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Reasonable Middle on Aggressive Actn [Action]--[Climate Change]

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Asian-American Is in Close Race Against Boxer

By JOHN HARWOOD

Staff Reporter of THE WALL STREET JOURNAL

PALO ALTO, Calif.—Two years ago, the election campaign ended in disappointment for Albert Chin. A Clinton supporter, he watched a late-breaking campaign-finance scandal cast a shadow over the new prominence of Asian-Americans in politics.

But this fall, Mr. Chin has reason to celebrate: the very real prospect that his fellow Chinese-American, Matt Fong, a Republican, could unseat Democratic Sen. Barbara Boxer in Tuesday's election. "It's very important," says Mr. Chin, a businessman who serves on the board of San Francisco's Chinese Hospital. "For all these years we really didn't have any representation."

His excitement, like that of the other Asian-Americans who packed a recent Fong fund-raiser here at Ming's Restaurant, suggests that the 1996 campaign-money controversy may prove to have had virtually no impact

on the rising political participation of Asian-Americans. Moreover, their enthusiasm for Mr. Fong could become a critical factor in one of the nation's key Senate races. A Field Poll released yesterday shows Ms. Boxer pulling out to a nine-percentage-point lead after a barrage of attack ads. Still, both candidates' strategists say their surveys show the race remains close enough that it could go either way.

Asian support "is going to be absolutely critical," says Mr. Fong, now California's state treasurer. Donations from Asian-Americans accounted for half of the \$3 million war chest that helped him win the GOP Senate nomination in June. (For the entire campaign through mid-October, he has raised \$8.8 million, compared with Ms. Boxer's \$13.5 million.)

In the general election, Mr. Fong's television ad campaign has featured Chinese-language spots aimed at snatching Asian-American votes away from Ms. Boxer's home base around San Francisco.

Though Asian-Americans represent just 6% of California's registered voters, Fong campaign aides say ethnic pride could help swell the proportion of those actually voting to 8% in an election that has given most voters here, as in other states, little reason to flock to the polls. Most are Democrats, but Mr. Fong hopes to a garner a solid majority of their votes.

Strategists for Ms. Boxer express doubt that the Asian constituency will prove that large on Election Day. But Republicans say Mr. Fong's ethnicity has paid dividends in other ways as the vulnerable Democratic incumbent attacks him as an opponent of gun control, abortion rights and environmental protection.

His status as a member of a minority group "makes the attack of being a right-winger less credible," says Sal Russo, a GOP consultant who is Mr. Fong's top strategist. For the same reason, a victory here could turn Mr. Fong into a valued spokesman for the national Republican Party.

However, the 44-year-old Air Force Academy graduate remains relatively inexperienced and has been squeezed between different GOP factions in the closing days of just the third campaign of his career. After news broke recently that he had donated money to a prominent con-

servative Christian group while fighting for the GOP Senate nomination, he quickly offered a public pledge of support for gay-rights initiatives. Ms. Boxer has pounced on the issue, which has riled both gay-rights Republicans and the religious right.

Mr. Fong, for his part, has fired back at Ms. Boxer for displaying "hypocrisy" in treating President Clinton's sex scandal more gently than earlier controversies involving GOP figures such as former Sen. Bob Packwood. And he has attacked his liberal-Democratic opponent for running "racist" TV ads that display Mr. Fong's picture alongside the words "foreign diplomat"; the ad, which the Boxer camp says has no racial connotation, argues that Mr. Fong favors giving managed-health-care executives the same immunity from lawsuits enjoyed by diplomats.

If the contretemps further energizes Asian-Americans to turn out for the GOP candidate, that would only underscore the contrast with the end of the 1996 campaign. Then, Republican presidential candidate Bob Dole railed against the "foreign aid" Mr. Clinton had received from illegal Asian sources. Last week, Mr. Dole was greeting Mr. Chin at the fund-raiser for Mr. Fong.



Barbara Boxer



Matt Fong

THE WALL STREET JOURNAL FRIDAY, OCTOBER 30, 1998

Global-Warming Treaty's Opposition Is Strained

By JOHN J. FIALKA

Staff Reporter of THE WALL STREET JOURNAL

WASHINGTON—The coalitions of oil, automobile, utility and other companies that opposed last year's global-warming treaty are showing some strain as talks to complete the pact are set to resume next week in Buenos Aires.

Some members are leaving the coalitions or repositioning themselves on the issue. One sign of the changed landscape is the American Automobile Manufacturers Association, whose members helped fund an anti-treaty television campaign on the eve of last fall's treaty deliberations in Kyoto, Japan. Now the AAMA is about to dissolve, and its largest member, General Motors Corp., has begun to work with environmental groups and joined a pro-treaty lobby association.

