs and increase benefits**

The President will not submit the treaty to the U.S. Senate for ratification without commitments (check this!) by developing countries.

- 1) These commitments will ensure emissions reductions globally, and thereby increase the effectiveness of the U.S. emissions reductions in addressing the global problem.
- 2) Their commitments will help establish emissions permit trading between developing countries and the U.S. Such trading could halve the cost to the U.S. of meeting emissions reductions targets. It would give U.S. firms with expertise in lean-carbon and carbon-free technologies large-scale market opportunities throughout the world.

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1) major surges of the West Antarctic ice sheets, leading to sea-level rises of 20 feet or more,

2) a runaway greenhouse effect in which warming melts tundras and releases large amounts of additional greenhouse gases like methane.

3) displacement of the Gulf Stream that warms western Europe. This is predicted by climate change models that appear to exhibit multiple equilibria and non-linearities.

Nordhaus' survey of experts indicates that there is a nonnegligible probability of a large impact (i.e., a discrete large-scale "catastrophe") at 3° C warming. Aversion to risk of catastrophic climate change is sensible, and a good reason to advocate a more stringent policy.

Talking Points on President's Climate Change Proposal

I. Science is compelling. Most significant environmental challenge of our generation.

Over 2500 scientists from over 150 countries have endorsed the report of the Intergovernmental Panel on Climate Change (IPCC), which concluded that "the balance of evidence suggests that there is a discernible human influence on climate change." Scientific consensus that on the business-as-usual trajectory, temperatures will increase by between 2 and 6.5 degrees Fahrenheit over the next century. (For reference, ~~cooling~~ *warming* in average temperature since last ice age is 9 degrees Fahrenheit.)

II. President's plan is ambitious, but sound and sensible. The target and timetable is to reduce emissions to 1990 levels by the period of 2008 to 2012, and below 1990 levels in the 5-year period that follows. Approach based on five fundamental principles:

1. Guided by the science;
2. Rely on market-based and common sense tools to reduce costs;
3. First look for the win-win, positive solutions that exist (engineering studies suggest that we can reduce emissions by 20 percent at zero or negative cost);
4. Global participation -- global problem that requires a global solution; and,
5. Recognizing the uncertainty, we need to have regular common sense, economic and scientific reviews.

III. Three-stage approach:

- **Stage 1: Priming the Pump Through R&D, Tax Incentives, Incentives for Early Action, Federal Leadership, and Industry Consultations.** The first stage of the President's package includes a 9-point action plan including:

\$5 billion over 5 years in tax incentives and spending for R&D and energy efficiency,

Incentives for early action,

Electricity restructuring,

A set of Federal government energy initiatives, and

Industry-by-industry consultations to explore their best ideas on how to reduce emissions in a cost-effective manner (including market-oriented standards for energy efficiency).

The first economic review would occur near the end of Stage 1.

- **Stage 2: Review and Evaluation.** The second stage, which would begin around 2004, will build upon the programs adopted in Stage 1, by including a review of our progress and an evaluation of next steps as we move toward a market-based permit trading system for carbon emissions. Details of the permit system refined and perhaps tested. Such a permit system is similar in concept to the one that dramatically cut acid rain emissions -- although the scale would be significantly larger than the current acid rain program. The second economic review would occur near the end of Stage 2.
- **Stage 3: Meeting Binding Targets Through Domestic and International Emissions Trading Program.** In the third stage, we would reduce emissions to 1990 levels by 2008-2012, and below 1990 levels in the 5-year period after that, through a market-based domestic and international emissions trading system. Before beginning this third stage, the second economic update and review would allow Congress and the President to evaluate how the economy had responded to a decade's worth of experience in the first two stages of the President's plan. The President is committed to working with labor and Congress to insure that we give proper assistance to any workers dislocated by the changes in energy usage inherent in any climate change plan.

IV. Immediate action plan: 9 Elements

- 1. \$5 billion in Tax Cuts and Federal R&D:** To spur energy efficiency and the development of lower-carbon energy sources, the Administration supports a major new package of tax cuts and R&D spending amounting to \$5 billion over five years. Many of the ideas from the recent report of the President's Committee on Science and Technology (PCAST) will be considered in constructing this package.
- 2. Credit for Early Action:** To provide an immediate incentive for near-term actions to cut emissions, the Administration is committed to ensuring that firms which act early are rewarded appropriately. We will work with companies to build a program that appropriately rewards those who take prompt and early actions before the beginning of the mandatory emissions budget period in Stage 3.
- 3. Industry-by-Industry Consultations:** The Administration challenges key industry sectors to prepare plans over the next 9 months on how they can best reduce emissions, including how the Federal government can remove regulatory hurdles that discourage energy efficiency. The Administration will work in partnership with industry to develop sensible efficiency standards in a variety of areas.
- 4. Encouraging the Use of Energy-Efficient Products:** As the Department of Energy's 5-Labs study illustrates, many existing technologies produce win-win solutions to reducing carbon emissions -- but nonetheless are still not widely used. The President is committed to expanding their reach. He will therefore complement his other programs by engaging in a broad-based effort to expand the use of *existing* energy-efficient

technologies -- while also spurring the development of *new* technologies.

5. *Federal Procurement and Energy Use:* To reduce greenhouse gas emissions from Federal sources, DOE will spearhead a comprehensive effort that includes expanded performance contracting to make Federal buildings more energy-efficient, improved Federal procurement of energy-efficient technology, and partnerships to improve the energy efficiency of Federal aircraft, ships and vehicles. Federal agencies will also be called upon to assess emissions in major initiatives.

6. *Electricity Restructuring:* To spur further efforts to clean our air and deliver a downpayment on greenhouse gas emission reductions, while saving consumers billions, we will pursue a bold plan to restructure the energy sector. It is time to change the rules that are often more than 70 years old -- stifling innovations that can save money and impede newer, cleaner technologies.

7. *Setting a Concentration Goal for Greenhouse Gases in the Atmosphere:* The goal of the existing climate treaty is to stabilize concentrations of greenhouse gases, but the specific concentration has never been defined. The U.S. supports developing a specific, long-term goal, with the assistance of the National Academy of Science and other appropriate bodies.

8. *Bilateral Dialogues:* In addition to pursuing agreement in Kyoto, the Administration will pursue bilateral dialogues with key developing countries to promote clean energy.

9. *Economics and Science Reviews:* The President proposes regular scientific and economic reviews, to ensure that policy-makers have the best possible information on climate

Carbon emissions, past/business-as-usual

	Millions of metric tons			Growth rate per year			
	1990	1997	2010 (BAU)	1990-97	1997-2010	1990-2010	1990-2010 (
Buildings	460	511	571	1.51	0.86	1.09	24.13
Industry	452	482	548	0.92	0.99	0.97	21.24
Transportation	432	486	616	1.70	1.84	1.79	42.59
TOTAL	1344	1479	1735	1.38	1.24	1.28	29.09

Possible sources of reductions. Best example: We currently throw out, as waste heat, 2/3 of the energy we use to produce electricity. We believe that much of this waste heat can be captured, and put to good use, through combined heat-and-power systems that use the waste heat from electricity generation to warm buildings and thus reduce the need for separate heating systems. Engineering estimates suggest we could reduce emissions by 20 percent or more without increasing costs.

1. Buildings

- A. Heating (space heating) accounts for 43 percent of building emissions. With improved building designs, fuel cells, and gas turbines, new residential heating systems can be 10 to 25 percent more efficient and commercial heating systems almost 50 percent more efficient.
- B. Heating water accounts for almost 10 percent of building emissions. The best available appliance technology for water heating can increase efficiency by 25 to 30 percent.

2. Transportation

- A. Autos account for 35 percent of transportation emissions. Partnership for a New Generation of Vehicles (PNGV) has a goal of reducing automobile fuel use per mile by a factor of three.
- B. Aircraft account for 13 percent of transportation emissions. A new NASA/FAA/DoD program is studying improvements in aircraft design and air traffic control, with a goal of reducing fuel use per mile by 35 percent in 10 years.

3. Industry

- A. Steam and process heat account for 46 percent of industrial emissions. Combined heat-and-power systems can dramatically reduce CO2 emissions while providing the same industrial output; potential CO2 reductions of up to 2/3.

4. Joint implementation

- A. Chinese coal-fired plants are only 2/3 as efficient as US boilers. Retro-fitting Chinese plants with US boilers saves more money than it costs. *A recent World Bank analysis found that China could reduce its emissions nearly 15 percent -- or roughly 333 million metric tons -- through zero and negative cost energy efficiency improvements.*
- B. Retrofitting Russian apartments saves 30 percent of heat use and saves more money than it costs.

Q: WHY DIDN'T YOU CONDUCT FORMAL ECONOMIC ANALYSIS?

A: We did. We conducted an intense program of economic analysis in six critical areas, and the conclusions we drew in these key areas are reflected in our policy package:

1. We studied the economic effects of not acting.

-- Several prominent economists, including Bill Cline and Bill Nordhaus, have examined the economic impact of *not* acting to address climate change. They study the costs of climate change in terms of agriculture, sea-level increases, life and morbidity, hurricane damage, and other factors.

-- Their general conclusion is that the cost of allowing climate change to continue unabated could amount to losses of about 1 percent of GDP -- equivalent to about \$80 billion -- in the United States. [Nordhaus, *Managing the Global Commons*, Table 4.1; Cline, *The Economics of Global Warming*, Table 3.4.]

-- Other analysts believe that the effects could be even larger.

CONCLUSION: We concluded that failing to act to address climate change could have substantial economic as well as environmental costs. We therefore put forward an ambitious, but sound and sensible, plan to reduce emissions.

2. We studied the impact of market-based systems to reduce costs.

-- The acid rain system provides the best example. It shows that a tradeable permits system, by harnessing the power of the market, can substantially reduce the costs of achieving an environmental objective.

-- Numerous papers -- including recent ones from Resources for the Future and Robert Stavins of Harvard University ("What Can We Learn from the Grand Policy Experiment? Positive and Normative Lessons from SO₂ Allowance Trading") -- conclude that the acid rain program is a resounding success, with reductions of acid rain ahead of schedule and well below projected cost.

CONCLUSION: Our analysis concluded that market-based systems would *substantially* reduce the costs of addressing climate change. One of our key principles is therefore to rely on market-based systems to reduce emissions. The acid rain tradeable permits system served as the model for our carbon tradeable permits system.

3. We studied the potential for international emissions trading and joint implementation to reduce costs.

-- A series of papers from the Stanford Energy Modeling Forum, which we would be happy to provide to you, highlight the benefits from international emissions trading and joint implementation.

-- Another recent paper (JA Edmonds, SH Kim, CN MacCracken, RD Sands, MA Wise, "Return to 1990: The Cost of Mitigating United States Carbon Emissions in the Post-2000 Period," Battelle, October 1997) also highlights the cost reductions available through international trading.

-- World Bank analysis (including by China experts Charles Feinstein and Kirk Hamilton) has concluded that China could reduce its emissions nearly 15 percent -- or roughly 333 million metric tons -- through zero and negative cost energy efficiency improvements. Note that we only have to reduce by about 400 million metric tons to reach 1990 levels by 2010.

CONCLUSION: Our analysis concluded that international trading and JI could lead to substantial cost reductions. A key aspect of our proposal is therefore to extend permit trading to the international sphere, and to include an innovative program of "Joint Implementation" to allow U.S. firms to pursue low-cost emissions reductions and win-win solutions wherever they may occur.

4. We studied the potential for energy efficiency improvements here at home.

-- The Department of Energy's Five-Labs study ("Scenarios of U.S. Carbon Reductions: Potential Impacts of Energy Technologies by 2010 and Beyond") documents in detail how four key sectors of the economy -- buildings, transportation, industry, and electric utilities -- could expand the adoption of energy-efficiency and low-carbon technologies.

-- A 1991 National Academy of Sciences study, which we could also provide to you, concluded that emissions reductions of 25 percent were available at a cost of less than \$10 per ton (2.6 cents per gallon of gas).

CONCLUSION: Our analysis concluded that there were many win-win solutions here at home -- and that we would work with industry to identify ways of increasing the penetration rate of energy-efficient products.

5. We studied the potential impact of electricity restructuring.

-- The Department of Energy has been working with EPA and other agencies to develop estimates of the carbon emission impact of a appropriately crafted electricity restructuring bill.

CONCLUSION: Our analysis concluded that an appropriately crafted electricity restructuring bill could significantly reduce emissions and save consumers billions of dollars. The President therefore announced his support for such an appropriately crafted bill as part of his climate change plan.

6. We studied the payoffs from R&D.

-- An October 1995 report from the Council of Economic Advisers shows that the rate of return from R&D investments can be quite large.

-- A report from the President's Council of Advisors on Science and Technology (PCAST), led by John Holdren, identified many of the specific R&D areas that would have the highest long-term payoffs in terms of energy efficiency and carbon reductions.

CONCLUSION: Our analysis suggested that a package of R&D and tax incentives could have very large benefits in reducing emissions. We therefore proposed a \$5 billion program over 5 years to provide tax incentives and R&D for carbon-reducing activities.

- [• It's true that we did not rely on macroeconomic models, because we decided that they were incapable of providing a definitive answer to how the economy would behave over the next 13 years. To give some insight into why the macroeconomic effort is so hard, remember that it is hard enough to predict what will happen to the economy next quarter, let alone next year. But the modelling effort involved here has to look ahead 13 years. To get a sense of how hard that is, do you think any econometric model would have predicted 13 years ago that we could possibly have a budget deficit of \$23 billion, an unemployment rate of 4.9 percent, and an inflation rate of 2.2 percent? Or would any econometric model have predicted in 1981 that the real price of gasoline would fall from \$2.27 per gallon to \$1.22 in 1996?]

Q: DON'T ECONOMIC MODELS SUGGEST THAT THIS EFFORT WILL COST MORE THAN 1.5 MILLION JOBS AND TANK THE ECONOMY?

A: Some models may suggest that, but only by ignoring several key elements of the President's plan:

1. They ignore the President's \$5 billion package of tax cuts and Federal R&D: To spur energy efficiency and the development of lower-carbon energy sources, the Administration supports a major new package of tax cuts and R&D spending amounting to \$5 billion over five years.

2. They ignore the potential for increased use of existing energy-efficient products: As the Department of Energy's 5-Labs study illustrates, many existing technologies produce win-win solutions to reducing carbon emissions -- but nonetheless are still not widely used. The President is committed to expanding their reach. The models referenced assume little

Peter R. Orszag

10/22/97 09:45:46

AM

Record Type: Record

To: Joseph E. Aldy/CEA/EOP

cc:

Subject:

Q: ARE YOU PROPOSING ANY OTHER STANDARDS AS PART OF YOUR PACKAGE?

A: As part of our industry-by-industry consultation process, we will be working with interested parties to explore all possible opportunities for reducing carbon emissions. That could include energy-efficiency standards if appropriate. But we are not putting out any specific proposals at this time. We want to elicit industry views on the subject.

JA

Questions and Answers on President's Climate Change Proposal
DRAFT -- 11:30 a.m. October 22, 1997

Q: Don't economic models suggest that this effort will cost more than 1.5 million jobs and tank the economy?

A: Some models may suggest that, but only by ignoring several key elements of the President's plan:

1. They ignore the President's \$5 billion package of tax cuts and Federal R&D: To spur energy efficiency and the development of lower-carbon energy sources, the Administration supports a major new package of tax cuts and R&D spending amounting to \$5 billion over five years.

2. They ignore the potential for increased use of existing energy-efficient products: As the Department of Energy's 5-Labs study illustrates, many existing technologies produce win-win solutions to reducing carbon emissions -- but nonetheless are still not widely used. The President is committed to expanding their reach. The models referenced assume little change in the penetration rate of existing energy-efficient equipment. *bc they are economic models*

3. They ignore the President's Federal energy initiative: To reduce greenhouse gas emissions from Federal sources, the Department of Energy will spearhead a comprehensive effort that includes expanded performance contracting to make Federal buildings more energy-efficient, improved Federal procurement practices, establishment of a new level of excellence for Federal building construction and renovation, and partnerships to improve the energy efficiency of Federal aircraft, ships and vehicles.

4. They ignore electricity restructuring: To spur further efforts to clean our air and deliver a down payment on greenhouse gas emission reductions, while saving consumers billions, we will pursue a bold plan to restructure the energy sector. It is time to change the rules that are often more than 70 years old -- stifling innovations that can save money and impede newer, cleaner technologies.

5. They ignore international emissions trading. Two key components of the President's plan are his support for an international system of emissions permit trading, and his commitment that developing countries must participate in the international effort. International trading can substantially reduce the costs of emissions reductions.

6. They ignore the economic costs associated with climate change itself. Climate change will lead to increased flooding, sea-level rise, and other dislocation. So looking just at the impact of reducing emissions on GDP is misleading.

Finally, we all must admit there is much uncertainty over cost projections that are a decade or more in the future -- after all, a decade ago, we could never have predicted that we would now have an unemployment rate below 5 percent, core inflation below 2.5 percent, and a budget deficit substantially under \$50 billion. That's why the President has proposed a graduated, three-stage approach with regular reviews -- starting with a period of voluntary action, tax incentives, R&D, and Federal efficiency improvements, and followed by an evaluation period before the internationally binding period. Only after we have accumulated ten years of experience with the first two stages of the program would we enter the internationally binding period.

Q: Didn't the 5-labs study conclude that carbon prices would have to rise by \$50 to reach 1990 levels by 2010, and isn't that on the optimistic side?

A: The 5-Labs study examined a scenario in which there was no international trading and no electricity restructuring legislation, and concluded that the permit price would have to be \$50 to reduce emissions to 1990 levels by 2010 without such elements. But the President's plan emphasizes international trading and developing country participation, and includes a commitment to properly crafted electricity restructuring. [A DOE analysis that combines international permit trading and electricity restructuring with the results of the 5-Labs study suggests that a permit price of \$25 or lower in 2010 would allow the country to meet its target and timetable.]

Q: Doesn't the President's plan amount to the largest energy tax increase in history -- \$200 billion a year or more?

A: Not at all. The President's plan includes tax *cuts*, not tax increases. It does not involve tax increases at all.

Follow: but isn't a permit system just like a tax?

A: No. There are several critical differences between a permit system and a tax. [For example, a permit system provides insurance that a given quantitative target will be met, whereas a tax does not.] In any case, the permit system does not begin until we have accumulated ten years of experience with tax incentives, R&D, Federal energy efforts, early credit, and the other components of the President's initial action plan.

Q: How can you possibly reduce emissions to 1990 levels by 2008-2012 without imposing excessive costs on the economy?

A: • The President believes that climate change is a critical challenge facing the country, and that if we make this a top priority, we can accomplish significant emissions reductions at low cost. In this effort, it would be irresponsible not to explore all possible avenues for low-cost emissions reductions. That's why the President has

proposed a graduated, three-stage approach -- starting with a period of early credit, tax incentives, R&D, and Federal efficiency improvements, and followed by an evaluation period around 2004. He has proposed regular economic reviews, to ensure that the economic costs are not excessive. Only after we have accumulated ten years of experience with the first two stages of the program would we enter the internationally binding period.

Q: Won't this plan lead to massive shifts of U.S. industry and jobs abroad?

- A:
- No. The President has made very clear that we will not assume binding obligations without the participation of developing countries.
 - I would also note that non-tradeable sectors account for a substantial share of carbon emissions. Transportation and buildings, for example, account for roughly two-thirds of U.S. emissions. For these sectors, the "competitiveness" argument seems largely irrelevant.
 - In most manufacturing sectors, furthermore, energy costs are a small percentage of total costs. According to the 1995 Annual Census of Manufactures, energy costs - for manufacturing industries averaged just 2.2 percent of total costs.

Q: How is the president's initial action plan different from the Climate Change Action Plan that the Administration has already adopted?

A: The first stage of the President's climate change proposal differs from the Climate Change Action Plan in four critical ways:

- It includes substantially more funding. The President's proposal includes funding for carbon-reducing activities of \$5 billion over 5 years -- substantially more than current funding for the climate change action plan. Activities under the Climate Change Action Plan are estimated to reduce CO2 emissions by 95 million metric tons in 2010 -- and doubling the funding should lead to more reductions. [Total reductions needed in 2010 are 390 million metric tons.]

[Funding for the Climate Change Action Plan in FY 1995 was \$184 million, in FY 1996 \$158 million, and in FY 1997 \$163 million. Total funding for climate-related activities is somewhat higher -- but still less than \$500 million per year -- because items such as PNGV are not included in the Climate Change Action Plan definition.]

- Crucially, the President's proposal now includes binding targets. In expectation of these binding targets, firms and households will begin to adjust their behavior today -- a factor that was not present in the climate change action plan.

- To provide further incentives for firms to take action now, the President has indicated his strong support for developing an early credit program of appropriate rewards for those who take prompt early action.
- Finally, the President has indicated his support for environmentally-friendly electricity restructuring, which has the potential to reduce emissions.

Q: Hasn't the climate change action plan failed to reduce emissions?

A: Total emissions are higher than anticipated when the Climate Change Action Plan was adopted several years ago, because of stronger economic growth, lower energy prices, and reduced funding for Congress. But the *partial* effect of the activities under the current Climate Change Action Plan is still estimated to be a reduction in CO2 emissions of 32 million metric tons in 2000 and 95 million metric tons in 2010 (and *all* greenhouse gas emissions of 76 million metric tons in 2000 and 169 million metric tons in 2010). The President's three-stage plan includes substantially more funding than the Climate Change Action Plan -- and thus could produce substantially more reductions in carbon emissions. [390 million metric tons of CO2 reductions are needed in 2010 to move from business-as-usual to 1990 emissions levels.]

Q: Will you submit any agreement reached at Kyoto to the Senate for its advice and consent?

A: • We honor and respect the U.S. Senate's important role in providing advice and consent to the ratification of treaties. We would anticipate the need for Senate advice and consent to any international agreement adopted in Kyoto that would impose binding commitments on the U.S. to control emissions.

Q: Will the President or Vice-President go to Kyoto?

A: • We have not made final decisions about the membership of our delegation in Kyoto.

Q: What is the President proposing that developing countries do as part of his proposal?

A: • Today, the President emphasized that the United States will not assume binding obligations under the climate treaty without developing country participation.

• The President believes we can engage developing countries on this issue in ways that are good for them and good for us. He believes that developing countries have an opportunity to chart a different energy future -- one based on clean and cheap technologies.

- The President spoke about this issue in each country he visited in Latin America last week. Throughout his trip, he shared his conviction that we can and must work together on this problem, in ways that benefit us all. He plans to raise this issue with Jiang Zemin next week.

Q: Why did the U.S. propose such a modest target and timetable, which is weaker than any of the proposals to date, including from the European Union and Japan?

- A:
- The President has put forward a strong target that is realistic, achievable and pragmatic, not just rhetorical. We have backed up those proposals with a three-stage domestic implementation plan. And we have called for a comprehensive international framework that will ensure that all countries participate in a global effort to reduce emissions at the least cost.
 - Keep in mind that some of these other targets aren't all they seem to be. The EU derives enormous benefits from a 1990 baseline -- Germany, for example, gets to claim credit for all the cheap reductions that were a fortuitous consequence of reunification.
 - With regard to Japan, a careful examination of their proposal shows that we are not so far apart.

Q: Isn't it true that this proposal doesn't actually reduce emissions at all but instead just stabilizes them at a certain level?

- A:
- No. Our proposal involves real and meaningful reductions. Consider that under a business-as-usual scenario, U.S. emissions are predicted to be 28% above 1990 levels by 2010.
 - We also stipulate that further reductions, below the 1990 baseline, would be achieved in a second emissions budget period.

Q: Given how far apart countries seem to be in their stated positions, is it realistic to expect any kind of agreement in Kyoto?

- A:
- We are hopeful that all countries will come to Kyoto with an open mind, prepared to negotiate an agreement that provides real and achievable gains.
 - No agreement is better than a bad agreement. The U.S. will continue to insist that any international framework include realistic, achievable targets; flexible implementation mechanisms like emissions trading and joint implementation; and

the meaningful participation of developing countries.

Q: What happens if there is no deal in Kyoto?

- A:
- We are hopeful that all countries will come to Kyoto with an open mind, prepared to negotiate an agreement that provides real and achievable gains.
 - Even if we cannot reach agreement in Kyoto, climate change will remain a top priority issue for this President. The U.S. will continue to work on building support for a comprehensive international framework that involves all countries in a common effort to meet this important challenge.
 - And we will get busy on the elements of the President's plan that we can start right away.

Q: Does the climate change science justify near-term action? Aren't the uncertainties still too great?

- A:
- No. The fundamental science of climate change is clear. Greenhouse gas concentrations in the atmosphere are rising as a result of human actions. These increased concentrations are warming the planet, and unless we reduce our emissions, the effects on our climate are likely to become increasingly severe.
 - Uncertainties do remain. We are not sure exactly how fast the planet will warm or which regions of the world will suffer the worst impacts. Yet what we do know is more than enough to justify taking the kinds of sensible actions the President has proposed.
 - As for the skeptics who would have us do nothing, they represent a tiny fraction of the scientific community. On the other hand, the Intergovernmental Panel on Climate Change, including 2,000 of the world's premier climate experts, has underscored the seriousness of the climate change problem and the need for action.
 - As part of his proposal, the President has called for additional scientific studies focused on key areas, including a call to the National Academy of Sciences to examine the issue of establishing a long-term goal for stabilizing atmospheric concentrations of greenhouse gases.

PRESIDENT CLINTON'S CLIMATE CHANGE PROPOSAL

October 22, 1997

Global climate change is the premier environmental challenge and opportunity of the 21st century, and the risks it poses justify sensible preventive steps. Addressing this issue is one of the United States' greatest imperatives, for this and future generations. Recognizing the solid foundation of climate science, President Clinton is committed to strong and sensible action to reduce greenhouse gas emissions -- including realistic and binding emissions targets.

Key elements of President Clinton's climate change proposal include:

- **Binding Targets to Reach 1990 Emissions Levels by 2008-2012 and Reductions Below 1990 Levels in the 5-Year Period That Follows.** A critical component of the President's comprehensive framework is a realistic, achievable, and binding target of reducing greenhouse emissions to 1990 levels by 2008-2012 and reductions below 1990 levels in the 5-year period that follows.
- **\$5 Billion Program of Tax Cuts and R&D for New Technologies.** To spur energy efficiency and the development of new technologies, the President proposes a major new package of tax cuts and R&D spending amounting to \$5 billion over five years.
- **Industry-by-Industry Consultations and Early Credit.** The Administration challenges key industries to prepare plans over the next 9 months on how they can best reduce emissions. To provide an incentive for near-term actions to cut emissions, the President is committed to ensuring appropriate rewards for firms that act early.
- **Developing Countries Must Participate.** Climate change is a global problem, and requires a global solution. That's why the United States has spear-headed joint implementation projects, and the President has committed that the United States will not adopt binding obligations without developing country participation.
- **Broad-Based Domestic and International Emissions Trading System Begins After A Decade of Experience Has Accumulated.** The President is committed to a market-based emissions trading system, both domestically and internationally, that will harness the power of the market to reduce emissions to 1990 levels by 2008-2012. The trading system would begin after a decade's worth of experience with tax incentives, R&D, early credit, electricity restructuring, Federal efforts, and other measures.

BINDING TARGETS: The U.S. binding target is realistic: It seeks to return U.S. emissions to 1990 levels in the period 2008-2012 and reduce them further thereafter. We reject the European proposal for more stringent early reductions, as well as the "do-nothing" approach of some interests. The target is achievable: By providing incentives for early action to reduce emissions, attacking domestic energy inefficiencies, and putting in place a market-based emissions trading system, we can reach 1990 levels in the proposed time frame with minimal economic costs. And it is meaningful: Achieving 1990 levels in the period 2008-2012 would amount to almost a 30 percent reduction off a business-as-usual path, an important first step on the road toward stabilizing greenhouse gas concentrations in the atmosphere.

SOLID PRINCIPLES: The President's five climate change principles include: that the policies should be guided by science, rely on market-based, common-sense tools, that we should seek win-win solutions, that global participation is essential to addressing the global problem of climate change, and that we must have regular common-sense reviews of the economics and science of climate change.

SOUND AND SENSIBLE THREE-STAGE APPROACH: Reflecting his five key principles, the President's plan includes three stages: Stage 1 includes priming the pump through programs such as R&D, tax incentives, incentives for early action, and Federal leadership, and industry consultations. Stage 2 builds upon the first stage by including a review and evaluation in preparation for the permit trading system. Stage 3 -- which does not occur for a decade -- involves meeting binding targets through a domestic and international emissions trading program. The President is committed to working with labor and Congress to insure that we give proper assistance to any workers dislocated by the changes in energy usage inherent in any climate change plan.

INITIAL ACTION PLAN: The President's immediate action plan includes 9 elements:

- 1. \$5 Billion in Tax Cuts and Federal R&D:* To spur energy efficiency and encourage the development and deployment of lower-carbon energy sources, the Administration supports a major new package of tax cuts and R&D spending amounting to \$5 billion over five years.
- 2. Credit for Early Action:* To provide an immediate incentive for near-term actions, the President is committed to ensuring that firms acting early are rewarded appropriately.
- 3. Industry-by-Industry Consultations:* The Administration challenges key industry sectors to prepare plans over the next 9 months on how they can best reduce emissions.
- 4. Encouraging the Use of Energy-Efficient Products:* The President will complement his tax incentives, commitment to early action credit, and industry consultations by engaging in a broad-based effort to expand the use of *existing* energy-efficient technologies.
- 5. Federal Procurement and Energy Use:* The Department of Energy will spearhead a comprehensive effort to reduce greenhouse gas emissions from Federal sources.
- 6. Electricity Restructuring:* To deliver a significant downpayment on emission reductions, while saving consumers billions, we will pursue a bold plan for electricity restructuring.
- 7. Setting a Concentration Goal:* The United States supports developing a specific, long-term concentration goal with the assistance of the National Academy of Sciences and other bodies.
- 8. Bilateral Dialogues:* In addition to pursuing agreement in Kyoto, the Administration will pursue bilateral dialogues with key developing countries to promote clean energy.
- 9. Economics and Science Reviews:* The President proposes regular scientific and economic reviews. These reviews will ensure that policy-makers have the best possible information on climate change.

WIN-WIN: There are numerous win-win solutions to reducing carbon emissions. For example, a breakthrough in fuel cell technology announced yesterday will clear the way toward developing cars that are three times as efficient as today's models -- cutting pollution while also cutting driving costs.

INITIAL CLIMATE CHANGE ACTIONS

October 22, 1997

President Clinton has proposed nine immediate actions to begin addressing climate change:

- 1. Tax Cuts and Federal R&D:** To spur energy efficiency and the development of lower-carbon energy sources, the Administration supports a major new package of tax cuts and R&D spending amounting to \$5 billion over five years. Many of the ideas from the recent report of the President's Committee on Science and Technology (PCAST) will be considered in constructing this package.
- 2. Credit for Early Action:** To provide an immediate incentive for near-term actions to cut emissions, the Administration is committed to ensuring that firms which act early are rewarded appropriately. We will work with companies to build a program that appropriately rewards those who take prompt and early actions before the beginning of the mandatory emissions budget period in Stage 3.
- 3. Industry-by-Industry Consultations:** The Administration challenges key industry sectors to prepare plans over the next 9 months on how they can best reduce emissions, including how the Federal government can remove regulatory hurdles that discourage energy efficiency. The Administration will work in partnership with industry to develop sensible efficiency standards in a variety of areas.
- 4. Encouraging the Use of Energy-Efficient Products:** As the Department of Energy's 5-Labs study illustrates, many existing technologies produce win-win solutions to reducing carbon emissions -- but nonetheless are still not widely used. The President is committed to expanding their reach. He will therefore complement his other programs by engaging in a broad-based effort to expand the use of existing energy-efficient technologies -- while also spurring the development of new technologies.
- 5. Federal Procurement and Energy Use:** To reduce greenhouse gas emissions from Federal sources, DOE will spearhead a comprehensive effort that includes expanded performance contracting to make Federal buildings more energy-efficient, improved Federal procurement of energy-efficient technology, and partnerships to improve the energy efficiency of Federal aircraft, ships and vehicles. Federal agencies will also be called upon to assess emissions in major initiatives.
- 6. Electricity Restructuring:** To spur further efforts to clean our air and deliver a downpayment on greenhouse gas emission reductions, while saving consumers billions, we will pursue a bold plan to restructure the energy sector. It is time to change the rules that are often more than 70 years old -- stifling innovations that can save money and impede newer, cleaner technologies.
- 7. Setting a Concentration Goal for Greenhouse Gases in the Atmosphere:** The goal of the existing climate treaty is to stabilize concentrations of greenhouse gases, but the specific concentration has never been defined. The U.S. supports developing a specific, long-term goal, with the assistance of the National Academy of Science and other appropriate bodies.
- 8. Bilateral Dialogues:** In addition to pursuing agreement in Kyoto, the Administration will pursue bilateral dialogues with key developing countries to promote clean energy.
- 9. Economics and Science Reviews:** The President proposes regular scientific and economic reviews, to ensure that policy-makers have the best possible information on climate change.

BACKGROUND INFORMATION

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PRESIDENT CLINTON'S FIVE CLIMATE CHANGE PRINCIPLES

October 22, 1997

Global climate change is the premier environmental challenge and opportunity of the 21st century, and the risks it poses justify sensible preventive steps. Addressing this issue is one of the United States' greatest imperatives, for this and future generations. Recognizing the solid foundation of climate science, President Clinton is committed to strong and sensible action to reduce greenhouse gas emissions -- including realistic and binding emissions targets.

President Clinton's climate change plan is based on **five key principles**:

- **Guided by science.** The vast majority of the world's scientists have concluded that if the countries of world do not work together to cut greenhouse gas emissions, temperatures will rise and disrupt the global climate. Indeed, most scientists say this process has already begun. But there is much we still don't know about how the climate and human health will react to increased greenhouse gas concentrations. That's why the President's plan includes regular science reviews, to ensure that our policies are guided by the best science available.
- **Market-based, common-sense tools.** We have learned that the costs of protecting the environment is substantially lower if we harness the power of markets to do so. That's why the President's plan emphasizes flexible and market-based mechanisms. His plan includes a domestic and international permit trading system for greenhouse gas emissions, similar to the highly successful permit trading system that has dramatically cut acid rain at a fraction of the predicted cost.
- **Seek win-win solutions.** There are a multitude of win-win solutions to reducing carbon emissions, that can improve our energy efficiency and save consumers money. For example, a breakthrough in fuel cell technology announced yesterday will clear the way toward developing cars that are twice as efficient as today's models -- cutting pollution while also cutting driving costs. The President believes that we must seek such win-win solutions to addressing climate change.
- **Global participation.** Climate change is a global problem, and requires a global solution. A ton of carbon emitted in Argentina has just as much effect on the global climate as a ton of carbon emitted in the United States -- and within the next few decades, emissions from developing countries are expected to exceed those from developed countries. And many win-win opportunities exist to reduce greenhouse gas emissions in developing countries. That's why the United States has spear-headed joint implementation projects and the President has committed that the United States will not adopt binding obligations without developing country participation.
- **Common-sense economic reviews.** Our knowledge of the challenges and opportunities we face will grow over time. Therefore, the President is calling for regular 5-year economic reviews and updates, to ensure that policy-makers, both in the Administration and in Congress, have the best possible information on how the economy is responding to the effort to address climate change, how other countries are performing relative to their own commitments, and how the climate is changing in response to human activities.

THE PRESIDENT'S THREE-STAGE PLAN ON CLIMATE CHANGE

October 22, 1997

Reflecting his five key principles, the President's plan will proceed in three stages:

- **Stage 1: Priming the Pump Through R&D, Tax Incentives, Incentives for Early Action, Federal Leadership, and Industry Consultations.** The first stage of the President's package includes a 9-point action plan -- including \$5 billion in tax incentives and spending for R&D and energy efficiency, incentives for early action, a set of Federal government energy initiatives, and industry-by-industry consultations to explore their best ideas on how to reduce emissions in a cost-effective manner (including market-oriented standards for energy efficiency). The first economic review would occur near the end of Stage 1.
- **Stage 2: Review and Evaluation.** The second stage, which would begin around 2004, will build upon the programs adopted in Stage 1, by including a review of our progress and an evaluation of next steps as we move toward a market-based permit trading system for carbon emissions. During this second stage, the details of the permit system would be refined and perhaps tested. Such a permit system is similar in concept to the one that dramatically cut acid rain emissions -- although the scale would be significantly larger than the current acid rain program. The second economic review would occur near the end of Stage 2.
- **Stage 3: Meeting Binding Targets Through Domestic and International Emissions Trading Program.** In the third stage, we would reduce emissions to 1990 levels by 2008-2012, and below 1990 levels in the 5-year period after that, through a market-based domestic and international emissions trading system. Before beginning this third stage, the second economic update and review would allow Congress and the President to evaluate how the economy had responded to a decade's worth of experience in the first two stages of the President's plan. The President is committed to working with labor and Congress to insure that we give proper assistance to any workers dislocated by the changes in energy usage inherent in any climate change plan.

This three-stage program recognizes the long-term nature of the effort to address climate change in three ways:

- By adopting a graduated approach to emissions reductions, it allows us to exploit the tremendous opportunities for win-win reductions first.
- By adopting a system of regular scientific and economic updates and reviews, it allows us to monitor our progress and re-assess our success in reducing emissions, the state of scientific knowledge, and how the economy is responding to our efforts. Only after we have accumulated ten years of experience with the first two stages of the program would we enter the internationally binding period.
- By insisting that the United States will not adopt binding obligations without developing country participation and by emphasizing the importance of an international trading system and joint implementation, we take advantage of low-cost reduction possibilities wherever they occur -- either here or abroad.

COMPREHENSIVE FRAMEWORK FOR EFFECTIVE, SENSIBLE ACTION

October 22, 1997

GREENHOUSE GAS EMISSION REDUCTION TARGET

Under the current international climate change agreement (signed in Rio de Janeiro in 1992), industrialized countries accepted a non-binding emissions reduction goal. Most nations, including the United States, will fall short of meeting it. This fact, coupled with better scientific evidence on the seriousness of the climate change threat, led the U.S. to propose last year that a new agreement set binding limits on emissions. The proposed U.S. emissions target is designed to provide important environmental gains while maintaining strong economic growth. It is:

- **Realistic.** Seeks to return U.S. emissions to 1990 levels in the period 2008-2012 and reduce them further thereafter. Rejects European proposal for more stringent early reductions, as well as the “do-nothing” approach of some interests.
- **Achievable.** By providing incentives for early action to reduce emissions, attacking domestic energy inefficiencies, securing flexible international implementation mechanisms, and putting in place a market-based domestic emissions trading system, the U.S. can reach 1990 levels in the proposed time frame with minimal economic costs.
- **Meaningful.** Achieving 1990 levels in the period 2008-2012 would amount to almost a 30 percent reduction off a business-as-usual path, an important first step on the road toward stabilizing concentrations of greenhouse gases in the atmosphere. Emissions accounting will include all greenhouse gas sources and sinks (including reforestation).

FLEXIBLE, MARKET-BASED IMPLEMENTATION

Just as the effects of climate change will be felt globally, so too are the causes of climate change global in nature. Greenhouse gas emissions do equal harm to the atmosphere whether they come from a coal plant in China or a bus in Boston. For this reason, any regime to reduce greenhouse gases must be global. It must also allow all nations the ability to seek out the most efficient way of reducing emissions so that the greatest gains are achieved at the least cost. For these reasons, the United States strongly supports the inclusion in a new climate change agreement of two innovative, flexible mechanisms for reducing emissions:

- **International Emissions Trading –Using Markets to Lower Costs.** The principle of emissions trading is to use the efficiency of the market place to achieve environmental objectives at the lowest possible cost. Under an international emissions trading regime, a country (or firm) would be able to meet its emissions reduction target by reducing pollution itself, purchasing reductions from another country (or firm) that was able to achieve excess gains, or some combination of both.
- **Joint Implementation --A Global Solution to Low-Cost Reductions.** Joint Implementation (JI) is an innovative, market-based approach for addressing global climate change that uses international partnerships to achieve low-cost reductions in greenhouse gas emissions. Under JI, a company in the United States invests in a project which reduces emissions in another country and uses those reductions as a less expensive means of meeting its own target.

PARTICIPATION OF DEVELOPING COUNTRIES

In addition to its non-binding emissions reduction aim for developed countries, the Rio climate change agreement required all countries to take policies and measures to reduce emissions. Many developing countries have made real strides, through, for example, reducing energy subsidies. Nevertheless, given that developing country emissions will eclipse those from the developed world within several decades, these countries need to do more. Accordingly, the U.S. calls on developing countries to strengthen their existing commitments and to agree that their obligations must increase over time to include binding emissions limits. Our principles include:

- **Global Participation.** All countries must participate. Every nation would be required to take meaningful actions to limit emissions. The U.S. will not assume binding obligations until developing countries agree to participate meaningfully in the challenge of addressing climate change.
- **Equity.** The obligations of poorer and less developed countries should take into account their state of economic development and their relative contribution to the climate change problem.
- **Assistance.** While insisting that developing countries take meaningful actions to address climate change, the U.S. recognizes that many of these countries face significant development challenges that hamper their ability to reduce emissions. President Clinton is reemphasizing his commitment to working with these nations to help build more sustainable energy futures. This includes a \$1 billion package of assistance from USAID and a renewed commitment to provide financial assistance through the Global Environment Facility, as well as our pathbreaking joint implementation proposals.

FACT SHEET ON INTERNATIONAL EMISSIONS TRADING

October 22, 1997

Description

The principle of emissions trading is to use the efficiency of the market place to achieve environmental objectives at the lowest possible cost. Under an international emissions trading regime, a country (or firm) would be able to meet its emissions reduction target by reducing pollution itself, purchasing reductions from another country (or firm) that was able to achieve excess gains, or some combination of both.

Given an effective international regime, emissions trading provides a powerful incentive for nations to reduce below the amount required and then sell excess reductions to others who in turn avoid more costly actions. The U.S. has proposed that emissions trading be permitted among all countries that agree to a binding emissions target.

How it would work

Consider a simplified example for how international emissions trading might work. Country A and Country B must reduce emissions by 100 tons each. It might cost each country \$1,000 to reduce 100 tons individually for a total cost of \$2,000. However, if Country A could reduce its emissions by 200 tons for a total cost of \$1,500 and sell half of these reductions to Country B, the overall target would be achieved for \$500 less, a savings of 25 percent.

U.S. experience

Emissions trading is being used successfully at the domestic level to reduce sulfur dioxide emissions (which cause acid rain) under the Clean Air Act. Achieving targeted reductions was originally estimated to cost \$5 billion annually if traditional controls had been required and \$4 billion with emissions trading. A GAO estimate after the initial stage of emissions trading now puts the cost at \$2 billion per year, or 60 percent below the original estimate with pollution reductions significantly ahead of schedule. Emissions trading has also been successful in cutting the costs of phasing out leaded gasoline and in curbing the production of chlorofluorocarbons which deplete the ozone layer.

Cost savings

According to the 1997 Economic Report of the President, international emissions trading for carbon dioxide could lower the cost of reductions by 50 percent below the minimum achievable using purely domestic programs.

FACT SHEET ON JOINT IMPLEMENTATION

October 22, 1997

Description

Joint Implementation (JI) is an innovative, market-based approach for addressing global climate change that uses international partnerships to achieve low-cost reductions in greenhouse gas emissions. Under JI, a company in the United States invests in a project which reduces emissions in another country and uses those reductions as a less expensive means of meeting its own target. The U.S. has proposed that a formal regime that gives credit for JI projects be part of a new climate change agreement.

How it would work

Consider the example of a project announced today as part of a pilot program on joint implementation instituted by the United States. Two U.S. companies (Solar Electric Power and Light of Washington, D.C. and Trexler and Associates, Inc of Oak Grove, Illinois) will work with Renewable Energy Services Company of Asia, Ltd. to market and install 812,000 solar home systems in Sri Lanka. These systems will replace the use of kerosene lamps for lighting and the use of diesel-electric charging of lead-acid batteries for powering small home appliances. The result will be a 1.5 million metric ton reduction in greenhouse gas emissions and cleaner energy for tens of thousands of people.

U.S. experience

Under the U.S. pilot program on JI (formed under the existing climate change convention), 28 projects have been approved in 12 countries, including Costa Rica, Bolivia, the Czech Republic, and Russia. These projects span a range of technologies, including solar, geothermal, and wind power; fuel switching for district heating; biomass energy; and reforestation. U.S. companies and organizations already participating include Commonwealth Edison, Wisconsin Electric Power, Kenetech Windpower, Sealweld Corp., American Electric Power, PacificCorp, Detroit Edison, Clean Air Coalition, and many others.

Benefits

Lower costs: JI provides a strong incentive for companies and countries to search the globe for the lowest cost ways of reducing greenhouse gas emissions.

Expanded exports of U.S. technology: The enormous potential for JI projects around the world creates major opportunities for the increased sale of U.S. energy efficiency and alternative energy technologies.

Technology transfer: Increased reliance on more energy efficient technologies and less carbon-intensive energy alternatives will help developing countries meet their growing energy needs with more environmentally sustainable solutions.

FACT SHEET ON FEDERAL ENERGY MANAGEMENT

October 22, 1997

Aggressive energy management can substantially reduce carbon emissions from the activities of the Federal government, which has the nation's largest energy bill at almost \$8 billion per year. Significant strides have already been made --energy consumption per square foot in Federal buildings is down 15 percent and energy use in civilian and military vehicles is down about 27 percent from 1985 levels. However, we can do much more.

The initiatives below will reduce Federal emissions of greenhouse gases through enhanced focus on energy efficiency and renewable energy. They address areas which can deliver the greatest energy savings, best leverage private sector funding and improve the Federal procurement system.

1. Expand Energy Savings Performance Contracting

- Expand use of Energy Savings Performance Contracts. ESPC uses private investment capital and expertise to accomplish energy and cost saving projects in Federal facilities. When a private sector firm which has invested in federal energy efficiency improvements is fully repaid from its share of the delivered savings, all additional savings accrue to the government. Streamlined ESPC contracts put in place by DOD and DOE are beginning to speed large investments in energy projects at Federal facilities. However, use of ESPC's is still limited in the Federal government. The Office of Management and Budget will lead an effort to increase their use. It will include new policy and budget guidance for agencies. ESPC authority can also be extended to other areas including:
 - *Leased Federal buildings.* These include buildings where the Government either pays for the energy use directly or in other building where ESPC can provide a better lease for the Government.
 - *Federal mobility.* There may be great potential for energy savings from more efficient energy use in aircraft, ships and vehicles.
 - *Water conservation.* Water conservation projects save energy because each gallon contains energy from pumping, heating, chilling or treatment.
 - *Non-federal facilities* where the Government makes indirect payment of energy expenses. These include, for example, National Guard facilities which the state owns but where the Federal Government covers utility expenses and public housing facilities which are Federally supported but owned by public housing authorities.
 - *State and local government facilities.* Federal energy experts can help transfer ESPC techniques to state and local governments so they can access this important approach to energy efficiency.