"Our main direction is to be constructive on this issue," explained John Williams, leader of GM's climate-issues team. "We need to be active in a wide variety of issues. It helps us influence the way things are going."

The giant auto maker's moves mean that this year it will be plotting strategies for lobbying on both sides of the issue. It is still a charter member of the Global Climate Coalition and the Business Roundtable, two large U.S. groups that oppose the treaty. But it has also joined the International Climate Change Partnership, a group of more than 40 companies and trade

associations working with the Clinton administration in support of the treaty.

"You are seeing a fair amount of reassessment," said Kevin J. Fay, executive director of the Washington-based group, which, he said, has doubled its membership in a year. Joseph M. McGuire, chief regulatory analyst for AlliedSignal Inc., said belonging to the group allows his company to get inside the process.

Connie Holmes, head of the anti-treaty Global Climate Coalition, said it, too, hopes to follow the process more closely. If a treaty limiting emissions of such "greenhouse gases" as carbon dioxide is ratified, she noted, emissions trading will be very important to many GCC members. Such trades would allow companies that don't meet carbon-dioxide emissions quotas to buy excess-emission certificates from those that do. "The rules for that, oh Lordy, are really important," she said, referring to the main item looming on the agenda in Buenos Aires.

Two major oil companies, British Petroleum Co. and Royal Dutch/Shell Group, have recently dropped their GCC memberships because of its opposition to the treaty, and some other large members are said to be considering following suit. "You're beginning to see the logs breaking up and a return to forward motion domestically on this issue," said Fred Krupp, executive director of the Environmental Defense Fund, which is helping BP design its own emissions-trading system.

Still, U.S. negotiators, led by Undersecretary of State Stuart Eizenstat, will find plenty of logs in their way in Buenos Aires. They include a Republican-led congressional delegation, most of which is opposed to ratifying the treaty, and a European Union proposal to limit the amount of international trading that a nation can use to meet its emissions quota.

The U.S., which may have to cut its emissions by 30% below 1990 levels to meet its treaty obligations starting in 2008, wants unlimited trading to ease the cut's economic impact and provide incentives for more-efficient uses of fossil fuels. Mr. Eizenstat said in a news briefing yesterday that he hopes to avoid a fight over the issue in Buenos Aires. But the U.S. is prepared to wage one, he added, with the help of Japan, Canada, Russia and other allies.



International Federation of Industrial Energy Consumers
North America

1110 N. Glebe Road, Suite 610 • Arlington, VA 22201 • Ph (703) 276-0600 • Fx (703) 276-7662

December 5, 1997

MEMORANDUM

TO: Distribution List

FROM: James M. Childress *JM*

SUBJECT: Letter to President Clinton

Attached is a letter IFIEC sent to President Clinton last week on climate change.

Attachment



International Federation of Industrial Energy Consumers

North America

1110 N. Glebe Road, Suite 610 • Arlington, VA 22201 • Ph (703) 276-0600 • Fx (703) 276-7662

November 26, 1997

President William J. Clinton
The White House
Washington, DC 20500

Dear Mr. President:

The International Federation of Industrial Energy Consumers represents U.S. manufacturers in energy intensive industries such as aluminum, steel, chemicals, cement and paper. Increases in the cost and availability of energy and power can severely impede the ability of major industrial energy consumers to compete on world markets and to provide well-paying jobs to millions of Americans. It is for this reason that we wish to share with you our views and concerns about the effect that upcoming climate change negotiations in Kyoto could have on our industries.

First, we agree with you that climate change is a global issue and all countries — developed and developing — must participate in any international treaty.

We also agree that many of the near term elements of your Stage 1 proposal — incentives for increased energy efficiency, electricity restructuring, and a review of the science and economics of climate change — could offer a way forward regardless of the outcome of the Kyoto negotiations. Prudent public/private sector cooperation under Stage 1 could move the U.S. along a path toward greater energy efficiency while gaining better knowledge of the science of climate change and the consequences of alternatives being put forward to address the issue.

However, committing the U.S. to a binding emission reduction target in the 2008-2012 period is not warranted and will not work. It is not warranted given current understanding of the science of climate change. It will not work given the enormous cost required to turn over the current capital stock to achieve these reductions over a short period of time. We have looked carefully at emissions trading proposals which are offered as a “market-oriented” means of reducing emissions. We do not find them sufficient to reduce greenhouse gas emissions without serious economic dislocations and loss of international competitiveness. For energy intensive industries a greenhouse gas tradable permit program would amount to energy rationing. We have enclosed a white paper that clearly outlines our thoughts on this matter.

A better way forward is through voluntary agreements between government and industry. They are preferable to tradable permit programs because they are based on mutually defined goals between the private and public sectors that provide industry with the flexibility to attain the goals by their own means. Setting a goal and providing flexibility to achieve the goal reflects the principles and methods industry uses and understands. Voluntary agreements are attractive to

government because they will make the best use of initiative and innovation by industry in achieving common goals.