2. Improve Federal Procurement of Energy Efficient Technology

- *Accelerate the development of Product Energy Efficiency Recommendations.* These cover products that are in the top 25 percent of their class for energy efficiency or have Energy Star ratings, for example electric motors and air conditioning chillers. They provide a guide to Federal purchasers

FACT SHEET ON ELECTRICITY RESTRUCTURING

October 22, 1997

As part of his climate change initiative, President Clinton announced his support for appropriately crafted electricity restructuring legislation that will save consumers billions of dollars while reducing carbon emissions.

Description

The electricity sector is our nation's most capital intensive industry -- and has sales of over \$200 billion. Under electricity restructuring, competition would be the primary mechanism to set electricity generation prices. Utilities would open up their distribution and transmission wires to all qualified sellers. The transmission and distribution of electricity would continue to be regulated because they will remain monopolies for the foreseeable future. The system would be restructured, not deregulated. Done correctly, this process can save consumers in their utility bills and reduce carbon emissions. A properly structured retail competition system can deliver electricity more efficiently, and just as reliably, as our present system of regulated monopolies.

Cost savings

Most experts are confident that restructuring will reduce the cost of electricity, although there is a diversity of views over the potential size of the savings. Because the industry is so large, even modest savings represent billions of dollars. DOE economists estimate potential savings of \$20 billion a year, which would mean average direct savings of about \$100 a year to a typical family of four and indirect savings to such a family through lower cost goods and services of about another \$100 a year. Other studies predict far larger savings.

Carbon reductions

With appropriate market-based provisions, electricity restructuring legislation could reduce carbon emissions by creating incentives to produce and use electricity more efficiently and with less pollution. As emphasized at the White House Conference on Climate Change, two-thirds of the energy used to produce electricity is currently wasted. Restructuring should introduce incentives for reducing this waste heat. Restructuring legislation could also include other provisions -- such as various incentives and mandates to promote energy efficiency and renewable energy -- that offer potential carbon savings.

Next steps

The Administration looks forward to working with interested parties on crafting comprehensive electricity restructuring legislation.

of the energy efficiency level to request in a specification or procurement.

- *Establish as standard practice, the purchase of energy efficient products for Government use.* Traditionally, federal purchases have been based on lowest price, ignoring the substantial savings many energy efficient products can achieve over their life. The Executive Office of the President will lead an interagency team to streamline and update Executive Orders and procurement practices to encourage the acquisition of these products. Use of alternative contracting vehicles to acquire energy-efficient products will be encouraged, and purchase of products in the top 25 percent of class for energy efficiency or conforming to Energy Star standards will become standard practice, subject to necessary exceptions. The initiative will be augmented by publication of a “best practices” buying guide and expanded training of purchasing decision-makers.
- *Use consolidated purchasing to stimulate markets and lower prices.* Consolidated Federal purchasing can stimulate commercial markets for new and emerging products which offer greater energy efficiency, lower operating costs, and sales opportunities for small businesses that produce these products.
- *Increase Federal procurement of renewable energy.* In states that have implemented retail competition in their electricity industry, Federal facilities will work with their suppliers to ensure that the facilities purchase competitively supplied non-hydro renewable energy at levels equivalent to the percentage specified in that state’s retail competition legislation.
- *Report Federal Agencies’ Contributions to Reduction of Carbon Emissions.* This initiative will develop an appropriate measurement methodology to convert currently available data on Federal energy use to carbon emissions to aid national carbon reduction efforts.

3. Building for the 21st Century

- *Establish a new level of excellence for Federal building construction and renovation that incorporates energy efficiency, quality, affordability, and sustainability.* By using the latest construction techniques and tapping the knowledge of the building community and local partners, agencies will work to ensure that new Federal buildings achieve energy efficiency increases of 30-50 percent by 2000 as compared to existing facilities. This will be accomplished through a “whole building” approach that treats buildings as integrated systems rather than a series of independent component selections.
- *Deploy solar technologies in Federal buildings.* Show Federal leadership by installing solar photovoltaic and solar thermal systems on 20,000 Federal roofs by 2010 in support of the President’s ‘Million Solar Roof Initiative’. Utilize alternative financing methods to provide the rapid infusion of investment necessary to support the cost-effective installation of these systems.
- *Expand the use of combined heat and power generation at Federal facilities.* Combined heat and power makes greater use of the waste heat produced in the generation of electricity.
- *Use biomass fuels in Federal boilers.* Biomass would come from agricultural and wood waste and methane from landfill and treatment plant operations.
- *Expand public awareness of energy efficient technologies.* By showcasing energy efficient and

renewable energy technologies at National Parks, Federal offices, embassies, military bases, and other facilities the public will be more aware of their potential to reduce pollution and lower costs.

- *Seek increased resources for civilian agency staffing to expand energy management activities and complete energy efficiency projects.* In recent years, budgets for energy management in several key agencies have been cut by more than 80 percent. These Federal appropriations often provide the most cost-effective funding for Federal energy efficiency projects.

4. Improve Aircraft, Ship, and Heavy Vehicle Fuel Efficiency

- *Public-Private partnerships to improve the energy efficiency of Federal aircraft, ships and vehicles.* Energy use in Federal aircraft, ships and vehicles, predominantly in the military services, is responsible for 43 percent of the \$8 billion Federal energy bill. This initiative would improve the energy efficiency of main propulsion systems, with particular emphasis on medium and heavy diesel engines and high performance turbine technology. The initiative – designed along the lines of the Partnership for a New Generation of Vehicles -- would involve a partnership between Federal agencies and the private sector. Advances under this initiative will have significant application in commercial markets. In addition, the initiative will focus on near-term energy efficiency opportunities such as lighting retrofits on ships.
- *Increase the use of alternative fueled vehicles (AFVs) in the Federal fleet.* Federal agencies are increasing the use of alternative fuel vehicles which, among other things, helps reduce emissions of greenhouse gases. This initiative would enhance the focus of the current program on AFVs such as electrics, hybrid-electrics, natural gas and renewable-fueled vehicles.

5. Greenhouse Gas Assessments

- Federal agencies will be required to assess their greenhouse gas emissions in major actions they undertake.

FACT SHEET ON U.S. GLOBAL CHANGE RESEARCH PROGRAM

October 22, 1997

Background: The U.S. Global Change Research Program (USGCRP) is a National Research Program conducted under the auspices of the National Science and Technology Council (NSTC) Committee on Environment and Natural Resources. The NSTC is a cabinet-level council established by President Clinton in November 1993 to coordinate Federal science and technology efforts. The program's fundamental purpose is to increase understanding of the Earth system, and of human and naturally induced changes in the Earth's environment, and thus provide a sound scientific basis for decision making on global change issues. The USGCRP began as a Presidential Initiative, and was codified by the Global Change Research Act of 1990. The overall FY 1997 USGCRP budget was \$1.81 billion.

The core program of the USGCRP is focused on four key scientific areas:

- *Seasonal to Interannual Climate Variability:* The development and refinement of forecasts of seasonal and interannual climate variability, including study and prediction of the El Niño phenomena.
- *Climate Change Over Decades to Centuries:* Analysis and projection of the effects of long-term climate change on natural resources, public health, and socio-economic sectors.
- *Changes in Ozone, UV Radiation, and Atmospheric Chemistry:* Research on the causes, rate, magnitude, and human health and ecological consequences of changes in stratospheric ozone, UV radiation, and atmospheric chemistry.
- *Changes in Land Cover and Terrestrial and Aquatic Ecosystems:* Research on the causes and consequences of land-cover changes, and on basic processes governing the functions and structure of terrestrial, aquatic, and marine ecosystems.

New Research Directions: Global change research is providing the information about the changing Earth system, and in particular, about climate change, that is needed to achieve a sustainable future. New research efforts include:

- *A National Assessment of Climate Change Impacts* to aggregate information across regions and sectors, analyze national-scale consequences, and support development of mitigation and adaptation strategies.
- *Improved Regional-scale Analyses*, including regional estimates of the rate and magnitude of climate change, analyses of the environmental and socio-economic consequences of climate change in the context of other stresses, and integrated assessments of the implications for society and the environment of climate change.
- *Regional Workshops* to examine the vulnerabilities of various regions of the United States to climate change.

FACT SHEET ON PNGV

October 22, 1997

Announced at the White House on September 29, 1993 by President Clinton, Vice President Gore, and the CEOs of the domestic auto makers, the Partnership for a New Generation of Vehicles (PNGV) is a partnership between the U.S. Federal government (7 agencies and 20 federal laboratories) and Chrysler, Ford, and General Motors that aims to strengthen America's competitiveness by developing technologies for a new generation of vehicles. Its programs include research support for over 350 automotive suppliers, universities, and small businesses.

PNGV's long-term goal is to develop production prototypes of an attractive, affordable car that can meet all applicable environmental and safety times and achieve up to three times the fuel efficiency of a comparable automobile sold today. This would mean that a typical midsize car would be able to achieve 80 mpg. The partnership also aims to (i) improve automotive manufacturing, and (ii) introduce efficiency technologies into production vehicles as soon as they are economically justified.

There are numerous reasons for pursuing PNGV, including:

- **Environmental:** Automobiles are a major contributor to atmospheric carbon dioxide, a major greenhouse gas. Already, concentrations of carbon dioxide are 25 percent higher than pre-industrial levels and are expected to double within the next century. Since the number of registered vehicles in the United States is expected to climb from 194 million in 1993, to as many as 270 million in 2010, PNGV's success is critical to any program of controlling US and world greenhouse gas emissions. It will also result in low cost methods for controlling the emissions that contribute to urban air pollution.
- **Reducing U.S. Dependence on Foreign Oil:** The United States currently imports 50 percent of the oil we consume -- this share is expected to grow to more than 60 percent by 2010. Petroleum imports make up ten percent of our country's import inventory and account for a large chunk of the nation's trade deficit. This dependence on foreign oil makes the United States vulnerable.

PNGV Status Report: The industrial partners are now in the process of selecting technologies that will be included in concept vehicles that will be completed by the turn of the century. The federal agencies are working to revise their research priorities to support both technologies that can be incorporated in production prototypes for 2004 and that can be integrated into even more advanced vehicles that would be designed in later years.

The goal of the program, while extremely ambitious, still seems possible given the advances in key technology that have been achieved during the life of the program. These include advances in production of low-cost, light-weight materials for the vehicle body and frame; electrical control systems, batteries; and compact, inexpensive fuel cells -- including the new technology for using gasoline to power fuel cells announced yesterday; and, advanced internal combustion engines for use in hybrid vehicles.

FACT SHEET ON FUEL CELLS

October 22, 1997

THE BREAKTHROUGH: A gasoline-powered technology that would allow you to double the fuel efficiency of a car and emit half the greenhouse gases and virtually no other air pollution. For the first time, gasoline was used to produce electricity from a pollution-free fuel cell, allowing the use of the existing gasoline infrastructure. Previously, fuel cells have been powered by hydrogen or methanol, which are less convenient for use in cars.

The Department of Energy, together with Los Alamos National Laboratory, and A.D. Little, have developed a breakthrough fuel processor, which can extract hydrogen from gasoline and other fuels such as ethanol and natural gas. Last week, this fuel processor was combined with a fuel cell from Plug Power to demonstrate for the first time that a fuel cell electric car could be fueled by gasoline or ethanol. This eliminates the limited driving range and lengthy recharging times associated with electric cars that run on batteries.

WHAT IS A FUEL CELL: The fuel cell converts the chemical energy of a fuel directly into usable electricity and heat without combustion. Fuel cells are similar to batteries in that both produce a direct current by means of an electrochemical process, but fuel cells can operate indefinitely as long as fuel is supplied to them. Fuel cells can provide power for cars and other applications, such as electricity and hot water for buildings.

The Department of Energy working with its partners has brought down the cost of proton exchange membrane (PEM) fuel cells by a factor of twenty in the last ten years. Continued R&D, coupled with the economies of scale from mass production of fuel cells as they enter the marketplace, should allow us to maintain this pace of cost reduction for another decade.

PARTNERSHIP FOR A NEW GENERATION OF VEHICLES (PNGV): The fuel cell breakthrough was accomplished as part of President Clinton's PNGV initiative, an innovative partnership between the government, the national laboratories, the big three automakers, and their suppliers. PNGV's goal is to develop a family-sized vehicle with triple the fuel efficiency of today's cars, without compromising cost or convenience.

POTENTIAL GREENHOUSE GAS REDUCTIONS: One-third of the nation's carbon dioxide emissions comes from the transportation sector, primarily cars. Fuel cell technology alone can directly double fuel efficiency and cut carbon dioxide emissions in half. In combination with other PNGV advances, such as lightweight materials and regenerative braking, fuel cells will allow a tripling of fuel efficiency and a further reduction in greenhouse gas emissions. Powering the fuel cell with renewable fuels, such as ethanol, could eliminate automotive greenhouse gas emissions entirely in the long run. The buildings sector also generates one-third of the nation's emissions of carbon dioxide. A building that uses the electricity and hot water from a fuel cell fueled by natural gas would have about half of the greenhouse gas emissions of the average building today. Plug Power expects to introduce fuel cells for homes and other buildings in 2000 that will provide electricity for less than the current residential rate. By 2010, fuel cells in buildings could be providing emissions savings of five million metric tons of carbon.

FACT SHEET ON PATH

October 22, 1997

What is PATH? We are working to develop a partnership for 21st century housing bringing together government and industry to develop, demonstrate and deploy housing technologies, designs and practices that can significantly improve the quality of housing without raising the cost of construction. The **Partnership for Advancing Technologies in Housing** includes government (DOE, HUD, EPA, Labor, Commerce, FEMA, and DOD) and industry working together develop, demonstrate and deploy housing technologies and practices so that homes can be built cheaper, more environmentally sustainable, more disaster resistant, and provide a safer working environment.

PATH has a five-part approach:

- Industry-driven research on new technologies and practices
- Working with industry on pilot programs building thousands of marketable houses
- Streamlining of federal, state and local codes and regulations
- Judicious use of existing authority on standards
- Information campaign to influence consumer demand

R&D: Support more funds for accelerated research and demonstration of inexpensive, highly efficient, highly attractive housing. Link with million solar roofs program.

Standards: The success of PATH will in some part be based on utilizing existing authorities on standards for a select few products that have the potential for great savings. There are five appliance/products currently under review by DoE; Clothes Washers, Ranges/Ovens, Ballasts, Residential water heaters, transformers. Of these, the Clothes Washers and Water Heaters seem to have greatest potential.

Creating Markets: The key to making the Partnership successful will be the ability to create markets and consumer demands for homes that meet the PATH goals. The Partnership will work with states and communities to help them understand the benefits of building these homes, and the opportunities it affords the communities for economic growth. The Partnership will attempt to gain agreements between communities that PATH homes can go through an expedited permitting process.

Education and Outreach: Marketing the benefits of these homes to consumers and to encourage consumers to begin to ask for homes that are built to the quality level of >PATH= homes. This will need to be an intensive campaign of getting the message out to communities, builders and developers. This will provide incentives for more and more builders to want to build these homes.

Pilots: The pilots will play an important role in the success of PATH. The pilot sites will begin of developing the markets and demonstrate the feasibility of the homes. The pilot sites can also act as training sites for builders and community leaders to learn about the benefits of the technologies and as a classroom for training on how to use the technologies. Sites under consideration are Stapleton Airport, Denver (Redevelopment of old airport site near downtown) and Florida (Working with the State to link energy and environment to disaster resistance and affordability).

Regulatory Streamlining: Working with states and communities on making the code approval process more efficient and less time consuming.

FACT SHEET ON POTENTIAL INDUSTRY SECTOR SAVINGS

October 22, 1997

The industrial sector produces approximately one-third of total U.S. emissions. We can cut emissions substantially in this sector through the right mix of tax incentives, accelerated research and development, electricity restructuring, and environmental regulatory reinvention. According to a recently released report from five of the nation's energy laboratories, programs such as the ones below can reduce emissions in the industrial sector in 2010 by 28 million metric tons even with no increase in energy prices.

Increasing Energy Efficiency: Energy audits encourage systematic approaches to energy efficiency that typically have high yields. Southwire Corporation, a large manufacturer of wire, rod, and cable, cut their use of natural gas by 60 percent and cut electricity use by 40 percent per pound of product produced. Motors consume 70 percent of industrial electricity used, and there is room for improving their efficiency. The Greenville Tube Company, for example, increased productivity by 15 percent, increased energy efficiency by 30 percent, reduced scrap by 15 percent, and achieved \$77,000 per year savings -- a 6 month payback -- by improving the efficiency of their motors.

Cogeneration (Combined Heat and Power): New technologies available in the industrial sector will allow us to capture the waste heat the U.S. now throws away. With the right policies, industrial cogeneration of natural gas or biomass could cut annual carbon emission significantly by 2010. Advanced turbines developed by DOE with industry will be available in three years (orders are already being taken). They have an overall efficiency of 80 percent to 90 percent, produce steam together with low-cost electricity and significantly reduce NOx emissions. These turbines can run on natural gas or biomass. Some industries have their own low-cost biomass feedstocks (for example, black liquor gasification in the pulp and paper industry), which makes possible cogeneration with nearly zero carbon emissions.

Expanding Industries of the Future: The seven most energy-intensive industries—steel, aluminum, petroleum refining, chemicals, pulp and paper products, glass, and metal casting—account for about 80 percent of the carbon emissions in U.S. manufacturing and more than 90 percent of the hazardous waste. Industry, partnering with the Department of Energy, has developed long-term visions of energy-efficient, low-polluting, highly competitive "Industries of the Future" as well as technology roadmaps to identify an R&D and deployment pathway to achieving the vision. Visions typically foresee annual energy efficiency improvements of 1.0 percent to 1.5 percent for two decades.

FACT SHEET ON POTENTIAL BUILDINGS SECTOR SAVINGS

October 22, 1997

The buildings sector also produces approximately one-third of total U.S. emissions. There is substantial opportunity to improve the energy efficiency of our buildings and the appliances in them. Many of these technologies improve the quality of service delivered (i.e. higher quality lighting), and have also been documented in a number of cases to improve productivity. According to a recently released report from five of the nation's energy laboratories, programs such as the ones below can reduce emissions in the buildings sector in 2010 by 25 million metric tons even with no increase in energy prices.

Standards: Substantial carbon emissions reductions in 2010 can be achieved through existing authority of the Department of Energy to establish market-oriented efficiency standards for appliances, such as refrigerators and air conditioners. The Department of Energy uses a consensus-based approach in which manufacturers, environmentalists, consumer advocates, and the states work together to develop applicable standards.

Voluntary Programs: Significant carbon reductions in 2010 could also be achieved by expanding voluntary programs such as the joint EPA-DOE Energy Star program. Energy Star labeling has already transformed a number of markets. For example, it has cut the energy used by computers, monitors, and printers by 50 percent at virtually no incremental cost. It is now being extended to dozens of other products.

Adopting Best Electricity Engineering Practices: Electronic equipment consumes electricity in stand-by mode (even when not being used) generating 12 MMTs of carbon emission each year. Preliminary analysis suggests that 80 percent of that could be saved through adopting best engineering practices without reducing service.

Research and Development: Designing buildings with advanced technology can reduce energy consumption by 25 to 50 percent without increasing the building's initial cost. The extra cost of some of the energy-efficient equipment is offset by the smaller required heating and cooling system.

Combined Heat and Power: As in industry, we can reduce the carbon intensity of the buildings sector by accelerating the use of combined heat and power (CHP). Two CHP technologies—small turbines and proton-exchange membrane (PEM) fuel cells—can convert natural gas to useful energy with 80 to 90 percent efficiency, significantly cutting carbon emissions from a building.

FACT SHEET ON POTENTIAL TRANSPORTATION SECTOR SAVINGS

October 22, 1997

The transportation sector produces approximately one-third of total U.S. emissions. According to a recently released report from five of the nation's energy laboratories, programs such as the ones below can reduce emissions in the transportation sector in 2010 by 73 million metric tons even with no increase in energy prices.

High Efficiency Cars And Light Trucks: The goal of the President's Partnership for a New Generation of Vehicles is to produce cars that are three times more efficient than current vehicles with no compromise in size, safety, comfort or cost. The objective is a production prototype vehicle with a fuel efficiency of 80 mpg in 2004 and commercial availability soon after. A variety of efficient technologies such as hybrid vehicle design, advanced engines, regenerative braking and lightweight materials are under development. These technologies are also applicable to light trucks and sport utility vehicles, so that a PNGV for these heavier passenger vehicles is quite possible with an expanded research effort.

High efficiency heavy trucks: Ongoing federal R&D on advanced diesel engines and lightweight materials have the potential to substantially reduce carbon emissions from heavy trucks. These technologies are projected to be available by about 2003 and be quickly adopted by trucking manufacturers since energy is a major cost component of freight transportation (a truck typically gets 7 to 8 miles per gallon while traveling over 50,000 miles a year).

Advanced Efficient Aircraft and Rail: Ongoing federal R&D on advanced aircraft engines, improved airframes, and air traffic control have the potential to improve aircraft energy efficiency by 35 percent, with an additional increment of carbon emissions reductions achieved by increasing the efficiency of trains.

Low-Carbon Fuel: Government-industry R&D partnerships have brought the cost of ethanol from cellulosic waste (such as crop waste) and dedicated crops (such as switchgrass) from \$3.60 per gallon in 1980 to \$1.20 per gallon today. Such fuels are carbon neutral because the crops capture carbon dioxide when they grow and release it during combustion.

Talking Points on President's Climate Change Proposal

October 22, 1997

The President has proposed an ambitious climate change plan that is environmentally strong and economically sensible. Based on the President's conviction that global climate change is the premier environmental challenge of the 21st century, the President's plan will proceed pragmatically -- in three stages and with periodic economic and scientific reviews -- to cut greenhouse gas emissions by almost 30% from levels projected for 2010.

In the first stage, the President's plan will provide funding, create incentives, build partnerships and give credit for early emissions reductions. The second phase, beginning around 2004, will review, evaluate and extend the efforts of the first phase while laying the groundwork for phase three. In phase three, an international and domestic emissions trading system would begin.

The President's plan includes the following key elements:

- **A binding, realistic target to reach 1990 emissions levels by 2008-2012.** This target is part of a comprehensive framework for agreement in Kyoto that also includes flexible, market-based mechanisms and the participation of developing countries. The President is also committed to reductions below 1990 levels in the five-year period that follows.
- **A \$5 billion program of tax cuts and R&D for new technologies.** To spur energy efficiency and the development of new technologies, the President proposes a major new package of tax cuts and R&D spending amounting to \$5 billion over five years.
- **Active consultations over the next 9 months on an industry-by-industry basis, with early credit for companies making early reductions.** The President is committed to working with business to get their best ideas on how they can best reduce their own emissions, and to rewarding firms that act early.
- **Developing countries must participate.** Climate change is a global problem, and requires a global solution. That's why the President has committed that the United States will not adopt binding obligations without developing country participation.
- **A domestic and international emissions trading system.** Such a system can harness the power of the market to reduce emissions, as it has with great success in the case of acid rain.
- **Encouraging the use of energy-efficient products.** The President will engage in a broad-based effort to expand the use of existing energy-efficient technologies.
- **Federal procurement and energy use.** The Department of Energy will spearhead a comprehensive effort to reduce greenhouse gas emissions from Federal sources.
- **Electricity Restructuring.** To deliver a significant down payment on emission reductions, while saving consumers billions, we will pursue a bold plan for electricity restructuring.
- **Setting a concentration goal.** With advice from the National Academy of Sciences, the U.S. supports developing a specific, long-term concentration goal for greenhouse gases in the atmosphere.
- **Transition assistance.** The President is committed to working with Congress and labor to ensure a just transition for any workers dislocated by the changes in energy usage inherent in any climate change plan.