Coupling voluntary agreements with technology development efforts under the Stage 1 proposal you outlined last month will provide a realistic, cost-effective way of bringing new technology into the capital stock of U.S. industry. Only as capital stock turns over can the next generation of technologies — the only real solution to climate change concerns — be introduced on a wide scale, bringing with it the increases in energy efficiency envisioned in your October 22 proposal.

Because energy is an important element in the cost of our products, we have a continuing, long term record of reducing energy consumption per unit of output. We believe that record can and should be extended and improved upon. Joint government-industry voluntary agreements offer the way forward. We offer our support and consultation in efforts to bring this about.

Very sincerely yours,

A handwritten signature in black ink, appearing to read "James M. Childress". The signature is fluid and cursive, with a long horizontal stroke at the end.

James M. Childress
Executive Director

Enclosures

International Federation of Industrial Energy Consumers North America

White Paper

Voluntary Industry Agreements — A Cost Effective Way to Address Greenhouse Gas Concerns

IFIEC represents industries where energy consumption is a significant proportion of total production costs and energy is therefore a key factor in competitiveness. IFIEC believes that choice, flexibility and responsible energy management are the necessary ground rules for competitive and sustainable industrial activity.

The time has come to expand the use of voluntary agreements between government and industry to address greenhouse gas concerns. They are preferable to emissions cap and trade programs, energy rationing, carbon/Btu taxes, or emissions/mandatory efficiency standards now being proposed. Voluntary agreements are attractive to business because they are based on mutually defined goals between industry and government that provide industry the flexibility to attain the goals by their own means. Setting a goal and providing flexibility to achieve the goal reflects the principles and methods industry uses and understands. Voluntary agreements are attractive to government because they will make the best use of initiative and innovation by industry in achieving common goals.

Voluntary agreements are recommended for a variety of reasons:

First, they work, with a history of success in Europe and the U.S. An example is the European Directive on Environmental Management and Audit Scheme (EMAS) and the ISO 14000 series which provide an opportunity for companies to meet or exceed environmental objectives while competing in world markets successfully.

Second, they are cost effective. Energy is a cost factor for industrial energy consumers and reduction of cost and improvement in energy use are consistent with sound business practice. This is a goal that can be supported by both government and industry, tying environmental success with good economic practices.

Third, by leaving achievement of goals up to individual companies, voluntary agreements encourage innovation and lowest cost approaches to environmental improvement. They allow for testing of a wide range of possible options, and concentration on those that work best. In this regard, they take advantage of private sector knowledge, initiative and technical and business expertise.

Fourth, voluntary agreements permit incremental steps along an energy efficiency path that allows for mid-course corrections in the event that conditions change from those that

existed when the agreements were first drafted. This enables participants to respond quickly without the need for time consuming regulatory or legislative changes.

Fifth, the agreements provide a means of achieving environmental improvement without loss of competitiveness. By bringing government and industry together in a cooperative partnership, they allow industry to identify possible efficiency paths that will provide reduced emissions per unit of output without loss of international competitiveness.

Key Components of a voluntary agreement program include:

Goal — Increased energy efficiency (reduction in energy consumed per unit of product) within a given time frame should be the overall goal of voluntary agreements. They should take account of all energy input (less feedstocks) and all product output. The goal is not a legally binding target, but is established by industry consensus developed in discussions between affected industries and government. The resulting goal reflects a proper balance of environmental improvement, economic realities, industry capabilities, status of technology and societal and government expectations.

Goals should be flexible to take into account the impact on changing economic conditions of participating industries, their competitiveness and world energy markets.

Scope — Voluntary agreement goals should be industry-specific and industry-wide to avoid competitive issues. Monitoring and reporting should also be on an industry-wide basis with individual companies providing data through trade associations or other credible third parties. This is a cost-effective, proven means of gathering such data and is necessary because publication of individual company data may raise competitive issues. This is also important in convincing individual companies to “buy into” the voluntary agreement by working within their individual industry’s structure and organizations.

A voluntary agreement program should be flexible to allow companies to report on an individual basis (in addition to reporting on an industry-wide basis) if they wish to take credit for specific actions or emissions reductions achieved in the event that legally binding reductions are enacted and enforced.

Industry-Government Interaction — A formal annual dialogue between industry and government should be established involving individual companies (or trade associations) and the government bodies responsible for energy, trade, commerce and environmental policies.

Incentives — An effective voluntary agreement program should include incentives focusing on improved energy efficiency, accelerating capital stock turnover, and encouraging research and development.