DRAFT TALKING POINTS, TO DEFEND AN AGGRESSIVE GCC PROGRAM

We will protect the environment, and at the same time protect the economy. Vigorous economic growth and environmental protection must go hand in hand.

The President has spent five years growing the economy, and laying the foundations to sustain that growth into the future. He is not going to endanger that record now. "I have worked far too hard to revitalize the American economy to jeopardize our progress now." [Oct. 1, 1997, WH meeting with weather forecasters.]

The U.S. will not go along with an agreement that threatens sustained economic growth.

While the President is deeply committed to reducing carbon emission, no one could reasonably expect that he -- or future administrations or Congresses -- would allow the costs of this effort to become extreme. That's why we have built in regular economic reviews, to monitor our progress and re-assess how the economy is responding.

Economic models are always subject to a great deal of uncertainty, and forecasts are all the more so. In this case we are talking about unexplored territory.

Fifteen years ago, we never thought we would see an unemployment rate under 5 percent, a core inflation rate of under 2.5 percent, and a Federal budget deficit well under \$50 billion. But that's what has happened. So a degree of modesty with regard to our forecasting abilities is appropriate.

The economics of technological progress, for example, is a big unknown. The processes of invention, innovation, diffusion, and learning, fall under the sway of other Muses at least as much as under the dictates of the goddess of Economics.

The President has faith in the American people, in their ingenuity and determination to overcome obstacles.

In 1941, President Roosevelt called the leaders of industry to the White House, and asked how much, with an all-out effort, they could increase their production of war-related materials and equipment. He then announced to the American people goals that were more ambitious by an order of ___ %. In the end, those goals were attained. The key was national mobilization in the face of a shared global threat. Climate change is a shared global threat. We might not be able to replicate the achievement of 1941. The American people are not all familiar with the new threat. But the President believes that we will never know what we can accomplish unless we try.

“If we would change our habits tomorrow, just some of our habits, we could with no extra charge, no cost at all on society, get rid of 20 percent of the GHG with presently available technology”[8/4/97 press conference]. It is impossible to know to what extent Americans will heed the call. We consumers are fond of our incandescent light bulbs, our high-flow showers and our sport utility vehicles. Industry is fond of its old ways of doing things as well. But the adoption of carbon-saving technology has to be a large part of the solution, and there is no knowing how far it can take us.

Even more unknown than future technological progress is the extent to which the cost of addressing climate change can be substantially reduced by so-called “where flexibility.” There are many other countries that could reduce emissions relative to their “business-as-usual” paths at lower costs than can industrialized countries such as the U.S.. We are insisting at Kyoto on a number of treaty provisions that would take advantage of this to reduce the costs to the American economy. These provisions include international trading, joint implementation, and -- most significantly -- participation by developing countries. Many countries disagree with one or more of these proposals. Furthermore, even if we somehow were able to win agreement with all our flexibility proposals, it is difficult to know whether they could be implemented efficiently and enforced fully. But if these uncertainties were resolved in a positive manner, there would be scope for bringing down the costs very substantially.

Q: The Commerce Department recently noted that capping carbon emissions at 1990 levels could require the equivalent of a 25 cent a gallon additional tax on gasoline...

A: First, the President's proposal does not call for any increase in gasoline or energy taxes. Instead, it proposes tax cuts over the next 5 years to stimulate the development and adoption of energy-efficient and carbon-lean technologies.

Second, the President's plan includes other policy steps -- including focused R&D spending, credit for early action by industry, Federal leadership through improved procurement and energy use, support for electricity restructuring, and industry-by-industry consultations -- intended to capture the substantial "win-win" opportunities for reducing carbon emissions without raising energy prices.

Finally, the President's plan adopts a market-based system of tradeable permits, not energy taxes, to achieve reductions in the internationally binding period starting in 2008. Such a system of tradeable permits has worked extremely well in reducing acid rain at low cost.

The President believes that a series of tax cuts, coupled with a market-based system of tradeable permits after a decade's worth of experience with other measures, provides a much better way of reducing carbon emissions than proposals to raise carbon taxes.

Q: In your testimony, you noted the Administration is proposing emissions trading between countries that exceed their allotments of greenhouse gases and ones that fall short....

A: The President has proposed a system of joint implementation and international emissions trading precisely to ensure that U.S. firms can take advantage of low-cost emissions reductions wherever they occur in the world. Ironically, the figures referred to in the question *ignore* the impact of these cost-reducing policies.¹ In addition to ignoring the effects of joint implementation and international trading, the Charles River Associates study also ignores many other critical elements of the President's climate change proposal, including:

1. It ignores the President's \$5 billion package of tax cuts and Federal R&D:

To spur energy efficiency and the development of lower-carbon energy sources, the Administration supports a major new package of tax cuts and R&D spending amounting to \$5 billion over five years.

2. It ignores the President's Federal energy initiative: To reduce greenhouse gas emissions from Federal sources, the Department of Energy will spearhead a comprehensive effort that includes expanded performance contracting to make Federal buildings more energy-efficient, improved Federal procurement practices, establishment of a new level of excellence for Federal building construction and renovation, and partnerships to improve the energy efficiency of Federal aircraft, ships and vehicles.

3. It ignores electricity restructuring: To spur further efforts to clean our air and deliver a downpayment on greenhouse gas emission reductions, while saving consumers billions, we will pursue a bold plan to restructure the energy sector. It is time to change the rules that are often more than 70 years old -- stifling innovations that can save money and impede newer, cleaner technologies.

4. It ignores the economic costs associated with climate change itself. Climate change will lead to increased flooding, sea-level rise, and other dislocation. So looking just at the impact of reducing emissions is misleading.

ARGONNE REPORT Q'S AND A'S

Q1. WHAT WAS THE PURPOSE OF THIS STUDY?

A1. The purpose of this study was to explore the possible effects of a set of hypothetical fuel price increases on six energy-intensive industries that are subject to significant foreign competition:

- basic chemicals;
- iron and steel;
- petroleum refining;
- paper and allied products;
- aluminum; and
- cement.

Panels of industry representatives and experts from academia, environmental groups, organized labor, the financial community, and government were asked to assume a projection of energy price increases that incorporated specific assumptions about the energy price effects of a postulated climate change agreement, and reflect on the possible industry responses. Panels for each of the industries met to discuss the possible impacts on industry output, employment, energy usage, technology, costs, prices, imports, and exports.

Q2. WHAT DID THE PANELISTS FIND?

A2. Overall, the participants reported negative impacts on the six industries under the assumed energy price increases. Panelists predicted that the industries would experience reductions in output and employment from the projected baseline levels.

Less-developed countries, which were assumed in the workshops not to adopt binding commitments to lower greenhouse gas emissions in the timeframe considered, would capture an increasing share of the respective markets. Some industries would locate new plants in the less developed countries, and some would increase the utilization of existing production facilities already located in these areas.

Q3. WHAT IS THE DEPARTMENT'S RESPONSE TO THIS INPUT FROM INDUSTRIAL EXPERTS?

A3. The workshops provided valuable information that reinforced the need to pursue sensible climate change policies. The negative conclusions expressed by the participants and summarized in this report are predicated on the specific energy price scenarios assumed in mid-1996, which do not reflect key policies advocated in international negotiations by the Clinton administration in the intervening year. For example, the assumed fuel price

scenarios do not take into account the impact of multi-year emissions budgets, international emission trading, and joint implementation. If adopted, these provisions would lower the costs of achieving emission reductions in the U.S. and other developed countries and would significantly lower the energy price increases assumed in the workshop scenarios. The Administration has also argued that the developing countries should assume additional obligations in the near future to reduce the projected rapid growth of greenhouse gas emissions. No such actions were reflected in the workshop scenarios.

The environmental and socio-economic issues surrounding the stabilization of greenhouse gas emissions have been the subject of considerable debate, but are especially sensitive now as participating nations are engaged in a new round of negotiations for further commitments within the Framework Convention on Climate Change that will conclude in December of 1997 in Kyoto, Japan. The U.S. position taken in these negotiations stresses that international agreements to combat the threat of climate change must be flexible, cost-effective, realistic, achievable, and ultimately global in scope.

By examining scenarios that do not reflect such policies, the workshops identified important economic risks in key industrial sectors that reaffirm the wisdom of the U.S. approach.

Q4. HOW DOES THIS VERSION OF THE REPORT COMPARE TO THE EARLIER (DRAFT) PAPER BY SUTHERLAND?

A4. A draft paper providing a personal interpretation of the workshops was circulated prior to completion of this report by an individual employee of Argonne National Laboratory. That paper was apparently prepared in advance of the participants' review of the workshop summaries and prior to the lead authors' completion of the revised focus papers based on comments received at the workshops. The Argonne report issued this week provides an accurate and complete summary of the workshop findings.

Q5. DOESN'T THIS REPORT UNDERCUT THE ADMINISTRATION'S POSITION ON CLIMATE CHANGE?

A5. No. Rather, it highlights the need for flexibility in implementing emissions reduction and the need to engage developing countries in the process of emissions reduction. Flexibility, including emissions trading, joint implementation, and multi-year emissions budgets and provisions to ensure the future participation of developing countries in binding emissions reductions are central elements of the Administration's climate change strategy.

Q6. HOW DOES THIS STUDY RELATE TO DOE'S INITIATIVES TO INCREASE INDUSTRIAL ENERGY EFFICIENCY?

A6. The study is unrelated to the activities of the Department's Office of Industrial Technologies, which is actively cooperating with many of these industries to achieve dramatically improved energy efficiency. Success of these efforts has the potential to improve the competitiveness of U.S. producers while reducing their energy use and greenhouse gas emissions. Increased energy efficiency also makes U.S. producers less sensitive to the adverse effects of any future energy price increases, regardless of their source.

Q7. WHAT WAS THE BASIS FOR THE PRICE SCENARIOS ASSUMED, AND HOW DO THEY COMPARE TO THE PRICE SCENARIOS BEING USED FOR THE INTERAGENCY ANALYSIS TEAM WORK?

A7. The hypothetical fuel price scenarios used in this project are within the range suggested by analyses presented at the inter-agency Climate Change Analysis Workshop held at Springfield, Virginia in June, 1996. These analyses were preliminary in nature and did not incorporate cost-saving features currently included in the U.S. negotiating position such as emissions trading, joint implementation, and multi-year emission budgets. The industry workshop participants did not assume any complementary technology-oriented policy measures, nor were they asked to consider price scenarios which included ameliorative policy measures that could offset the impact of energy price increases on industry.

Q8. WHAT IS THE BASELINE STATUS OF THESE INDUSTRIES IN THE ABSENCE OF CLIMATE POLICY?

A8. In many of these industries, recent U.S. investment has been in the form of refurbishing existing plants rather than building new "greenfield" plants. Even without the assumed fuel price increases, countries with lower costs for energy and other inputs or more rapidly growing demands may be more attractive than the U.S. as sites for new greenfield plants.

Q9. HOW IMPORTANT ARE DEVELOPING COUNTRY COMMITMENTS TO THE LONG RUN RESULTS?

A9. The Administration has argued that developing countries should assume additional obligations in the near future to reduce growth in their GHG emissions. While developed countries now account for the lion's share of emissions, developing country emissions are projected to grow rapidly. The potential for shifting production of energy-intensive products to developing countries identified in the Argonne report would exacerbate emissions growth. It will not be possible to achieve the long run objective of the Climate Convention without substantial

emissions reductions by developing countries. Their commitment to such reductions, which were not reflected in the workshop scenarios, would be likely to significantly reduce the potential for shifts in industry location identified at the workshops.

It is likely that energy-intensive industries in other developed countries would be subject to similar challenges as their U.S. counterparts under the energy price increase scenarios developed for this study. Energy-intensive industries in other Annex I would also benefit from the cost-reducing flexibility provisions included in the U.S. proposal, and from an approach that assures developing country participation in emissions reductions will occur in the near future.

Q10. DOESN'T THIS REPORT PROVE SENATOR BYRD'S POINT THAT ENTERING INTO INTERNATIONAL AGREEMENTS WITHOUT THE FULL PARTICIPATION OF DEVELOPING COUNTRIES WOULD BE RUINOUS TO THE U.S. ECONOMY?

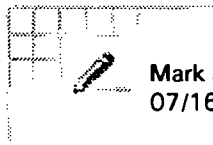
A10. The panelists felt that if less-developed countries did not adopt binding commitments to lower greenhouse gas emissions, they would capture an increasing share of the markets. The current Administration position, which was not reflected in the energy price scenarios considered by the panelists in mid-1996, is that developing countries should assume additional obligations in the near future to reduce the projected rapid growth of greenhouse gas emissions.

Q11. WHY DID IT TAKE THE DEPARTMENT SO LONG TO RELEASE THIS REPORT? WEREN'T THESE WORKSHOPS HELD OVER A YEAR AGO?

A11. The participants at the workshops focused their discussions around an initial draft of an expert author's paper. The expert authors then revised and clarified their papers over the following months in response to the panelists suggestions. Summaries of both the papers and the workshop proceedings were then forwarded to all participants for their review and to confirm that the workshop summary provided an accurate characterization of the workshop discussions.

Q12. THIS REPORT SHOWS HOW SOME INDUSTRIES WOULD BE HURT BY LARGE ENERGY PRICE INCREASES. WOULDN'T SOME INDUSTRIES, LIKE COMPACT FLUORESCENT BULB MANUFACTURERS, ACTUALLY BE HELPED? HOW COME THEY WERE NOT INCLUDED IN THE STUDY?

A12. The study focused on energy-intensive industries in order to develop information that would help in assessing the validity of the existing approaches to modeling the impacts of regime changes on energy use in the industrial sector, which accounts for over 1/3 of total U.S. energy use. The industries considered in this study account for over 80 percent of energy use in manufacturing. An understanding of the forces driving production decisions in these sectors is critical to comprehending and projecting the implications of alternative policy scenarios for the national energy market, a primary function of the Policy Office. Identifying changes in the relative performance of different economic sectors is also important. A second phase of our effort, which is now ongoing, is examining those industries that might benefit from higher energy prices.



Mark J. Mazur
07/16/97 07:18:34 PM

Record Type: Record

To: Janet L. Yellen/CEA/EOP, Alicia H. Munnell/CEA/EOP, Jason Shogren/CEA/EOP
cc: Michele Jolin/CEA/EOP
Subject: argonne study price increases

Folks,

I called Howard Gruenspecht of DOE about this study and he said that the study participants were given hypothetical energy price increases by energy source (e.g., so much per barrel of oil, so much per ton of coal, etc.) for 2 scenarios. These price increases correspond roughly (but only roughly) to carbon taxes of:

Scenario 1: \$100 in Europe, \$150 in US, \$200 in Japan, nothing in developing countries

Scenario 2: \$100 in Europe, \$100 in US, \$175 in Japan, nothing in developing countries

The Argonne study was careful not to put these in terms of carbon taxes, but the conversion is relatively simple (you can just take the coal price increase and divide by 0.7 to get the approximate implied carbon tax -- I would have used 0.6 in the denominator).

Anyway, this should give us the material we need to respond to the question posed at the House subcommittee hearing.

Mark

July 4, 1997

THE IAT REPORT: ECONOMIC EFFECTS OF GLOBAL CLIMATE CHANGE POLICIES

- Produced by a team of staff from many agencies. Purpose is to understand the economic effects of climate change policies. This is not an official White House forecast or analysis. It is a helpful working paper to facilitate understanding of economics of climate change.
- Uses a group of economic models to assess the economic effects of policies to limit emissions of greenhouse gases. No model is perfect--trying to bracket an estimate of the economic effects and study the sensitivity of outcomes to assumptions and policies.
 - **DRI** (identifies transition issues for specific industries and regions and the economy as a whole based on short-run behavior); (Reviewers:) *But uses a fixed-coefficient input-output model which goes against the primary objective of climate policy.*
 - **Second Generation Model (SGM)** - a CGE model good at identifying an economy's long-term trends in economic growth, consumption and energy use in response to climate policies--international in scope. Used to look at permit trading and JI. (Reviewers:) *May fail to adequately capture the opportunity costs of technical substitution and understate the costs of abatement policies; models based on technical options may fail to fully recognize the tradeoffs faced by real economic agents.*
 - **Markal-Macro model (DOE)**. An integrated energy supply and demand modeling system combined with a macro model--useful for translating technological assumptions into economic outcomes. Recognizes 11 primary fuel sources and dozens of fuel conversion technologies. Useful for answering the question: How do we get there from here? Focuses on technology and its interaction with the economy and helps determine whether expected energy efficient technologies hold the key to continued economic growth.
- **Each model has strengths and weaknesses.** The models do not deal well with trading program, effects on international flows and U.S. competitiveness; technical progress and its costs; benefits.
- There is no attention in the IAT report to deriving an optimal policy by working backward from a long term goal. There is no comparison of how different policies attain various goals.
- Baseline estimates for energy use and carbon emissions are questionable--assume faster price increases and slower reductions than in the past. Need to use alternative baseline

estimates.

- Start from a consistent, **common baseline** with regard to projections of baseline GDP, total energy consumption and carbon emissions. Carbon emissions in the baseline are projected to increase by about 1.2% per year through 2010 and by 0.6% per year from 2010 to 2020. In 1990, carbon emissions were 22% below the 2010 baseline projection and 36% below DRI's projection for 2020.
- Technological change in the baseline: In the 1970s and 1980s, energy intensity declined about 2% per year--1.5% due to price effects and 0.5% due to nonprice effects. Baseline projection incorporates a 1% annual reduction in energy consumption per unit of output.
- **Starting point scenario:** Focuses on limiting emissions to 1990 levels by 2010--subject of numerous analyses by academic researchers. Facilitates comparison with outside work. Assumes tradable emission permits at earliest point of energy production or when imported into the U.S. The policy is announced in 2000 and phased in over a ten year period to reach the 2010 goal. Permits are initially auctioned so that all revenues generated through permits would be recycled through deficit reduction. Assumes no international cooperation or trading.
- **Technological change in the starting point scenario:** Incorporates an improvement in the pace of energy efficiency from 1.0% to 1.25% over the baseline due to foreseeable increases in the future price of energy in the climate change policy undertaken, because of implementation of the CCAP, or other policies. The announcement effect leads to a faster rate of diffusion of energy efficient technologies and a higher rate of innovation through R&D in anticipation of future higher energy prices.

Starting Point Results:

- **Implicit price of carbon in the economy** (the estimate of the permit price) rises to about **\$100 per ton of carbon in 2010 in 1995 dollars**. This result is reasonably consistent across models. A permit price of \$100 per ton is the equivalent of a price increase of 26 cents per gallon of refined petroleum product, \$1.49 per thousand cubic feet of natural gas, \$52.52 per ton of coal and 2 cents per kilowatt hour of electricity produced.
- The price of carbon rises somewhat over time, reflecting the fact that the 1990 emission ceiling becomes progressively more binding over time given projected growth in base case emissions.
- Higher energy costs impose burdens on households but these are partially offset by

conservation and subsequent efficiency improvements.

- **GDP losses, at peak, are between 0.2 and 1.0% of GDP by 2005 and -0.6% to +.2% in 2020.. Economy eventually bounces back or stabilizes. Losses in the model are real but transient.**
- **The IAT baseline policy of 1990 by 2010 implies about 26% reduction below baseline emissions in 2020. In the Repetto-Austin analysis, looking at all the models, they find that, under unfavorable assumptions, GDP would be 2.4% lower in 2020 than under baseline and under favorable assumptions, 2.4% higher. The 4 key influences are (whether there are significant short term adjustments--macro model; whether JI; whether recycling of revenues via reducing other taxes; whether benefits from abating pollution. Under reasonable assumptions, the predicted GDP impact would be neutral or even favorable.**
- **Consumption declines even through 2020--peaking at about 1.5% in 2007 and declining to about -0.30% in 2020 in the DRI model. This is a better measure of the change in economic welfare.**
- **Impact on investment:** If the permit revenue is saved, the cost of capital declines. Also, the marginal profitability of investment rises because new investment allows firms to neutralize higher energy costs. Capital is a long-term substitute for energy and is favored after a transition period. The faster rate of investment creates a newer and larger capital stock, raising growth modestly after a transition.
- **Sensitivity to policy:** Size of losses and carbon price increase depend on **size of emission reduction.**
- **Some sectors, particularly energy producers, bear large burdens. Energy-intensive sectors face greater losses. Other sectors expand as the economy undergoes the adjustment.**
 - Coal bears the brunt of greenhouse gas stabilization. The reduction of coal use under utility boilers is generally the largest, cheapest option to reduce carbon emissions in the economy. This is accomplished through better operating rates and substitution of gas-fired combined cycle units for coal fired units. The implicit price of carbon in most model runs is usually the one that accomplishes this transition in electricity baseload. And the \$100 per ton estimate is as high as it is because most coal-fired units are fairly old and already fully amortized. The price of coal, therefore, must rise considerably to make coal-fired electricity more expensive on the margin than electricity generated by a new gas-fired plant that entails new capital costs.
- **The effect of the emissions policy is to raise unemployment about 0.2% from 2001**

through 2011 in the DRI model. Inflation rises about 0.3%. The increase in the energy tax is akin to the oil shock

- Paths depend critically on **revenue use and monetary policy.**
- **International trading of carbon permits among the Annex I countries leads to sizable reductions in costs needed to stabilize emissions.** This has been proposed by the U.S. for inclusion in a multinational agreement. It would increase efficiency and lower the cost of reducing global emissions by giving all emitters the incentive to search for least-cost solutions across national boundaries.
 - The U.S. could purchase additional emissions rights (permits) from other countries (with low emissions reduction costs.) The forces of supply and demand would set the permit price and market incentives would push the group as a whole to institute the least cost emissions reductions first. **International trading reduces the implicit price of carbon dramatically--from \$82 to \$56.** The source of cheap emissions is the FSU and the Eastern European nations with lax environmental standards and slow economic growth. Trading is a win-win situation. The U.S. is projected to purchase \$4 billion of permits from FSU and Eastern Europe. This saves \$12.2 billion of higher costs under domestic implementation only.
 - FSU countries are below 1990 emissions levels and would be allowed to sell to other nations their right to emit up to those levels. In this instance, emissions trades would not result in corresponding reductions in annual emissions.
- **Joint implementation** with non Annex I countries would further reduce costs. Under this scenario, the FSU and Eastern Europe lose their monopoly on permit sales. We would likely buy from China and India pushing them to reduce their use of coal.
- The United States has smaller output losses than Japan or Western Europe predominately because it has more "cheap" carbon-abating opportunities. It is somewhat easier for the U.S. to reach emission targets than other regions which have already picked the low hanging fruit.
- **Sensitivity analysis.**
 - **cross-border trading** of emissions rights or permits
 - **Pace of technological progress as measured by energy intensity**--energy use per dollar of GDP greatly affects the GDP losses and carbon price. This measures the growing efficiency with which the economy uses energy. The results are very sensitive to this assumption. (Faster efficiency--the 1.25% rate assumed in the

starting point simulations) could be achieved through faster diffusion of off the shelf technology and new technologies that are near commercial viability. However, a 1.75% pace of change requires a new set of advanced energy efficiency technologies. These include fuel efficient cars (55 mpg) The models fail to account for the costs of the investments needed to reach a higher rate of technological progress.

- Increasing the **implementation period** from 5 to 10 years dampens the negative effects on GDP. A 5-year ramp up between 2005 and 2010 results in a maximum output loss in 2010 that is 65% greater than that associated with a ten year ramp up and a return to the baseline two years later.
- Raising or lowering emission targets lead to larger/smaller economic losses.
- Using any resulting **revenues**--to reduce growth distorting taxes or deficit reduction--leads to less impact on the economy during the transition and greater returns to the economy in the long term. Better outcomes are associated with greater investment and capital formation. Recycling to consumers results in the worst GDP path but a better consumption path.
- The economic effects of recycling and of a carbon limitation per se should be separated.
- Reducing carbon emissions would also reduce other pollutants, creating some economic benefits.
- The **Federal Reserve's reaction** affects the results. For example, if the FR maintains nominal reserves at baseline, the size of the GDP loss is approximately doubled. Since the IS curve has shifted to the left, the Fed can offset through easing. The willingness to ease is likely to be related to the impact on price inflation.
- Regional effects--analysis hinges on use of revenue for savings cum investment.

PROBLEMS WITH THE MODELS:

- Some questionable results--See a bigger long term GDP gain with a stricter emission standard. DRI is prone to depicting large effects of interest rates on investment. Thus, the use of the revenue for deficit reduction stimulates growth a lot.
- Grandfathering of permits raises investment--impossible.

ISSUES:

1. Increase in carbon tax is like an oil shock.
2. Concern that forcing an energy price increase on U.S. producers will disadvantage them substantially through trade, particularly with those countries outside of Annex I that may not be subject to emissions limits. This is proxied in the IAT model by a lower pace of import price increase. This has an impact on the exchange rate.

Reviewer Critiques of the IAT Report

- Models are inadequate for the purpose--cannot deal sufficiently well with emissions trading, international flows, technical progress and its costs.
 - None of the models focuses adequately on how economic agents respond to market and non-market signals.
 - Should add more models to the suite (EMF)
- **International Issues.** The analysis ignores the possibly large effects of international flows resulting from an international carbon trading system. These could affect the U.S. current account requiring currency and or capital adjustments. Existing models cannot deal with this. Also investment diversion needs to be examined if only Annex 1 nations are included.
- **Technology:** Most reviewers were skeptical of the assumed rate of autonomous technological change and the representation of the announcement effect. Models can not easily represent industry response to government policies. There is little consensus among experts as to how technological change will affect the costs of emissions reduction policies or how to model that process. No empirical support for the values chosen for the announcement effect.
- **Need more sensitivity analysis to bound the range of costs and more than one set of baseline assumptions.** Objective is to describe the range of possible outcomes.
- Current modeling focuses on a **few limited scenarios**--not enough to answer questions of timing and optimal reduction.
 - Cannot address the timing debate on 2010 vs. later. Issues of intertemporal trading should be included
 - What are cost effective strategies for limiting concentrations to alternative levels?
 - May be better to use discounted PDV of costs to compare scenarios.
- Revenue recycling
- Need to place the IAT exercise in the context of other models (Stanford EMF etc.)

REPETTO-AUSTIN ANALYSIS

- Most recent scientific assessment by the Intergovernmental Panel on Climate Change emphasized that the continued buildup of greenhouse gases could have long-lasting climactic effects, some of which would impose significant economic burdens on nations and vulnerable populations. The effects are warming are hard to predict but a precautionary approach seems warranted.
- Voluntary efforts, as pledged in Rio, are insufficient. The U.S. has pledged to accept a legally binding commitment in the Kyoto protocol.
- **Efforts to limit CO₂ will imply significant changes in energy use and sources, probably changing energy costs substantially.** Household budgets and business profits will be affected. There could be an impact on inflation, international trade, patterns of investment and the macroeconomy.
- **The cost can be reduced by taking action using market-friendly instruments and implementing changes with adequate time and flexibility for economic adjustments to occur.** One of the most effective and efficient mechanisms to reduce emissions is a carbon tax--levied on all fossil fuels in proportion to their carbon content. A tradable permits program in which a permit is required in order to sell or use fossil fuel is an alternative. The permit price in the marketplace would signal how much firms should spend on abatement. The permits could be auctioned and the revenues used to reduce other taxes or deficits.
- Emissions trading: may be difficult to include small fuel users through their aggregate energy use is important, without creating administrative burdens. If new scientific information necessitated further emissions reduction, canceling carbon permits could be difficult--more so than raising a carbon tax.
- As interest in climate change has accelerated, more than a dozen models have been constructed. Many predictions have been derived from many models. There are some systematic reasons that the models reach different conclusions. **Assumptions matter.**
- Repetto-Duncan reviewed 162 analysis of climate change policy coming from 16 models.
- **All models reviewed show an initial loss in aggregate economic output, but the loss is not very large.**
- **Key assumptions:** Size of loss depends predictably on assumptions: although the models are very complex, important results depend more on different key assumptions than on structure.

- **Extent to which substitution among energy sources** (substitute less carbon-intensive fuels like gas for more intensive fuels like coal; substitute non-fossil energy for fossil fuel), **energy technologies, products** (substitute less energy-intensive goods for energy-intensive ones), **and production methods** (substitute L, K and materials for E) **is possible**. The longer the time for adjustment, the lower the burden of adjusting and the larger the substitution possibilities. Producers can bring in new technologies with new equipment and consumers can adapt when they replace durable goods.

- **Bottom-up models** examine technological options for energy savings and fuel switching that are available in individual sectors of the economy. Information on the costs of these options is aggregated to calculate the overall cost of reducing CO₂ emissions. **These models estimate substitution possibilities by considering the actual technologies firms can use, not historical substitution possibilities**. These models are more optimistic than top-down models, partly by overlooking barriers to implementation, such as management and retraining time, risk-aversion, capital constraints, household preferences, or lack of information. **They highlight energy inefficiencies and technological opportunities**.
 - Companies that joined EPA's voluntary Green Lights Program found numerous opportunities to save energy and money
 - There are inefficiencies that can be remedied through **building improvement measures** such as better insulation and low-energy lighting; through conversion of industrial processes. Engineering studies suggest 20-25% of emissions could be eliminated at an overall cost savings and that further cuts could be made at relatively low cost.
 - Some inefficiencies are due to energy market imperfections such as divergence in incentives between tenants and landlords etc. However, some savings may entail overlooked costs. Energy service companies which seek to find and implement energy saving opportunities on a contract basis have not found unlimited business opportunities at current low energy prices.
 - **We currently have energy subsidies that encourage excessive fuel use**. These include favorable tax and credit treatment for energy producers. Hydropower subsidies reduce carbon emissions. Tax breaks for independent oil drillers merely replace foreign oil

with domestic oil. On balance, removing U.S. energy subsidies could significantly reduce CO₂ emissions according to one study.

- Top down models that assume limited substitution, slow technological change and limited response to price signals and low availability of non-fossil energy sources predict high costs.
- **Extent to which market and policy distortions create opportunities for low-cost (or no-cost) improvements in energy efficiency**
- **Rate of technological innovation and responsiveness of such change to price signals.** Hard to reach consensus on AEEI but value is critical. For example, a change from 0.5% to 1.0% cuts projected 2100 emissions levels by half and markedly affects the cost of meeting a CO₂ target. Induced technological change in response to price increases is a distinct possibility.
- **Availability and likely future cost of non-fossil backstop energy sources** (hydroelectricity, nuclear power, wind and solar energy and biomass) Alternative, low carbon energy sources exist but aren't currently cost-effective. They will become increasingly so as carbon energy sources rise in price and technology makes them less expensive. The availability of these backstop non-carbon energy technologies has a large impact on the costs of meeting whatever emission reduction goal is chosen.
- **Number of years available to achieve a specified CO₂ reduction.** Merely stabilizing emissions rates will allow concentrations to continue rising for centuries. Recent analysis shows that **adopting an explicit long-term target for atmospheric concentrations and then choosing policies to achieve the most efficient time path for emissions reductions to meet the target could significantly lower the economic impact.** A target for concentrations is like a carbon budget limiting CO₂ emissions within a specified period of years. Under some circumstances, it is cheaper to use more of the budget early on and postpone cutbacks because the capital stock is so durable. In a system of emissions trading, **there should be banking and borrowing of permits to allow flexibility over time.** When time is allowed for capital stock to be replaced, overall abatement costs could be reduced. Also, R&D will yield new technologies so postponing costs reduces them. Flexibility in timing of global reductions could lower costs by more than 35% compared to a less flexible program to achieve the same concentration.
- Under some assumptions, we should adopt a carbon tax now to encourage early development of energy efficient and low-carbon technologies and

discourage long-lived investments in carbon-intensive energy facilities. **Realistically, action today is likely to be necessary to induce investors to make commitments and not just the expectation of a tax in a decade or more.** To quell doubts, a credible policy signal is necessary at the outset--e.g., a carbon tax introduced at a low level that rises, perhaps significantly, in future years.

- **Potential for international joint implementation.** This would allow a utility in Norway to achieve reduced emissions by contracting to pay a factory in Poland to install more fuel-efficient furnaces. Finding the lowest cost abatement possibilities is cost effective. JI cannot be used more widely until countries have set binding emissions reduction targets. But getting countries to agree on the baselines that should apply to each, from which emissions reductions will be measured is a formidable task. Monitoring and verification and a mechanism to enforce contractual obligations is essential if JI is to work. The potential savings are substantial.
- **Recycling to reduce economically burdensome tax rates or lump sum rebates.** Without recycling the carbon tax is highly deflationary, lowering GDP substantially. Lump sum recycling enables a modeler to separate the economic impact arising from climate abatement from that arising from other tax cuts. However, it would be possible to reduce taxes that distort economic activity--payroll taxes, on investment earnings. Some economists have argued that there could be a double dividend--a gain purely from substituting an energy tax for a more distorting tax on labor or capital income. This is questionable. etc.
- **Benefits in form of avoided economic damages from climate change and other pollution reduction damages.** Can avoid pollution associated with auto emissions and higher medical expenditures.
- Under a reasonable standardized set of assumptions, most models predict a small macroeconomic effect of a carbon tax to stabilize emissions and potentially favorable outcomes.
- **The IAT baseline policy of 1990 by 2010 implies about 26% reduction below baseline emissions in 2020.** Looking at all the models we find that, under unfavorable assumptions, GDP would be 2.4% lower in 2020 than under baseline and under favorable assumptions, 2.4% higher. The 4 key influences are (whether there are significant short term adjustments--macro model; whether JI; whether recycling of revenues via reducing other taxes; whether benefits from abating pollution. Under reasonable assumptions, the predicted GDP impact would be neutral or even favorable.

- A carbon tax might have a disproportionate impact on low income households but it could be offset through other taxes reductions.
- The impact of a tax on coalmining and coal carrying railway lines would be substantial. However, the baseline predicts a substantial expansion in coal mining in the western U.S.
- Reduced energy demand in the U.S. would help hold down world oil prices, improving our terms of trade.
- **Impact on competitiveness.** If the U.S. alone imposes a significant carbon tax, international trade and investment in some energy intensive industries might shift abroad. However, evidence suggests that differential environmental policies have a weak impact on trade and investment flows and many nonOECD countries have raised energy prices unilaterally. Coordinated international action could avoid these trade effects.

MAJOR POINTS:

- **2000 economists** endorsed taking measures to reduce the threat of climate changes on the grounds of the Intergovernmental Panel on Climate Change finding that “the balance of evidence suggests a discernible human influence on global climate.” The economists concluded that global climate change carries with it significant environmental, economic, social and geopolitical risks, and that preventive steps are justified. They concluded that proper policies can significantly reduce greenhouse gas emissions without harming the American economy. Some policies could even improve U.S. productivity in the longer run. Market based policies (such as carbon taxes or emissions permits) would lower the costs of control substantially. They said that there are many policies with total benefits in excess of costs. Revenue could be used to lower the deficit or reduce existing taxes. Nations need to cooperate to achieve climactic objectives at minimum costs--international emissions trading.
- A great deal of controversy surrounds the issue of climate change with some saying that climate change is one of the greatest threats facing humankind and others saying the risks are weakly documented. The same kinds of divides arise in discussing costs and benefits of various policy options. The President believes there is a risk so that policy action is needed, but will look for policy actions that are sensible, cost effective and consistent with continued economic growth and job creation.
- It is particularly difficult to measure the benefit of climate change action especially when one takes a broad interpretation and thinks about the value of reducing risk related to ecological impacts.
- Economists differ in their views about emissions policies, some advocating a “broad, then deep” approach in which we begin with a broad but low cost agreement and others favoring a deep, then broad perspective, by first establishing a narrow coalition of developed nations and then reaching out to developing countries to join later via evolution. The problem with the latter approach is that costs rise for a narrow coalition of countries leading carbon intensive industries to migrate and making nonparticipant countries even more carbon dependent.
- Any agreement without the cost flexibility provided by international trading or JI will at least double the US costs.
- Models are helpful in understanding implications of climate change policies--give orders of magnitude and sensitivities to assumptions. There is no single correct set of assumptions or appropriate model. It is a mistake to offer just a best guess assessment of either costs or benefits. One should think about ranges of possible outcomes

- IAT exercise is an attempt to get different modelers from different parts of the government using different tools to begin to speak a common language--standardizing assumptions and understanding where the differences in results come from.
- Some useful morals emerge. Results are in same ballpark as broader literature.
- No analysis in IAT of optimal policy.
- No policy has been chosen by the Administration. Administration wants to conduct a dialogue with the public over how best to go about choosing a policy to deal with climate change.
- President Clinton's top priority has been to restore prosperity to the American economy and he would not take a step that would bring serious damage to it. We need to proceed pragmatically--taking steps that are reasonable and justifiable given what we know and the dangers.
- This is an effort that will need to be maintained over decades rather than years. Especially since we will be in this for years it is important to proceed sensibly. We must make sure that any policies that are adopted are cost effective and flexible (market based). A system of tradable permits at the international level and over time (when and where (bank and borrow) flexibility) receives wide support from economists. Faster technological change will decrease the cost.
- The benefit of proceeding slowly is that we will have more time to invest and benefit from technological change, as well as more time to allow existing capital to depreciate.
- There is some consensus on the need to take low-cost medium-term actions that can reduce the costs of substantial reductions in future emissions should they become necessary.
- Developing country participation is important
- Need to carefully consider the timetable for emission reductions.

THE SCIENCE

- There is now fairly wide scientific consensus that anthropogenic climate change is occurring.
- While uncertain, the possible risks include loss of coastal areas from rising sea levels, changes in rainfall and agricultural productivity, and increased incidence of diseases such as malaria, yellow fever, and cholera.
- Nordhaus has estimated that U.S. GDP would drop 1% with a 3 degree C warming. Jorgenson estimates a 1.34% loss in world GDP by 2050 as a result of climate change. Agriculture and forestry would probably benefit from climate change.
- Carbon dioxide accounts for approximately 86% of the total global warming potential of all U.S. anthropogenic emissions not covered by the Montreal Protocol to protect stratospheric ozone and combustion of fossil fuels, primarily coal and oil, is the main source.

U.S. POLICY

In July 1996, UnderSecretary Wirth announced that the

- “United States recommends that future negotiations focus on an agreement that sets a realistic, verifiable and binding medium-term emissions target.”
- Call for “market-based solutions that are flexible and cost-effective.”

In December 1996, the U.S. issued a position paper expanding:

- Need to examine an intl. Greenhouse gas emissions trading system among annex I (OECD plus former Soviet block) countries.
- Joint implementation (projects that reduce emissions below baseline in host country which are credited to the target of the partner country) between Annex I and the rest of the world.
- Need for a concerted global effort that eventually would mean targets for all countries.
- Support for multi-year, rather than single year, targets.
- Urge consideration of a right to bank and borrow permits.



Jason Shogren

07/12/97 02:40:18 PM



Record Type: Record

To: Janet L. Yellen/CEA/EOP

CC:

Subject: Re: analysis question 

the climate tsar finally asks the right question.

we have not done enough of this to answer todd's question--we do not have a benefit side in any of the three IAT models, so the benefits have not really been debated. OSTP is drafting "impact" papers separately. we need, if we are going to do more analysis, an Integrated Assessment style model to answer todd's question. otherwise, the enviro-side will always claim dooms day is just around the bend.

below are two potential responses to Jorgenson's "worse than nothing"

Is the Administration's approach worse than doing nothing at all?

First, the Administration's final policy has yet to be decided on by the President. Projecting the Berlin statement of target and timetables as final Administration policy is **premature**. The Administration recognizes the importance of global climate change policy and the US economy. And that is why the President has called for a national dialog over the next few months to layout the pros and cons of alternative climate change policies.

We know good climate policy depends on a good understanding of the relative magnitudes of benefits and costs. While costs of abatement are relatively straightforward to evaluate, the benefits of climate protection are more difficult to quantify. Reasonable people can disagree over the potential short-term and long-term benefits of climate protection. This is a complex question. Again the national debate asks for the people to reveal what they perceive as the potential benefits from climate protection.

Damage fragmentary.

Need a credible policy giving clear signals.

Can give impetus to a worldwide tech. push.

Need to show leadership, ^{get} intl. cooperation

NOTE TO MICHELLE JOLIN

RE: Climate Change Hearings

Attached are a number of background questions and answers for next week's climate change hearings. These should also be reviewed with Mark and in light of any relevant discussions on Friday.

If you have any questions, I can be reached at home this weekend at 301/656-3272.

Thanks,

Steve Seidel

would you endorse a policy of 1990 by 2010? Do you think the costs are reasonable?
What other policies are under consideration? How will you evaluate them?

draft 7/12

BACKGROUND QUESTIONS AND ANSWERS ON CLIMATE CHANGE

Q. When will the Administration release its economic analysis of the costs of acting to reduce greenhouse gas emissions?

A. -- We intend to release this report by the end of the month.

-- The report will summarize the current understanding from the economics literature and discuss how the analysis we have undertaken fits into that broader picture.

Q. The Administration has been working on this analysis for several years and promising it to Congress and the public for almost that long. Why have you withheld this information for so long a time?

-- By its very nature, climate change is a long-term issue requiring analysis that spans many decades.

- Needless to say, neither energy models or economics models do a very good job of forecasting over a such a long period of time.
- It's critical to recognize that there is no "right" model and no "right" answer.
- Nonetheless, as the analysis has progressed we have learned quite a bit both about the models themselves and about the implications for policy design.
- This has taken time. Longer than we thought it would take. But it nonetheless has and will continue to be useful in guiding our policy process.
- We look forward to issuing this report and continuing the dialogue about the appropriate actions to address climate change and its impact on the economy.

Q: How can the Administration be off negotiating an international treaty without having completed its analysis and without having had a public dialogue about the impact of such actions on American jobs and our economy?

A: -- The Administration's position in the negotiations has been informed throughout by the economic analysis in the literature and its on-going analytical efforts.

-- For example, we have rejected proposals calling for significant near-term reductions in emissions because we think they are too costly.

-- We have also pushed for flexibility in how a target is set (e.g., multi-year, banking and borrowing) and for the use of market-based approaches (emissions trading and joint implementation), because we believe that these approaches will be substantially reduce the costs of achieving any given target.

-- We have not, however, yet proposed any specific target or timetable. This obviously critical dimension of our position must await further analysis and dialogue as the President clearly stated in his speech at the United Nations last month.

Q: A copy of the Administration's draft analytical report has been circulated widely. How will the final report differ from that draft?

-- I believe it is generally inappropriate to comment on details of a draft report.

-- I will say however that we got a number of useful comments from the peer reviewers that will substantially alter the draft report.

-- For example, the reviewers thought it was important to put our analysis in the context of the existing economics literature on climate change impacts. We will be doing this in the final draft.

-- The reviewers also thought we placed far too great an emphasis on the results from a macroeconomic model (DRI) and that such a modeling approach is largely inappropriate for looking at changes on a timescale beyond a few years.

Q: When will the Administration release its peer review comments?

A: -- We intend to release the comments received from peer reviewers by the end of the month when our report is made publicly available.

Q: We remain very concerned that the Administration is going to agree to actions in Kyoto that will cripple our economy and drive jobs overseas? Can you assure us that we would not sign on to any such agreement?

A: -- The President has stated that he would oppose any plan that would be harmful to our economy, but that he believes we can take and need to take prudent steps to begin addressing this issue, and that we can do so consistent with continued economic prosperity.

-- We have opposed proposals calling for significant near-term reductions that could adversely impact on our economy.

-- We need to avoid causing costly premature retirement of our nation's capital stock, while at the same time spurring research and investment in the energy technologies that will lead us and the world into the next century.

-- In his recent speech at the United Nations, the President made a strong commitment to channel our technological prowess toward producing the energy solutions for the next century.

-- While taking steps to reduce greenhouse gas emissions will not be free, we also have to keep in mind that there are costs of a changing climate associated with not acting to reduce greenhouse gas emissions.

Q: Many in Congress are very concerned that the current negotiations are simply a bad deal for the American public. Why should we incur costs to reduce emissions when developing countries are not required to do anything? From an economic perspective, how can you advise the President that this path makes sense?

- A: -- Equity is often an important part of any economic discussion. Since the U.S. is the largest emitter of greenhouse gas emissions and developed countries are responsible for about 75% of emissions in the atmosphere, we have a responsibility to show leadership.
- However as developing countries economies grow and as their emissions grow, the U.S. proposal calls on them to incur increasing obligations.
- Specifically, the U.S. proposal calls for agreement on a date certain by which developing countries would agree to negotiations for them to take on binding obligations.

Q: The Dept. of Energy through Argonne Labs conducted a study of 7 basic manufacturing industries that are critical to the U.S. industrial base. Press accounts report that this study concluded that the current negotiations are likely to lead to widespread shifts in these industries from the U.S. to developing countries with huge job loss here. Why has DOE withheld this study from the public? Do you disagree with its findings?

- I am not personally familiar with this study. But I have been told that the Argonne study does not take into consideration any of the flexibility contained in the U.S. position and assumes incorrectly that developing countries never take on any obligations. Thus, the study in no way represents an analysis of what the U.S. has proposed during these negotiations.

Q: The draft Administration analytical report states that stabilizing greenhouse gas emissions at 1990 levels in 2010 would result in throwing 900,000 workers out of jobs. How can the Administration even contemplate entering into such an agreement?

- A: -- I am certain that we would not agree to a proposal that would have that impact.
- There are many dangers in working from a draft report.
- The numbers you cite are based on a scenario that doesn't reflect U.S. positions in these negotiations calling for flexibility and market-based approaches. In addition, they are based on a macroeconomic model that our peer reviewers criticized as being inappropriate for this type of analysis.
- We have worked hard to achieve the most robust economy in the world and if we continue to work together we can develop the technologies that address this problem and enhance our economic prowess.
- Our partnership with the U.S. automakers is a good example of what we hope to be able to achieve through technological progress. The goal of the Partnership for New Generation of Vehicles is to achieve three times

today's fuel efficiency without increasing costs or sacrificing safety. If successful, this one technological program would go along way toward reducing greenhouse gas emissions.

Q: The draft Administration's analysis suggests that gasoline prices will increase 35 cents per gallon and coal prices will triple in order to stabilize emissions at 1990 levels. Is the Administration prepared to ask Congress for this new tax and does it really think we would approve such a measure?

A: -- The Administration has not made any decision on a specific target and timetable and therefore, I cannot comment on possible increases in energy prices that might result.

-- Our goal in developing a specific proposal will be to allow for adequate lead time to avoid costly capital stock retirements and to allow for the development of alternative technologies that can reduce the costs of compliance.

-- As President Clinton stated at the United Nations, if we can channel the ingenuity of American industry, academia and government labs to work on solving this problem, this could become an economic opportunity rather than a burden.

Likely
friendly
question

Q: The Administration has been assessing the costs of climate change policies for over a year. What are you finding?


A:  The Administration's results are consistent with the lessons learned from a recent assessment by the World Resources Institute. Specifically:

Developing and diffusing new technologies will be a key to minimizing the costs of reducing greenhouse gas emissions. Investing in the development and dissemination of new energy-saving and low-carbon technologies will reduce overall costs and enable US companies to capture the emerging international market for these technologies.

International trading and joint implementation of commitments, as called for by the US, will increase the flexibility of countries in meeting treaty obligations and greatly reduce costs.

Actions will be implemented efficiently. Options being considered by the Administration will provide resources that can be used to offset distortionary fiscal policies.

Local air pollution will be reduced. Improving energy efficiency and increasing our use of clean-burning fuels will reduce both our emissions of greenhouse gases and traditional air pollutants. Greenhouse gas policies will significantly lower the costs of complying with new air quality standards.

The benefits of avoiding climate change are large. It is important to remember why we are taking these actions in the first place. The potential damages from climate change are great, including These costs will occur across countries and generations. It is not feasible or proper to attempt to add up the costs of climate change in a simple balance sheet. While we cannot simply monetize all of these costs, we should qualitatively compare the costs of our policies with the costs of doing nothing.

Q: Is it the intention of the Administration to adopt policies which would triple the price of coal, raise gasoline prices by 25 cents, and put thousands in energy intensive industries like coal mining out of work?

A: No, and the best and most recent work on the subject clearly shows that this would not be necessary. Robert Repetto of the World Resources Institute recently published a study of the cost of mitigating greenhouse gas emissions in which he concluded that efficiently implemented flexible policies that encourage investments in new technologies would actually generate net benefits to the overall economy. In addition, more than 2300 economists, including 8 Nobel Laureates, have said that many policies exist to reduce greenhouse gas emissions for benefits outweigh the costs.

We are confident that, working together, we can design policies that will meet the challenge of climate change while improving the US economy.

Revenue Recycling

Q: The Administration is considering an emissions cap-and-trade system. How will the Administration allocate permits? Does the Administration plan to auction permits, what does it plan to do with the revenue?

A: The Administration is considering an emissions cap-and-trade system. Market-based mechanisms are among the most efficient for addressing long-term environmental problems. We are evaluating a number of allocation and auction systems as well and other policies that could complement a cap-and-trade system or that could work in place of a cap-and-trade system.

As noted by Robert Repetto, in his recent review of climate change analysis, revenue recycling can be used to significantly offset the direct costs of reducing greenhouse gas emissions. We will continue to solicit comments from you, the public, and stakeholders on how to efficiently implement greenhouse gas reduction strategies.

Q: What are the potentially impacts on human health and the environment if climate change is left unabated? What are the consequences of inaction?

A: Climate change will have wide ranging impacts on human health, ecological systems, and socioeconomic sectors. Human health, natural ecological systems (e.g., water resources, coastal zones including wetlands and drylands, biodiversity), and socioeconomic systems (e.g., agriculture, commercial timber) are all sensitive to both the magnitude and the rate of climate change. The Intergovernmental Panel on Climate Change (IPCC) concluded in its 1995 Second Assessment that, "With the growth in atmospheric concentrations of greenhouse gases, interference with the climate system will grow in magnitude, and the likelihood of adverse impacts from climate change that could be judged dangerous will become greater."

Human health. The IPCC concluded that if climate change is left unabated, it "...is likely to have wide-ranging and mostly adverse impacts on human health, with significant loss of life." Health effects will potentially include increased incidences of illness and death from: (1) increased contributions of heat stress to cardiovascular and respiratory disease; (2) reduced air quality and increased levels of air borne pollen and spores which exacerbate respiratory disease, asthma, and allergic disorders; (3) extended geographic ranges of insects such as mosquitos and other disease carrying vectors which can increase the populations exposed to diseases such as malaria, dengue and yellow fever; and (4) ecological changes that can increase the incidence of cholera, diarrheal and other infectious diseases.

Socioeconomic sectors. Climate change poses risks to agriculture, coastal zones, and water resources. Climate change could adversely impact food production and increase the incidence of hunger and famine among the poorest populations of the world. Although total global food production may not substantially change, the effects will vary considerably across regions and localities, and some areas, including parts of the US, could sustain severe reductions in their ability to produce food. Rising sea level, if not addressed, can inundate large land areas, displace human populations, and place more people at risk of flood from storm surges. In the US, a 50 cm rise in sea level is estimated to inundate more than 5,000 square miles of dryland and 4,000 square miles of wetlands if no protective measures are taken. Measures to prevent or limit these effects would cost billions of dollars. Finally, climate change poses risks to the availability of fresh water. Relatively small changes in temperature and precipitation can cause large changes in water runoff, affecting the quantity and quality of water supplies for domestic and industrial uses, irrigation, hydropower generation, navigation, instream ecosystems and water based recreation. Also affected will be the frequency and intensity of floods and droughts.

Ecological systems. The impacts of climate change on the natural environment are difficult to predict. But impacts there most assuredly will be; some of them dramatic and many of them irreversible. The environmental impacts of climate change threaten to undermine our efforts to protect natural areas that provide habitat for wildlife, reservoirs

of genetic material for future medicines, foods and fibers, regulation of water runoff and flood control, and refuge from a modern world. For example, precipitation changes and salt water intrusion from sea level rise could adversely affect the ecological communities of the Florida Everglades and degrade this critical and unique habitat for many species of wading birds. The wetlands of the prairie pothole region of North America, which supports half the waterfowl population of this continent, could diminish in area and change dramatically in character in response to climate change. Such changes could be devastating to migratory bird populations and species survival.

Q: Why should we act today to reduce greenhouse gas emissions when there are so many uncertainties -- especially about the expected impacts? Shouldn't we wait until these uncertainties can be resolved?

A: It is a scientific fact that since the Industrial Revolution, the atmospheric concentrations of greenhouse gases have been increasing substantially due to human activities. There is strong scientific evidence that the continued addition of these gases into the atmosphere will alter global climate, increasing temperatures, changing rainfall and other weather patterns, and causing sea level to rise.

It is true that uncertainties remain about the timing, magnitude and regional patterns of these changes. But the best available science (as summarized in the 1995 Second Assessment of the IPCC) suggests that the wide range of potential impacts of climate change poses wide-ranging risks to human health, the economy, and the environment, that will add to existing stresses on resources caused by other factors such as population growth, land use changes, and pollution, resulting in a world very different than that which exists today. Climate change will pose risks for forests, wetlands, fisheries, coral reefs, and other ecosystems. In turn, these environmental effects will translate into economic impacts, and have possible repercussions for expenditures on health care, timber production, expenditures to protect our coastal areas and wetlands, prospects for hydropower generation, and agricultural productivity.

We need to deal with this problem now. The greenhouse gases that we emit into the atmosphere today will remain there for many decades -- and in the case of carbon dioxide, for centuries. How much we emit over the next years and decades will be determined by economic decisions we make today; for example, decisions about the type and energy efficiency of capital equipment that we invest in now. Consequently, if we delay taking action, more greenhouse gases will be emitted over time and we will leave the atmosphere with a higher concentration of greenhouse gases for the next century and beyond.

The emission reductions that we invest in today are a "down payment" to ensure that we can sustain our quality of life and economic growth in the future -- a down payment to ensure that human health, welfare and the environment are protected. Although scientific uncertainties still exist, current commitments may be viewed as an "insurance" investment; i.e., insurance against uncertain future "bad" impacts of climate change.

Furthermore, as the science of climate change improves and uncertainties are reduced, we may very well discover that the magnitude of the global warming problem is even worse than expected. Therefore, failing to reduce emissions now will mean that the eventual reduction will be even more drastic, if we want to prevent concentrations from exceeding a particular level. It is less expensive to begin to gradually reduce greenhouse gas emissions today, than to take no action and later institute draconian reductions.

Q: Won't we simply be able to adapt to any adverse effects? Haven't we done this for changes that we already have seen?

A: The rate at which climate change occurs may be the most important factor affecting both natural and managed ecosystems. The faster the warming, the harder it will be to adapt.

Temperature changes of the magnitude expected from the enhanced greenhouse effect have occurred in the past, but the previous changes took place over centuries or millennia instead of decades. The rate of increase in global temperatures will be greater than those which have occurred naturally over the last 10,000 years. However, the ability of natural ecosystems (forests, wetlands, barrier islands, national parks) to adapt to a rapidly warming climate is limited. Rates of natural migration and adaptation could be much slower than the rate of climate change. Populations of many species and inhabited ranges could decrease, and many may face extinction. The ultimate effects could last for centuries and would be virtually irreversible.

Intensively managed systems, such as agriculture, water resources and developed coastlines, may show more resilience to climate change than natural systems. Technological and management options exist which can, to some extent, cope with the stresses associated with a changing climate. However, it is difficult to currently design effective adaptation strategies because of uncertainties about the geographic location of impacts. These strategies also may be costly to implement.

Q: Isn't it true that any of the actions that are being contemplated for a protocol (e.g., stabilization of greenhouse gas emissions at 1990 levels) would have a negligible impact on future climate change and the resulting impacts?

A: It is not true that actions taken today will have a negligible impact on future climate change and the resulting impacts. Policy decisions in the near term -- particularly decisions about whether or not to begin reducing greenhouse gas emissions now -- will have long-term consequences.

Human-induced climate change is a complex problem, which can affect the quality of life for this and future generations. The lag time between emission of greenhouse gases and their impacts is on the order of decades to centuries; so too is the time needed to reverse any effects. Proactive measure taken today to begin reducing emissions of greenhouse gases will have two important effects: (1) They will influence the ultimate level of concentrations of greenhouse gases that occurs in the atmosphere; and (2) They will begin to slow the *rate* at which climate changes, which may have important implications for the ability of natural ecosystems to adapt to long-term climatic changes. The rate at which climate change occurs may be the most important factor affecting both natural and managed ecosystems. The faster the warming, the harder it will be to adapt.

In contrast, decisions not to reduce greenhouse gas emissions will have important long-term implications for human health and the environment. The longer emissions continue to increase, the greater reductions would eventually have to be to stabilize concentrations at a given level. However, the long atmospheric lifetime of many greenhouse gases, coupled with the thermal inertia of the oceans, means that the warming effect of anthropogenic emissions will be long-lived. Even with a stabilization of greenhouse gas concentrations in the year 2100, temperatures would continue to increase for several decades, and sea level would continue to rise for centuries.

Finally, actions taken today to begin reducing greenhouse gas emissions can be viewed as consistent with the "precautionary principle." If the climate changes more than expected, we will not have the option of returning the climate to that of today because the CO₂ will stay in the atmosphere for more than a century. It is therefore prudent to undertake some emissions policies that do not pose extreme risks to the U.S. economy as a precaution ("insurance") against this potential outcome.

Q: The World Resources Institute recently published "The Costs of Climate Protection: A Guide to the Perplexed" which shows that the assumptions made in the analysis have a great deal of influence over the results. What are the key assumptions being made by the Administration?

A: ~~What I cannot release specific results from the Administration's analysis until~~
~~it has been completed with the peer review,~~ I can say that the Administration's results are consistent with the lessons learned from the WRI assessment:

Developing and diffusing new technologies will be a key to minimizing the costs of reducing greenhouse gas emissions. Investing in the development and dissemination of new energy-saving and low-carbon technologies will reduce overall costs and enable US companies to capture the emerging international market for these technologies.

International trading and joint implementation of commitments, as called for by the US, will increase the flexibility of countries in meeting treaty obligations and greatly reduce costs.

Actions will be implemented efficiently. Options being considered by the Administration will provide resources that can be used to offset distortionary fiscal policies.

Local air pollution will be reduced. Improving energy efficiency and increasing our use of clean-burning fuels will reduce both our emissions of greenhouse gases and traditional air pollutants. Greenhouse gas policies will significantly lower the costs of complying with new air quality standards.

The benefits of avoiding climate change are large. It is important to remember why we are taking these actions in the first place. The potential damages from climate change are great, including [see climate benefits q & a]. These costs will occur across countries and generations. It is not feasible or proper to attempt to add up the costs of climate change in a simple balance sheet. While we cannot simply monetize all of these costs, we should qualitatively compare the costs of our policies with the costs of doing nothing.

Friendly question

Q. Why are you and 2000 other economists optimistic that we can address climate change without hurting our economy?

A. The cornerstones of smart climate change policy are;

- market based approaches (such as emissions trading) that will result in the most economically efficient response
- technological innovation
- reasonable targets and timetables

Q. What is the role of technology in mitigating climate change?

A. As President Clinton stated at the United Nations, if we can channel the ingenuity of American industry, academia and government labs to work on solving this problem, this could become an economic opportunity rather than a burden. Our goal in developing a specific proposal will be to allow for adequate lead time to avoid costly capital stock retirements and to allow for the development of alternative technologies that can reduce the costs of compliance.

Our partnership with the U.S. automakers is a good example of what we hope to be able to achieve through technological progress. The goal of the Partnership for a New Generation of Vehicles is to achieve three times today's fuel efficiency without increasing costs or sacrificing safety. If successful, this one technological program would go a long way toward reducing greenhouse gas emissions.

Q. Are we sure market-based approaches can work?

A. Yes. The acid rain program under the Clean Air Act is just one of many examples of how we can reconcile our economic and environmental goals and reduce pollution at the lowest possible cost. Under the acid rain program, we have an excellent record of early compliance, low costs, and an active emissions trading market.

Q. What targets and timetables are reasonable?

A. The Administration has not yet decided, although it has decided that the targets and timetables advocated by the European Community are not reasonable. The Administration will be engaging in internal and external discussions over the next several months before finalizing our position on targets and timetables.

Q. What is the potential role of nuclear power in addressing climate change?

A. Nuclear power faces enormous challenges including the waste disposal question, and whether new plants can be economically competitive, particularly as a deregulated electric utility industry will be less favorable to capital-intensive technologies.

However, nuclear power is playing a role in mitigating greenhouse gas emissions now. It is a zero-carbon-emitting technology that provides 22% of our electric generation. Improvements in reliability and availability of nuclear plants have been reducing, and can continue to reduce greenhouse gas emissions. In fact, a significant fraction of the utility industry's voluntary greenhouse gas reductions under the Department of Energy's voluntary programs come from nuclear power plant improvements.

Most analysts believe that these plants will retire over the next few decades and be replaced by new gas-fired generation, resulting in some increase in greenhouse gas emissions. DOE recently began an initiative designed to resolve technical issues around extending the lives of these plants. This program could contribute to greenhouse gas reductions.

Q. Senator Byrd and 64 other Senators have expressed concern that U.S. competitiveness will be badly damaged by a climate treaty that requires developed countries only--and not developing countries--to reduce greenhouse gas emissions. In addition, the recently released Argonne study shows a devastating impact on U.S. energy-intensive industries. What is your view of the competitiveness implications of the current U.S. policy?

A. First of all, let me say that there is a much greater difference between the U.S. negotiating position and the rest of the world than there is between the Administration and Senator Byrd. We agree that developing countries have to be part of the solution to the problem of climate change. We believe that the U.S. must lead, and that the developing countries must follow. The U.S. negotiating position is that (1) we should go first and (2) there should be an agreement on a date certain by which developing countries would agree to negotiations for them to take on binding obligations.

The Argonne study assumed that developing countries never take on obligations. This is not the U.S. position. The Argonne study assumed no international trading. That is not the U.S. position. The Argonne study assumed no technological advances in energy efficiency. That is not the U.S. position.

The Administration believes that addressing climate change will result in both impacts and opportunities. In general, we believe that with the help of smart policies and American ingenuity, we can minimize the impacts and maximize the opportunities.

We need to do more work on the competitiveness question, but my view of this problem is more sanguine than what is reflected in the Argonne report. First of all, energy prices are only one of many factors that affect competitiveness. And the energy price changes that might occur under a climate change mitigation policy are small compared to the differences that now exist between nations.

Secondly, most of our trade is with other Annex I countries, who would have similar obligations to us. Thirdly, there are trends affecting our basic industries which are much bigger than climate change. After shakeouts in the past decades, our competitive position in many of these industries is solid, based on the utilization of existing world class facilities. However, there is a trend of locating new facilities overseas due to a host of factors which have nothing to do with climate change.

Finally, technological innovation is the key to maintaining competitiveness, and American industry has demonstrated again and again that it has an enormous ability to innovate. Thus I believe that our energy intensive industries will respond to the challenge of climate change with innovation rather than movement offshore.

Q: Several of the peer reviewers were highly critical of the Administration's analysis. Some argued that the models selected were inappropriate, that our treatment of technology was biased, and that we failed to adequately consider issues related to international trade impacts. What is your response on these issues and what changes do you intend to make over what time frame?

A: MODEL SELECTION

- The IAT spent several months evaluating a wide range of models before selecting three to use DRI, Second Generation Model, and Markal-Macro). These models represented a range of analytical tools covering key issues.
- Reviewers criticized the lack of a true general equilibrium model. However, one of the models we employed (Second generation Model) has many of the features of a general equilibrium model.
- Other reviewers criticized our reliance on a macromodel, stating that because it is structurally inflexible, should only be used for projections over several quarters to a few years and would overestimate costs for a problem that will be addressed over several decades.

B. TECHNOLOGICAL CHANGE

- Many reviewers criticized our use of an "announcement effect" to raise the rate of technological change. Two reviewers suggested that technological change will occur at a greater rate than our analysis assumed.
- Predicting technological change is one of the most challenging elements of this analysis.
- Any credible analysis must include a range of assumptions about the rate of technological change.
- The President made it clear in his speech at the United Nations that we intend to more fully engage the research community within industry, our universities and government research labs in developing the technologies of the future needed to reduce greenhouse gas emissions.
- We need to accelerate our research activities both to reduce our own emissions but also to insure continued leadership of U.S. industry in these future high growth sectors in the global marketplace.

Likely
friendly
question

Q: I have a copy of a statement which I understand has been signed by more than 2300 economists, including eight Nobel laureates. That many economists agreeing on anything is impressive enough, but listen to what they said:

"Economic studies have found that there are many potential policies to reduce greenhouse gas emissions for which the total benefits outweigh the total costs. For the United States in particular, sound economic analysis shows that there are policy options that would slow climate change without harming American living standards, and these measures may in fact improve U.S. productivity in the longer run."

If I understand this correctly, they're saying that policies to curb greenhouse gas emissions could actually improve the economy. How can this be?

A: Flexible policies, investments in new, more efficient technologies and substantial environmental benefits together produce outcomes where benefits of climate policies exceed costs.

The Administration is confident that the US private sector, given flexible policies and clear market signals, will move rapidly to provide the technologies the world will need to combat climate change. Under smart policies, U.S. businesses will not only save money and reduce dependence on foreign oil, but they will be better positioned to lead markets for the high efficiency technologies the world will need in the future.

Given flexible implementation, US businesses have outperformed even the most wildly optimistic expectations:

in acid rain, EPA predicted a cost of \$500-\$600/ton of sulfur emissions; under emissions trading the cost is only \$100/ton;

in the Montreal Protocol, we predicted a cost of \$3.50/kilo for a 50% reduction of CFCs; we're now looking at \$2.45/kilo for a complete phase-out.

The economists also recognize the great benefits of policies that improve the environment. Avoiding the human health, natural resource and economic impacts of climate change will greatly benefit the economy.

Clearly, we have a great opportunity to design policies which simultaneously protect the environment and boost economic performance. We look forward to working with the Congress and the American people to do that.

OPTIONAL FORM 10 (7-91)

FAX TRANSMITTAL

of pages 9

To	Judy Greenwald	From	Bill White
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NSN 7540-01-317 7348

5010-101

GENERAL SERVICES ADMINISTRATION

ARGONNE REPORT Q'S AND A'S

Q1. WHAT WAS THE PURPOSE OF THIS STUDY?

A1. The purpose of this study was to explore the possible effects of a set of hypothetical fuel price increases on six energy-intensive industries that are subject to significant foreign competition:

- basic chemicals;
- iron and steel;
- petroleum refining;
- paper and allied products;
- aluminum; and
- cement.

Panels of industry representatives and experts from academia, environmental groups, organized labor, the financial community, and government were asked to assume a projection of energy price increases that incorporated specific assumptions about the energy price effects of a postulated climate change agreement, and reflect on the possible industry responses. Panels for each of the industries met to discuss the possible impacts on industry output, employment, energy usage, technology, costs, prices, imports, and exports.

Q2. WHAT DID THE PANELISTS FIND?

A2. Overall, the participants reported negative impacts on the six industries under the assumed energy price increases. Panelists predicted that the industries would experience reductions in output and employment from the projected baseline levels.

Less-developed countries, which were assumed in the workshops not to adopt binding commitments to lower greenhouse gas emissions in the timeframe considered, would capture an increasing share of the respective markets. Some industries would locate new plants in the less developed countries, and some would increase the utilization of existing production facilities already located in these areas.

Q3. WHAT IS THE DEPARTMENT'S RESPONSE TO THIS INPUT FROM INDUSTRIAL EXPERTS?

A3. The workshops provided valuable information that reinforced the need to pursue sensible climate change policies. The negative conclusions expressed by the participants and summarized in this report are predicated on the specific energy price scenarios assumed in mid-1996, which do not reflect key policies advocated in international negotiations by the Clinton administration in the intervening year. For example, the assumed fuel price

scenarios do not take into account the impact of multi-year emissions budgets, international emission trading, and joint implementation. If adopted, these provisions would lower the costs of achieving emission reductions in the U.S. and other developed countries and would significantly lower the energy price increases assumed in the workshop scenarios. The Administration has also argued that the developing countries should assume additional obligations in the near future to reduce the projected rapid growth of greenhouse gas emissions. No such actions were reflected in the workshop scenarios.

The environmental and socio-economic issues surrounding the stabilization of greenhouse gas emissions have been the subject of considerable debate, but are especially sensitive now as participating nations are engaged in a new round of negotiations for further commitments within the Framework Convention on Climate Change that will conclude in December of 1997 in Kyoto, Japan. The U.S. position taken in these negotiations stresses that international agreements to combat the threat of climate change must be flexible, cost-effective, realistic, achievable, and ultimately global in scope.

By examining scenarios that do not reflect such policies, the workshops identified important economic risks in key industrial sectors that reaffirm the wisdom of the U.S. approach.

Q4. HOW DOES THIS VERSION OF THE REPORT COMPARE TO THE EARLIER (DRAFT) PAPER BY SUTHERLAND?

A4. A draft paper providing a personal interpretation of the workshops was circulated prior to completion of this report by an individual employee of Argonne National Laboratory. That paper was apparently prepared in advance of the participants' review of the workshop summaries and prior to the lead authors' completion of the revised focus papers based on comments received at the workshops. The Argonne report issued this week provides an accurate and complete summary of the workshop findings.

Q5. DOESN'T THIS REPORT UNDERCUT THE ADMINISTRATION'S POSITION ON CLIMATE CHANGE?

A5. No. Rather, it highlights the need for flexibility in implementing emissions reduction and the need to engage developing countries in the process of emissions reduction. Flexibility, including emissions trading, joint implementation, and multi-year emissions budgets and provisions to ensure the future participation of developing countries in binding emissions reductions are central elements of the Administration's climate change strategy.

Q6. HOW DOES THIS STUDY RELATE TO DOE'S INITIATIVES TO INCREASE INDUSTRIAL ENERGY EFFICIENCY?

A6. The study is unrelated to the activities of the Department's Office of Industrial Technologies, which is actively cooperating with many of these industries to achieve dramatically improved energy efficiency. Success of these efforts has the potential to improve the competitiveness of U.S. producers while reducing their energy use and greenhouse gas emissions. Increased energy efficiency also makes U.S. producers less sensitive to the adverse effects of any future energy price increases, regardless of their source.

Q7. WHAT WAS THE BASIS FOR THE PRICE SCENARIOS ASSUMED, AND HOW DO THEY COMPARE TO THE PRICE SCENARIOS BEING USED FOR THE INTERAGENCY ANALYSIS TEAM WORK?

A7. The hypothetical fuel price scenarios used in this project are within the range suggested by analyses presented at the inter-agency Climate Change Analysis Workshop held at Springfield, Virginia in June, 1996. These analyses were preliminary in nature and did not incorporate cost-saving features currently included in the U.S. negotiating position such as emissions trading, joint implementation, and multi-year emission budgets. The industry workshop participants did not assume any complementary technology-oriented policy measures, nor were they asked to consider price scenarios which included ameliorative policy measures that could offset the impact of energy price increases on industry.

Q8. WHAT IS THE BASELINE STATUS OF THESE INDUSTRIES IN THE ABSENCE OF CLIMATE POLICY?

A8. In many of these industries, recent U.S. investment has been in the form of refurbishing existing plants rather than building new "greenfield" plants. Even without the assumed fuel price increases, countries with lower costs for energy and other inputs or more rapidly growing demands may be more attractive than the U.S. as sites for new greenfield plants.

Q9. HOW IMPORTANT ARE DEVELOPING COUNTRY COMMITMENTS TO THE LONG RUN RESULTS?

A9. The Administration has argued that developing countries should assume additional obligations in the near future to reduce growth in their GHG emissions. While developed countries now account for the lion's share of emissions, developing country emissions are projected to grow rapidly. The potential for shifting production of energy-intensive products to developing countries identified in the Argonne report would exacerbate emissions growth. It will not be possible to achieve the long run objective of the Climate Convention without substantial

emissions reductions by developing countries. Their commitment to such reductions, which were not reflected in the workshop scenarios, would be likely to significantly reduce the potential for shifts in industry location identified at the workshops.

It is likely that energy-intensive industries in other developed countries would be subject to similar challenges as their U.S. counterparts under the energy price increase scenarios developed for this study. Energy-intensive industries in other Annex I would also benefit from the cost-reducing flexibility provisions included in the U.S. proposal, and from an approach that assures developing country participation in emissions reductions will occur in the near future.

Q10. DOESN'T THIS REPORT PROVE SENATOR BYRD'S POINT THAT ENTERING INTO INTERNATIONAL AGREEMENTS WITHOUT THE FULL PARTICIPATION OF DEVELOPING COUNTRIES WOULD BE RUINOUS TO THE U.S. ECONOMY?

A10. The panelists felt that if less-developed countries did not adopt binding commitments to lower greenhouse gas emissions, they would capture an increasing share of the markets. The current Administration position, which was not reflected in the energy price scenarios considered by the panelists in mid-1996, is that developing countries should assume additional obligations in the near future to reduce the projected rapid growth of greenhouse gas emissions.

Q11. WHY DID IT TAKE THE DEPARTMENT SO LONG TO RELEASE THIS REPORT? WEREN'T THESE WORKSHOPS HELD OVER A YEAR AGO?

A11. The participants at the workshops focused their discussions around an initial draft of an expert author's paper. The expert authors then revised and clarified their papers over the following months in response to the panelists suggestions. Summaries of both the papers and the workshop proceedings were then forwarded to all participants for their review and to confirm that the workshop summary provided an accurate characterization of the workshop discussions.

Q12. THIS REPORT SHOWS HOW SOME INDUSTRIES WOULD BE HURT BY LARGE ENERGY PRICE INCREASES. WOULDN'T SOME INDUSTRIES, LIKE COMPACT FLUORESCENT BULB MANUFACTURERS, ACTUALLY BE HELPED? HOW COME THEY WERE NOT INCLUDED IN THE STUDY?

A12. The study focused on energy-intensive industries in order to develop information that would help in assessing the validity of the existing approaches to modeling the impacts of regime changes on energy use in the industrial sector, which accounts for over 1/3 of total U.S. energy use. The industries considered in this study account for over 80 percent of energy use in manufacturing. An understanding of the forces driving production decisions in these sectors is critical to comprehending and projecting the implications of alternative policy scenarios for the national energy market, a primary function of the Policy Office. Identifying changes in the relative performance of different economic sectors is also important. A second phase of our effort, which is now ongoing, is examining those industries that might benefit from higher energy prices.

Q. The Administration is planning to implement a climate change agreement which would require developed countries to reduce emissions, but not require developing countries to do so. Won't this agreement negatively affect the international competitiveness of U.S. industry?

A. Work that the U.S. government has commissioned by DRI, a private consulting firm, suggests that the international competitiveness implications for U.S. economy will be slight. DRI estimates that only 1% of all U.S. industrial sector energy use (and emissions) will shift overseas as a result of the agreement. The degree to which particular industry is vulnerable to overseas competition will depend upon (1) its energy intensiveness (2) the degree to which it is in direct competition with imports from countries not likely to be subject to our binding targets for emissions and (3) whether the particular U.S. industry exports to countries not subject to the agreement.

For most industries, either (a) energy is not a large fraction of their costs, or (b) the industries do not have direct competitive pressure on their products. However, there may be particular industries that will be more adversely affected.

**Q&A for Climate Change Hearings
7/14/97**

IAT Questions:

Models:

Under-Secretary of State Wirth stated at the June 19 hearing before the Senate Foreign Relations Committee: "These are the same models [IAT models] that were very wrong about what happened with the energy bump up in pricing after the Arab Oil Boycott of 1972. They were the same models that, for the most part, were very wrong about the cost of the Clean Air Act." Why should we base our policy on models that have a track record of being "very wrong"?

I would not characterize these models as being "very wrong". These models have provided and continue to provide useful information on how the economy operates, especially when government implements new policy. While the models may not pinpoint the exact state of the economy 15-25 years into the future, they do provide a reasonable range of the state of the economy. Further, they illustrate how different sectors and different energy inputs vary through time with policy implementation.

If one model cannot fully describe the effects of climate policy on the economy, then why 3? Why not 4 or 5, or 16 (as in the Repetto and Duncan analysis)?

The IAT selected the 3 models it did because the strengths of each one compensates for weaknesses in the others. The IAT process was designed to provide policy-makers with economic information on the effects of climate policy. The process did not necessitate an assessment with every available economic model in existence. The IAT process is another useful set of information that complements the existing economic literature on climate change.

The panel of reviewers of the draft of the IAT report made several significant criticisms of this process. Regarding the selection of the models, do you share their concerns about them? Specifically, do the models insufficiently address international trade? If they cannot capture international trade well, then how can we estimate the effects of climate policy on competitiveness?

Every model has a weakness, and in the case of the models used in the IAT process, none of them do a good job of describing the international trade implications of climate policy. Economists, both within the government and in the private sector, continue to conduct research on this issue. The key to minimizing negative impacts to U.S. competitiveness is ensuring that a climate change agreement requires non-annex I countries to participate in emissions reductions.

Do you have faith in the assumptions used in creating the baseline projection? Should there be more than one baseline so that we have a range of possible predictions? Is the baseline sensitive to the assumptions that oil and gas prices will rise in the future (even though they have been declining thus far this decade)? What about new discoveries of fossil fuel reserves that can push down prices of these energy sources even more (and result in higher costs for a carbon constraint)?

Any forecasting exercise involves a large set of uncertainties, as I mentioned in my opening statement. Our efforts to assess the economic impacts can provide us with information on the range of costs, but cannot give a definitive answer.

Drawing from the economic literature and further analyses on the sensitivity of these assumptions can assist in improving our confidence in the range of estimates we generate for policy-makers.

Benefits:

What are the benefits of preventing climate change estimated by the IAT models? If there are no estimates of benefits, how do we know what we are getting with these expensive policies? If the state of the science and the economics is insufficient to generate estimates on benefits, doesn't that imply that we don't know enough about the problem to enact costly policy measures?

The benefits of climate policy have not been quantitatively assessed in this process, in large part because of the uncertainties in the biophysical and economic responses to climate change. However, the benefits from reducing the risk of climate change are significant enough to warrant the statement by 2000 economists in support of cost-effective climate policy.

GDP:

Some of the studies on this issue indicate that climate change policy might actually increase U.S. GDP. How can this be? If there are great win-win technologies already in existence, why hasn't the private sector already adopted them? Isn't the Administration's Climate Change Action Plan supposed to encourage voluntary adoption of these energy efficiency technologies?

Some of these "win-win" technologies aren't fully adopted in part because of the bias in favor of low energy costs (for example, by subsidizing coal and hydro power and ignoring the environmental costs such as carbon dioxide emissions). The Climate Change Action Plan does attempt to encourage the adoption of these technologies, but low funding levels have prevented the program from being more successful.

Based on the three models used in the IAT analysis, it is difficult to determine if the hypothetical climate policy subsumed in the analysis will lead to an increase or a decrease in GDP over the baseline by 2020? The DRI model yields results that the economy under climate policy would be 0.3% larger in 2020, while the economy is about 0.2% smaller than baseline with the SGM model, and the Markal-Macro model generates estimates that the economy would be about 0.6% smaller under climate policy in 2020 than otherwise. The report notes that these values should serve as brackets about a reasonable range. However, this range is much smaller than the one provided in the Repetto and Duncan (WRI) analysis (about 2% gain to 2% loss in 2020). Why should an analysis of 3 models generate a more reliable range than an analysis of 16 models?

The report is correcting in using these point estimates simply as markers of a range of expected responses by the economy to climate policy. The more broad range in the Repetto and Duncan analysis represents greater variation in assumptions than the IAT analysis. Several of their low estimates of losses in GDP reflect assumptions not considered by the IAT (such as no low-cost substitute for fossil fuel energy, inefficient economic responses, and no joint implementation). Several of their high estimates of gains in GDP include other assumptions not considered by the IAT (such as averted air pollution damages and climate change damages). It should be noted then that the IAT range is fairly consistent with the Repetto and Duncan analysis.

The DRI model indicates that consumer expenditures fall below baseline and do not at anytime reach baseline. The report notes that consumer expenditures are "closer to consumer 'welfare' than total GDP". Doesn't this mean that individual consumers will be made worse off under climate policy, even if we do have a positive effect on GDP? Should the appropriate evaluation of policy then be based on GDP or consumer expenditures?

IAT reports most modeling results in terms of GDP. This is consistent with most economic analysis on climate change where researchers have estimated the effects of emissions reductions on economic output. Further, providing only information on consumption misses the larger picture that includes potentially substantial increases in investment. To paint a fuller picture of the effects of climate change, however, both consumption and GDP results should be provided to inform policy-makers.

Revenue Recycling:

Do some of these gains in GDP reflect revenue recycling? Is the argument for revenue recycling unique to climate change? Isn't it just a reflection of the more basic idea that the economy would improve if government removed more distorting taxes and replaced them with less distorting taxes?

Many of the modeling efforts use economic instruments that increase federal revenues. Effectively targeting these revenues, towards deficit reduction or cuts in income or investment taxes, can help the economy grow. While this is not unique to climate change, it is important in considering the implementation of climate change policy.

The IAT analysis assumes that the revenues from a permit auction would go towards deficit reduction. How would the results change if the revenues financed a tax cut? Or additional government spending?

The economic literature indicates that revenue recycling that targets investments better stimulates economic growth than alternative recycling strategies. Therefore, revenue recycling through deficit reduction, which has the effect of reducing the real interest rate, or through tax cuts for investments are likely to generate more economic growth than other forms of recycling.

The IAT analysis assumes that by using the revenues from an auction of carbon permits to reduce the deficit, the real interest rate will fall and thereby stimulate investment. How far will it fall?

How far the real interest rate falls depends on how the Federal Reserve Board interprets the economic conditions after the implementation of climate policy. The decision about whether or not to employ revenue recycling and the method of recycling used are very important. Different revenue recycling approaches can affect the inflation rate and the unemployment rate differently, yielding different responses by the Federal Reserve. IAT analysis found that climate policy with recycling through deficit reduction resulted in almost a 2% fall in the real federal funds rate relative to the base case.

If we allocate permits to existing emitters of carbon dioxide instead of auctioning them, what will be the economic impacts? The IAT analysis indicates that the economy under climate policy will be larger by 2012 than it would have been under baseline conditions with this grandfathering of permits. The reviewers doubt that this is plausible. In fact, grandfathering of permits appears to outperform an auction with revenues used to reduce the deficit and any auction with revenues used to reduce personal income taxes. Should we grandfather permits?

As you note, the reviewers questioned the likelihood that grandfathering could be that effective. On issues as important as permit allocation, we will do a careful and comprehensive assessment of the economics literature to ensure that any mechanism the administration supports can achieve our emissions goals cost-effectively.

Announcement Effect:

Could you explain this “announcement effect” phenomenon described in the IAT Report? The reviewers of the report appeared to be skeptical of the impact and magnitude of this effect.

The announcement effect implies that announcing a policy to curb carbon dioxide emissions in the future will provide a stimulus for the private sector to invest in R&D and smoothen the transition to climate policy. The reviewers differed on what the appropriate rate of gains in energy efficiency should be resulting from this effect, and recommended that future analyses assess a range of values.

Why would an agreement in Kyoto increase the diffusion of technologies at a faster rate through the “announcement effect”, but the President’s Climate Change Action Plan, the primary purpose of which is to increase technology diffusion, apparently does not have this effect in the IAT modeling?

The IAT modelers could make this assumption for two reasons. First, the Climate Change Action Plan includes a set of voluntary actions for the private sector to take. Since these are voluntary, they may not generate the same kind of incentive as a mandatory cap-and-trade program. Second, the announcement effect is weakened for circumstances where the private sector discounts the likelihood of the policy actually being implemented. In this case, the low levels of funding for CCAP may make the private sector hesitant to invest in energy efficiency technologies.

How sensitive are the results to the assumption on the improvements in energy efficiency and the “announcement effect”?

For climate policy, the costs of achieving emissions reductions are sensitive to the diffusion of energy efficiency technologies. The size of the announcement effect in the analysis affects the results generated by the models. The IAT tested two values for the announcement effect, and based on the recommendations by the peer reviewers, we will cast a wider net across the economic literature to identify the impacts of different announcement effects.

Couldn't an announcement result in higher emissions prior to implementing the announced climate policy than under a baseline scenario with no announcement?

Private firms undertake behavior to maximize their profits. Under the baseline scenario, firms are assumed to be producing at an optimal level. This question assumes then that under the announcement, but prior to policy implementation, firms would find it optimal to increase carbon emissions. Since the announcement generates expectations of higher prices in the future, firms are likely to invest in energy efficiency R&D. It is not likely that they would pump up emissions prior to policy implementation, unless the government implemented a grandfathering permit allocation scheme that rewarded that kind of behavior.

Do the models account for the opportunity costs of investing in energy efficiency? The reviewers believe that the models do an inadequate job of representing these costs.

The reviewers made some valid comments on the capacity of these models to account for the opportunity costs of capital. The IAT process is simply another—piece of knowledge on the economics of climate change. On issues such as this, we will incorporate some of the pool of knowledge to complement our understanding of the potential effects of climate policy.

If this “announcement effect” is supposed to increase the rate of diffusion of energy efficient technology, then shouldn't investment expenditures parallel this faster diffusion rate? If so, then why is investment under climate policy lower than baseline investment between 2000 and 2005?

By instituting a climate policy, there will be a short period of time for the economy to make the transition to energy efficiency. Since there will be real costs, the economy will actually contract. During this period, investment falls below the expected baseline investment level. However, the surge in investment after this transition period brings the economy to well above the expected GDP under baseline in the later years.

Energy Prices:

Why do the models yield such different results? DRI estimates that in 2010 the price of carbon will be \$95 per ton while Markal-Macro estimates that the price will be \$145 per ton. Interestingly, DRI estimates the price of carbon will increase through 2020, while Markal-Macro estimates that the price will decrease through 2020.

These models vary in their results because they model how the economy works in different manners. By providing a set of estimates from several models that employ different assumption about the opportunities for substitutions, investments in energy efficiency, and the effects on business activity generates a reasonable range of information for policy-makers.

The IAT analysis estimates the price of carbon to be about \$100 per ton in 2010. The report notes that this will have the effect of raising gasoline prices by 26 cents per gallon, natural gas by \$1.50 per thousand cubic feet, and electricity by 2 cents per kilowatt hour. These are very substantial price hikes. How will they affect businesses? Consumers?

The exact value can vary based on the assumptions used. Other simulations by the IAT found that the price of carbon could be as low as \$9 per ton with annex I country trading and joint implementation with non-annex I countries. How businesses and consumers are affected depends on the magnitude of the price increase. We do know that businesses and consumers will adapt to changes in the price, by investing in more energy efficient technology for example, thereby mitigating the effects of higher carbon prices.

How will the higher energy prices affect lower income households? Won't these prices translate into higher heating costs and higher food bills, and make life tougher for households just trying to make ends meet?

This depends on the extent of higher prices. Research by several economists have found that the burden of higher energy prices does not fall disproportionately on lower income households. Adaptive behavior by industry, by making substitutions in their production of goods, and investing in energy efficiency, can minimize the costs of higher energy prices.

Why do two models (SGM and Markal-Macro) estimate that climate policy will increase natural gas consumption in 2010, while DRI has natural gas consumption falling more than 15%?

This is a result of how different models model the nature of the economy. Some economic models assume that the prices for renewable energy sources will become competitive and utilities will substitute them for coal and natural gas. Other models do not assume that substitution can occur that quickly.

Based on the IAT analysis, how much of the reductions will be achieved by cutting coal emissions? How will this affect the coal-producing states? What kinds of job losses are predicted?

Estimates on the reductions based on cutting coal emissions range between 50-80% of all carbon dioxide reductions. Again, this range is broad because of the uncertainties associated with how businesses and individuals adapt to a new set of economic incentives. Employment values in the IAT report assumed no international trading -- with trading, they would likely be lower. Mining employment in the west-south central region will decrease by about 15,000 in 2010, or 6% of its total mining employment. The east-south central region will lose about 8,000 mining jobs in 2010, or 22% of its total mining employment. It should be noted that regions that can support production in goods and services that take advantage of the need for improvements in energy efficiency could experience gains in employment.

Based on the IAT analysis, how much of the reductions will be achieved by cutting car emissions? How will this affect the price of gasoline and the price of cars? What kinds of job dislocations does the IAT predict?

It should be noted that two counteracting influences affect the impacts of climate policy on transportation. Higher energy prices can negatively impact transportation by increasing variable costs of transport, while lower interest rates can positively impact transportation by increasing capital investments. The IAT analysis indicates that these lower interest rates actually increase automobile production by 2.2% in 2010 over the baseline scenario. This illustrates again the importance of effective revenue recycling.

Employment:

The DRI model indicates that the unemployment rate is higher under climate policy than under the baseline assumption of no-policy for all but 3 years between 2000 and 2020. How many jobs will be lost because of this policy?

Given the uncertainties in the modeling, it is more important to consider employment effects in terms of a range. DRI estimates in 2010 a drop in employment of 400,000, assuming no international trade. With international trade, the costs of implementing a climate policy drop significantly, and the effects on employment would be lessened.

International Cooperation/Non-Annex I

Some economic analyses indicate that attempting to stabilize U.S. emissions by 2010 without stabilization assurances by non-annex I countries is worse than doing nothing. Why should we then implement an expensive climate policy?

To achieve the goals of a global climate policy and to minimize the costs of such a policy, non-annex I countries must participate. As I noted before, "any comprehensive plan to deal with this global problem must include a mechanism to bring developing countries into the process."

Flexibility

What does the IAT analysis tell us about the value of emissions budgets?

The IAT analysis did not focus on the effect of emissions budgets. We do know from other economic analyses that emissions budgets can increase the flexibility of climate policy and lower the costs to the economy.

Q&A for Global Climate Change

from meeting in Janet's Office

15 July 1997

Answers

Decide what you want to say

1. This is a potential long-term problem
2. Requires: a change in consumption patterns
a change in production patterns
a technological fix
3. Price signals are needed
4. Many ways to send price signals
5. The President is exploring all the different options

Don't let them get you to say what you do not want to say. Therefore, frame the answer to bridge to your message:

- A "what if" question: "I don't answer hypothetical questions....it depends on..."
- A #s question:
 - A. "In the middle" approach
 1. Some want to take such stringent response
 2. Others want to take much less action
 3. The President wants a sensible policy because job creation and economic growth has been and remains his top priority
 - B. "Qualitative not quantitative"--"glad to discuss how the think about that issue"
- A tax question: The 1-2-3 response
 1. President--cut taxes in balanced budget deal
 2. President clearly does not want to increase taxes
 3. People outside the Administration who think about increasing taxes usually explore a revenue neutral plan
 4. The right approach is to consider all the options

Questions

1. Ev Ehrlich, former Undersecretary at Commerce, ran the IAT--do you consider him staff?

Dr. Ehrlich was asked to coordinate an interagency effort at the staff level so as to achieve a standardized baseline and a common set of assumptions.

2. Why was this exercise started and who authorized?

Although I wasn't here when this all started, it is my impression that the IAT was started so as to provide directional information on the effectiveness of flexible policy options.

3. Yes or no: Are you now distancing yourself for the IAT?

The IAT is one attempt to understand the directional impacts of climate change, and many other modeling efforts exist outside the Administration that attempt to do the same directional analysis. Sound economic judgement requires input from many sources.

4. Is the IAT the best the Administration can do?

GCC is too big and too uncertain for any one modeling effort. The President will base his decision on the best information available.

5. If the science is so uncertain, why is the Administration dumping this policy on the American people?

6. When this policy is decided, when will you give us some information on the impact on the economy?

The Administration will use the best tools and minds to get good economic analysis to understand the impacts of any policy. Sound economic judgement will help guide the President's decision.

7. These are Administration policies that have big projected impacts--how can you justify this?

Some people out there who might make these proposals; other people have argue for less significant changes. The President will take a sensible approach to this problem. His Administration's top priority has been and will continue to be economic growth and job creation.

8. If GDP goes down by 2%, what happens to the personal income of African-Americans?

It is not useful to try and answer hypothetical questions. It depends: Some people have made strong proposals; others have argue for less significant changes. The President will take a sensible approach to this problem. His Administration's top priority has been and will continue to be economic growth and job creation.

9. How can you contemplate a policy that will raise the price of energy--a policy that punishes the poorest citizens on a wild goose chase?

The President believes that GCC is an issue. But no policy has been decided on yet. The President has set the wheels in motion to begin engaging in a dialogue with the American people to understand

10. Are you considering raising taxes--yes or no?

The President is very committed to cutting taxes in his balanced budget proposal. Clearly he is not interested in raising taxes. Those out there who propose tax increase usually talk about a revenue neutral plan. But the President has not made a decision yet.

11. Can you make a commitment today that the Administration will not raise taxes?

We are not proposing policies, we are looking at everything. The President is very committed to cutting taxes in his balanced budget proposal. Clearly he is not interested in raising taxes. Those out there who propose tax increase usually talk about a revenue neutral plan. But the President has not made a decision yet.

12. What about taxes on carbon-intensive energy? How can the Administration avoid an increase in the price of energy?

This is a potential long term problem. It will require a change in consumption patterns. Price signals are an important tool to help make these changes. Many ways exists to send a price signal. Flexibility, technology, R&D in any policy are key factors to help send these price signals. We are not proposing policies, we are

looking at everything.

13. A Dingle question: There will be a negative impact on the coal sector and the automobile industry. What are you going to do about the hard-working people put out of work in the automobile industry because of the Administration's policy?

Some people out there who might make these proposals; other people have argue for less significant changes. The President will take a sensible approach to this problem. His Administration's top priority has been and will continue to be economic growth and job creation.

14. What will be done for the workers in the coal industry who lose their job because of climate change policy?

Some people out there who might make these proposals; other people have argue for less significant changes. The President will take a sensible approach to this problem. His Administration's top priority has been and will continue to be economic growth and job creation.

Flexibility is a key to keeping costs low.

15. Will the Administration be exploring any transition policies?

The President has not yet made a decision on any policy.

16. You praised the letter of the 2300 economists. Professor Jorgenson signed that letter; and he also testified last week that the best policy was to start with a \$5 tax that rises up to a \$10 tax. Does this sound like a good policy?

Some economists out there who might make these proposals; others have argued for more significant changes. The President will take a sensible approach to this problem. His Administration's top priority has been and will continue to be economic growth and job creation. All options are being considered.

17. Should developing countries sign a binding emission agreement too?

Developing countries are an important part of any GCC treaty. The US has pushed this point stronger than any other nation.

Pass to Tim Wirth

18. Won't this treaty without developing countries just push US industry off-shore?

The President's top priority has been job creation and economic growth. It does not make any sense, economically or environmentally, to shift carbon emissions elsewhere.

19. Is the developing country issue a deal-breaker in Kyoto?

Pass to Tim Wirth

**Draft Q&A on the IAT Report
July 15, 1997**

Q: What is the Interagency Analytical Team?

A: When the Administration evaluates possible policies, it normally sets up a variety of staff-level working groups to inform the principals' discussions. The Interagency Analytical Team (IAT) was one such group -- an informal group of modelers from various agencies in the Federal government who conducted a preliminary analysis of various *hypothetical* emissions reduction policies. Once the relevant principals reviewed the work and the peer review comments on it, it was decided that further activity would be futile because of the difficulty of developing a model or set of models that can give us a definitive answer as to the economic impacts of a given climate change policy. Professional and policy judgement will always be necessary.

Q: What is the Interagency Analytical Team (IAT) Report?

A: The staff-level Interagency Analytical Team wrote a report of their early results from modeling a few emissions reduction policies that are widely examined in the literature. I should emphasize that the scenarios examined were not and are not Administration policy; instead, they were picked to make comparisons with other models easier.

The working group's draft report, which was released on July 15, summarizes the preliminary results of the team's modeling effort. That modeling effort produced some useful lessons, but -- as illustrated by comments from peer reviewers -- it also suffered from some serious shortcomings. As Chairman Yellen emphasized in her testimony on July 15, the lessons and the shortcomings of the exercise point to one clear conclusion: the effort to develop a model or set of models that can give us a definitive answer as to the economic impacts of a given climate change policy is futile. Rather, we are left with a set of parameters and relationships that influence estimates of the impacts. As she indicated, it is more productive to employ a broad set of economic tools to analyze policy options, than to seek to develop a single definitive model.

[I would refer any more technical questions about the draft report to Chairman Yellen.]

Q: Why was the release of the Interagency Analytical Team (IAT) report delayed?

A: After the staff-level working group received comments from peer reviewers of the draft report, and after the relevant principals reviewed the draft report and the comments, it became apparent that it was futile to refine the modeling process further -- that it would be more productive to employ a broad set of economic tools

to analyze policy options, rather than seeking to develop a single definitive model. After the decision had been made that further refinement of the econometric analysis would be futile, the draft report was issued on July 15.

[I would refer any more technical questions about the draft report to Chairman Yellen.]

Q: The Interagency Analytical Team (IAT) draft report indicates that energy prices will rise markedly as a result of the Administration's climate change policies. Are substantial price increases necessary to reduce greenhouse gas emissions?

A: First, let me emphasize that the Administration has not settled on any climate change policies. The results generated in the staff report suggest that policies to reduce emissions to 1990 levels by 2010 -- which is a common metric, and not necessarily the Administration's policy -- tend to rely on price signals that call forth new technologies and induce fuel switching. However, even within that hypothetical scenario, the staff results also suggest that various assumptions have the potential to substantially change the outcomes. For example, more flexible implementation plans, more rapid development and deployment of technology, and more pro-investment fiscal policy all act to mitigate any upward pressure on prices.

[I would refer any more technical questions about the draft report to Chairman Yellen.]

Q: The Interagency Analytical Team (IAT) report indicate that economic growth will slow markedly as a result of the Administration's climate change policies. Must economic growth suffer to reduce greenhouse gas emissions?

A: First, let me emphasize that the Administration has not settled on any climate change policies. The results generated in the staff report suggest that reducing emissions to 1990 levels by 2010 -- which is a common metric, and not necessarily the Administration's policy -- tend to leave economic growth rates somewhat below baseline levels in the medium term. However, even within that hypothetical scenario, the staff results also suggest that the particular policies relied on have the potential to substantially change the outcomes -- with more flexible implementation plans (including international emissions permit trading), more rapid development and deployment of technology, and more pro-investment fiscal policy all acting to mitigate any reduction in growth rates.

[I would refer any more technical questions about the draft report to Chairman Yellen.]

Q: The Interagency Analytical Team (IAT) report indicates significant job losses will occur as a result of the Administration's climate change policies. Must American workers suffer to reduce greenhouse gas emissions?

A: First, let me emphasize that the Administration has not settled on any climate change policies. The results generated in the staff report suggest that policies to reduce emissions to 1990 levels by 2010 -- which is a common metric, and not necessarily the Administration's policy -- tend to leave employment growth somewhat lower than it would otherwise be the case. However, even within that

hypothetical scenario, the staff results also suggest that the particular policies relied on have the potential to substantially change the outcomes -- with more flexible implementation plans (including international emissions permit trading), more rapid development and deployment of technology, and more pro-investment fiscal policy all acting to attenuate any impact on overall employment.

[I would refer any more technical questions about the draft report to Chairman Yellen.]

RESPONSE TO IAT

While some worthwhile insights have emerged from the staff level analysis, the results in this document do not constitute an Administration forecast. I have tried to summarize the things we learned that have some general validity--they concern the importance of flexibility in the design of any climate change mitigation policy. The numbers in this document have some utility, but they are limited. We found out that flexibility really has the potential to mitigate the economic effects of any policy we would propose. But we do not have a policy, and we recognize that it is futile to rely on any single model or even any small group of models for economic analysis of climate change policy.

As we work to develop a policy, we will rely on the advice of experts in a variety of fields and use a broad range of economic tools of analysis.

It is utterly futile to try to perfect a model.

WHAT WAS THE PURPOSE OF THE IAT EXERCISE?

I believe that Under Secretary Ehrlich and the staff were trying to facilitate communication among the staff of the various agencies with capabilities in the energy modeling area. These staff engaged in a useful exercise in which they were able to see why they were arriving at different answers with different models. To the maximum extent possible, the different staff chose a standardized set of economic assumptions and baseline forecasts and were able to run their models and compare results. By choosing a rather standard policy exercise, the staff were able to compare their own approaches with those of outside researchers.

We wanted to get a sense of what the value would be of having flexibility in the various proposals. And we found it that it matters a lot--this justifies the U.S. approach in emphasizing flexibility.

Some may have hoped that this exercise would arrive at a good forecast for use in Administration policymaking but there were also, as I understand it, many skeptics of the project.

DOES THE IAT ANALYSIS REPRESENT THE ADMINISTRATIONS' POSITION?

No. It is useful staff work but does not represent the views of the Principals. The models used are not the Administration's models.

IS THIS THE BEST EFFORT THAT CAN BE DONE?

No. There is no best to be achieved. It is just futile to try to get a best estimate of any economic impact. We ended up recognizing the same things as every other researcher in this field--the morals I have tried to summarize in my testimony.

Modelling gives a misleading sense of certainty. It relies on assumptions that are untested and

GROWING FOR OIL/NG
1) flexible, market
2) technological innovation
3) reasonable targets
penalties

assumed to hold over decades. The models just are not robust enough to be a definitive guidepost for policy. At the end of the day, we will need to use good judgement. To reach a policy decision we will use all of the tools of economic analysis and make what we think is a sensible policy judgement.

WHAT CRITERIA WILL THE PRESIDENT USE IN EVALUATING A PROPOSED POLICY?

Does it begin to address the problem - is it sensible.

Some believe that climate change is not an established scientific fact and that no policy actions are justified now to address it. Others argue that climate change is so serious that we should make large policy changes to address it immediately. The President has made it clear that he believes the science is clear ~~with respect to policy change~~, that the risks are real, and we should address it now. But he endorses a practical, pragmatic, sensible approach that will put us on the right road without damaging the economy.

The President has made the economy his top priority since day one on the job and he continues to consider it the top priority. This President will not endorse policies that would damage the economy. Growth and job creation are key goals and he has a record of success which he is not about to damage.

He agrees with the 2000 economists who argued that there are sensible policies that can address climate change without damaging the economy and he will be judging policies in reference to that standard.

We don't have a policy. The President will engage people in this issue to find out what's best.

WHY ACT NOW? WHY NOT WAIT?

The science is clear. It is prudent to begin to address the risks and to create incentives for improvements over time. We need to make a credible commitment now to induce the appropriate private sector investments and to achieve a global solution.

THE IAT MODEL SAYS THAT ADDRESSING CLIMATE CHANGE COULD RESULT IN GDP LOSSES BETWEEN .2 - 1.0% AND JOB LOSSES OF 900,000.

Those estimates come from one model with one very special set of assumptions about Federal Reserve policy and are transitory losses. The losses refer to a policy we have not proposed and use a model we would not endorse which received criticism from the reviewers.

There are certainly people who would advocate proposals that would hurt people to deal with climate change just like there are those who want to do nothing. The President wants a sensible policy that will not harm the economy but he has also indicated that the process of climate change, left unattended, will also cause harm and that we should begin to address that now.

Some would do a lot
Some would do nothing
We will try to do something sensible.

WON'T THIS BE HARD ON THE POOR?

The President is not about to endorse a set of policies that will harm America's families. He will have to be satisfied that any package of policies is good for hardworking families. But remember, this is an important problem. If we con't address it, it will also hurt the poor.

It is really premature to be discussing policy options and impacts. Everything depends on the package of policies we adopt and how they are implemented and on the assumptions one makes about how the economy makes.

One thing I can say is that we have concluded that market mechanisms are important and will lower the impact of policies we might adopt.

ARE YOU CONSIDERING A TAX HIKE?

1. POTUS has just proposed to cut taxes while balancing the budget. He is committed to cutting taxes to help hardworking families trying to raise children and send their kids to college.
2. He certainly doesn't want to raise taxes.
3. Modellers and outsiders analyzing climate change policy sometimes focus on options that could result in revenue increases, but most consider revenue neutral policies to be a natural baseline.
4. At this point, I don't think we should be ruling anything in or out at all with respect to climate change. We have no policy position.

DON'T YOU HAVE TO HAVE HIGHER ENERGY PRICES TO SOLVE THIS PROBLEM?

Climate change is a long term problem and to solve it, we will have to figure out how to reduce our dependence on fossil fuels. We need a technological fix. That will require new technologies and signals to the private sector to undertake the kinds of investments necessary to reduce that reliance and develop new technologies.

Certainly, many would suggest market policies that impact the price of carbon as part of the solution to this problem. Technology and R&D can go a certain way alone. However, the large numbers that you see in the staff report are based on models that are not official Administration models and have been criticized and on policies that are not Administration policy. Moreover, the implied price change depends dramatically on how policy is implemented--whether it is implemented flexibly or not.

AUTOMOBILES: The President emphasized in his speech at the U.N. that a program to address climate change would create opportunities for the private sector and not just costs. Autos are a case in point. I believe there are opportunities for us to work with the auto industry in a partnership to develop a new generation of fuel-efficient vehicles that will be good for the industry and good for the environment. The President cares enormously about jobs and there have been over 100,000 new jobs in the automobile industry over the last four years.

COAL: The President's top priority is jobs. He is not about to propose the kind of radical policies that are sometimes suggested. He will look for a sensible policy. He is focused on jobs.

DEVELOPING COUNTRIES:

1. Yes, LDCS must be in.
2. The U.S. pushed this strongly.
3. Developing countries must be part of the solution.

Nobody can be allowed to evade their responsibilities on this critical issue. Clearly, POTUS would not want to see industry move off shore. That would not help reduce CO2 in the environment and it would harm American jobs. As we look at policies, this is a very important criterion. We don't think it makes economic or environmental sense to have that happen. We don't have a policy position, so it is really premature to address the issue.

Remember, we have 4% of the world's population and emit over 20% of the GHGs. We have a responsibility here. We need to take it on and show leadership. But the developing countries also need to be involved.

WHY NOT JUST ADAPT RATHER THAN PREVENT?

An ounce of prevention is worth a pound of cure. Climate change can have very harmful side effects. Remember that about 1/3 of the U.S. population lives near the coastline.

Economic Q&As (CEA suggestions)

--draft--

1. Won't it ruin the economy to restrict fossil fuel consumption?

promotes
the economy is the healthiest
is a generation worth climate
carbon
policy
kill our
growth

Costs depend on how a carbon policy is implemented. Global climate change policy should be based on market-based mechanisms because such mechanisms allow for flexibility in both the timing and location of emission reductions, thereby minimizing the costs to the U.S. economy. The speed at which emissions reductions occur has large effects on the estimated costs. If emissions reductions are phased in over a longer period of time, the natural turnover of the capital stock will incorporate newer, energy-efficient technology, lowering the ultimate economic cost of meeting any specified emissions target. Similarly, longer lead times until emissions constraints are binding permits the development of new technologies and allows a more orderly fuel-switching process, preventing bottlenecks that can drive up the estimated costs.

A "cap and trade" system in which emission permits are issued and then traded among firms can substantially reduce the cost of meeting an emissions target by creating incentives for emissions to be reduced by those firms and in those activities where costs are lowest. Also international emission permits trading substantially lowers costs by applying the same cost-minimizing principle globally. So-called "banking" and "borrowing" of permits increases flexibility and lowers costs by allowing firms to change the timing of their emission reductions. Joint implementation, whereby US firms would receive credit for undertaking emission reductions in countries with low abatement costs, would also lower the domestic burden.

An additional aspect of implementation that profoundly affects the costs of reducing emissions concerns "revenue recycling." In many model simulations, emissions are reduced either by selling permits to emit carbon, or by imposing a carbon tax. In either case, the Federal government realizes an increase in revenues. Economic growth can receive a long-term boost if these revenues are used to reduce distortionary taxes that diminish the incentive to invest, save or work, or if the revenues are channeled into deficit reduction, thereby boosting investment. In fact, in some models and scenarios, emissions reduction generates a net economic benefit when the revenues are recycled in a growth-promoting fashion.

2. How can we compare the known costs of restricting greenhouse gas emissions with the unknown costs of environmental impacts that might not even occur?

Great uncertainties exist with estimating both the costs and benefits of reducing greenhouse gas emissions. With global climate change, we are concerned with economic and physical processes that operate globally and over decades, if not centuries. The potential damages associated with increasing concentrations of greenhouse gases are not predicted to occur for many decades, and it is difficult to know which regions will get warmer and which will get cooler; which will get wetter and which will get drier; which will get stormier and which will get calmer. This means that the benefits of climate protection are very difficult to quantify. And, while the potential costs of reducing greenhouse gas emissions may be more immediate, they too, are difficult to predict.

Many unanswered questions exist about the biophysical systems, potential thresholds, and economic impacts. Inherent uncertainty dictates that models should only be expected to generate a range of economic impacts, not definitive answers.

3. Isn't it cheaper to wait a few decades before we take any action?

Economic models of climate change policy have estimated the least-expensive strategies begin with modest reductions in carbon emissions in the early years followed by sharper reductions later. This approach is not a wait-and-see policy, but rather a sensible strategy to minimize the economic burden of any climate change policy. First, since the economy yields a positive return on capital, the longer one postpones an economic burden, the fewer resources that must be set aside today to finance the burden. Second, since the capital stock for energy production and use is usually long lived, this approach will allow the stock to turnover at a natural rate. Time is needed to reoptimize the capital stock. Third, evidence suggests that with proper price signals energy-conserving technologies will improve. With credible signals from the market, the availability of low-carbon substitutes will likely improve and the costs will fall over time.

4. Won't it hurt US competitiveness to limit greenhouse gas emissions if the developing world isn't playing by the same rules?

The Administration's position is that both developed and developing countries must be part of the process. While developed countries are responsible for most of the greenhouse gas currently in the atmosphere, developing countries will catch up. The sooner developing countries face incentives to move away from carbon intensive energy sources, the less likely it is that they will become dependent on those types of fuels to spur their economic growth.

If left outside the process, would developing countries serve as a haven for carbon-intensive industries from developed countries? The general economics literature suggests that when a nation tightens its pollution rules it does not cause industries to move on, suggesting that carbon policies are unlikely to effect a massive shift of energy-intensive production abroad. Two factors tend to militate against significant location or trade effects: (1) non-tradeable sectors account for a substantial share of carbon emissions, e.g., transportation and buildings account for roughly two-thirds of U.S. emissions. For these sectors, the "competitiveness" argument seems largely irrelevant; and (2) in most manufacturing sectors, energy costs are a small percentage of total costs. According to the 1995 Annual Census of Manufactures, energy costs for manufacturing industries averaged just 2.2 percent of total costs. However it is worth remembering that the empirical literature on the specific impact of carbon policies is sparse.

An important caveat to the general findings is that for several industries, energy costs are a significant share of total costs. For example, energy accounts for 21.4 percent of total costs in primary aluminum production; 20.5 percent of total costs in hydraulic cement, and 13.7 percent in inorganic chemicals. And in other industries -- including the pulp and paper industry, and the steel industry -- energy is a significant input. In these industries, which account for perhaps 2 to 3

percent of total industrial output, the effects may be more significant.

5. Aren't most business leaders against taking action to limit greenhouse gases, and don't they know what is best for the economy?

The magnitude of the costs of reducing greenhouse gas emissions depends on a number of key assumptions about how the economy works. For instance, if firms in the economy can shift from high carbon to low carbon energy sources quickly, the costs of climate protection will be lower; if there are significant opportunities, even now, to employ energy-saving technology at low or even negative costs, the costs of climate protection will be lower; if technological change occurs at a rapid rate, or is highly responsive to increases in the price of carbon emissions, the costs will be reduced; and if the Federal Reserve pursues a monetary policy oriented toward keeping the economy at full employment, transitional output costs will be lower. In short, the greater the substitution possibilities and the faster the economy can adapt, the lower the costs. The Administration has stressed that any climate change policy will be flexible, e.g., emission trading. Flexibility can keep costs low by providing the opportunity to firms and nations to reduce their emissions over time and location -- wherever and whenever such reductions are cheapest. Modeling runs suggest the costs saving could be substantial. SEE the answers to questions 1 and 3.

Climate Change Q&As ECONOMY

Q: The U.S. economy is the healthiest it has been in a generation. Won't climate change policies -- like carbon taxes -- kill economic growth and destroy jobs?

A: President Clinton's top priority, since his first days in office, has been revitalizing the economy, creating jobs and investing in people and technology to enhance long-term growth. And, we have made tremendous progress: growth is strong, unemployment is down to 4.8%, and 12.9 million jobs have been created since January, 1993. He is not going to do anything to jeopardize that progress. Any policy on climate change that the President endorses will be consistent with his commitment to sustaining a healthy and robust economy.

Q: How much is it going to cost?

A: Over 2,300 economists -- including 8 Nobel Laureates -- signed a statement concluding that "there are policy options that would slow climate change *without harming American living standards*, and these measures may in fact improve U.S. productivity in the longer run."

There is no definitive answer as to how much it will cost to slow climate change. Different economic models come up with different numbers based on different assumptions. Economists are able to come up with a range of economic impacts using certain models. But, it is impossible to come up with an answer as to the exact cost.

Instead, the cost of slowing climate change will depend greatly on a number of different factors -- factors such as: .

- the manner in which a policy is implemented. In short, if we do it dumb, it could cost a lot; but, if we do it smart, it will cost less and indeed could even produce benefits for our economy in the long run.
- the speed at which the economy adapts. For instance: if firms in the economy can shift from high carbon to low carbon energy sources quickly, the costs of climate protection will be lower; if there are opportunities to use energy-saving technology at low or even negative costs, the costs of climate protection will be lower; if technological change occurs at a rapid rate, or is highly responsive to increases in the price of carbon emissions, the costs will be reduced.

Q: What does it mean to “do it smart”? What is an example of a policy approach that will cost less?

Climate change policies that are based on market-based mechanisms will be less costly to the U.S. economy, because they are more flexible with respect to the timing and location of emission reductions. The speed at which emissions reductions occur has large effects on the estimated costs. If emissions reductions are phased in over a longer period of time, the natural turnover of the capital stock will incorporate newer, energy-efficient technology, lowering the ultimate economic cost of meeting any specified emissions target. Similarly, longer lead times until emissions constraints are binding allows new technologies to be developed and allows a more orderly fuel-switching process, preventing bottlenecks that can drive up the estimated costs.

Q: If you don’t know how much it will cost to slow climate change, how can you justify going forward with a policy?

Yes, it is difficult to determine the exact cost of policies designed to slow climate change. Global climate change involves economic and physical processes that operate globally and over decades, if not centuries.

But, the science is clear and compelling: we humans are changing the global climate. Concentrations of greenhouse gases in the atmosphere are at their highest levels in more than 200,000 years, and climbing sharply. Over time, climate changes will disrupt agriculture, cause droughts and floods and the spread of infectious diseases.

We must take steps now to reduce greenhouse gas emissions. And we can do this in a way that will not impose dramatic and crippling costs to our economy. More than 2,300 economists agree: if implemented properly, emissions reductions would “slow climate change without harming American living standards, and these measures may in fact improve U.S. productivity in the longer run.”

Q: If developing countries aren’t included in efforts to reduce greenhouse gas emissions, U.S. businesses are not going to be competing on a level playing field. Aren’t policies to reduce greenhouse gases going to hurt US competitiveness?

A: The Administration believes that both developed and developing countries must be part of the process. While developed countries are responsible for most of the greenhouse gas currently in the atmosphere, developing countries will catch up. The sooner developing countries move away from carbon intensive energy sources, the less likely it is that they will become dependent on those types of fuels to spur their economic growth.

Q: If developing countries are left outside the process, would energy-intensive American companies relocate to the developing world in order to avoid restrictive climate change policies?

Economists have found that, for the most part, when a nation tightens its pollution rules it does not cause industries to move to other countries -- which suggests that policies restricting the use of fossil fuels are unlikely to cause a massive shift of energy-intensive production abroad. There are 2 key reasons for this: (1) non-tradeable sectors account for a substantial share of carbon emissions, e.g., transportation and buildings account for roughly two-thirds of U.S. emissions. For this reason, moving from the developed to the developing world is out of the question; and (2) in most manufacturing sectors, energy costs are a small percentage of total costs. According to the 1995 Annual Census of Manufactures, energy costs for manufacturing industries averaged just 2.2 percent of total costs.

[NOTE: An important caveat to the general findings is that for several industries, energy costs are a significant share of total costs. For example, energy accounts for 21.4 percent of total costs in primary aluminum production; 20.5 percent of total costs in hydraulic cement, and 13.7 percent in inorganic chemicals. And in other industries -- including the pulp and paper industry, and the steel industry -- energy is a significant input. In these industries, which account for perhaps 2 to 3 percent of total industrial output, the effects may be more significant.]