For more information contact: International Federation of Industrial Energy Consumers, 1110 North Glebe Road, Suite 610, Arlington, VA 22201 ph. (703) 276-0600, fx. (703) 276-7662

International Federation of Industrial Energy Consumers North America

White Paper

A CO₂ Cap and Trade System – Energy Rationing for Industrial Energy Consumers

Introduction

One concept being promoted to help cut greenhouse gases emissions both at the national and international levels is a “cap and trade” system (also referred to as tradable allowances, tradable permits, or tradable emission rights) that would allocate emission permits among sources which could then buy and sell the permits on the open market. Cap and trade advocates assert that tradable permits can provide a “market-based” solution that is the most efficient, cost effective way to cut emissions of greenhouse gases (GHG). This assertion does not hold up under scrutiny. For energy-intensive industries a cap and trade system is not market-based, but instead amounts to energy rationing that will cap economic growth.

Basics of a cap and trade system

In order for a cap and trade system to operate, a legally binding limit must be placed on total carbon emissions. Proposals range from achieving 1990 emission levels by the year 2010 to fifteen percent below those levels. Permits for total emissions that do not exceed the cap would be allocated to sources (plants or companies) according to a predetermined formula, most likely based on emissions in a given year. Each permit would allow a source to emit one ton of carbon equivalent per year. After being allocated, permits could be used immediately, banked for future use, bought or sold.

Permits could be issued in one of two ways — either to energy producers or directly to energy consumers. If permits are issued to energy producers (petroleum, natural gas, coal companies) the effect will be similar to a carbon tax, raising fossil fuel prices. Energy producers would compete for the limited number of permits, incurring costs (related to limitations of energy availability and the cost of GHG emission permits) which would be passed on to consumers.

If permits are issued to energy consumers, the system would be vastly more complicated, but the end result would be the same, rising energy costs as sources with growing energy needs bid for a fixed number of permits. Facilities or companies lacking sufficient permits to operate using existing capital stock could scale back production, buy permits on the market, or relocate to a country not operating under a cap. The price of permits would be set by supply and demand, or by government. Facilities or companies able to reduce emissions below their initial allocation could bank permits for future use or sale. However, it is unlikely that banking could be of value to industrial energy consumers if the base is 15% below

1990 emissions. It would be extremely difficult to accommodate economic growth and return emissions to some past level simultaneously.

Implications for energy intensive industries

Because the emissions cap would likely be permanent (total annual CO₂ emissions could not exceed a level set by international treaty), the finite number of permits would become more scarce, and more expensive, each year as industrial output and energy consumption grow.

As the cost of permits grows in tandem with energy demand (and increasing CO₂ emissions) so too would the cost of doing business. Energy intensive industries operating under the GHG emissions cap would be at a competitive disadvantage to industries in developing nations not under the cap.

The cost of using fossil fuels (the purchase price plus the cost of permits) would rise. Energy markets would be distorted. As an example, higher demand for natural gas (a lower carbon fuel) would drive up its price and feedstock costs.

The rising cost of using energy would redirect capital of affected industries from investment in developed nations. Capital and jobs would flow to those developing nations not under the emissions cap and trade program.

Under a cap and trade system, energy producers will pass the higher cost of energy and permits on to consumers. This will be problematic for industrial energy consumers who already face stiff international competition and will not be able to pass on all of the increased costs to their customers.

Companies and industries that have previously invested in energy efficiency will be at a disadvantage to those that have not, rewarding inaction and penalizing those who have acted responsibly.

Implications for greenhouse gas reduction efforts

If the permit system applies only to developed nations, GHG emissions, along with capital and jobs, will flow from developed to developing nations, whose emissions are expected to grow at a rate almost three times that of developed nations without the cap and trade system. With cap and trade in place for developed nations only, this trend can be expected to accelerate.

The cost of permits will redirect capital in energy intensive industries from development of newer, more efficient technologies that are the long term solution to reducing the rate of growth of GHG emissions by industrial energy consumers.

The millions of sources that emit approximately two-thirds of GHG emissions (transportation and residential/commercial) will not be able to participate in a cap and trade system that issues permits at the consumer level because the sheer number of individual sources would render the system unmanageable.

Practical implications — a large scale system that addresses all sources is unmanageable

Cap and trade advocates cite the U.S. sulfur dioxide trading system as a successful model for a GHG permit system. This comparison is not valid. First, the U.S. SO₂ trading system regulates a relatively small number of sources, just over 100 large utility power plants. The regulatory system is relatively simple compared to that required to oversee millions of CO₂ sources in the industrialized nations, or worldwide. Second, the regulated utilities have been allowed to pass on their costs to the ultimate consumer, something industrialized energy consumers would not be able to do in a competitive international market. Finally, the options for cutting SO₂ emissions are well known — end of stack or process controls or fuel switching. Unlike SO₂, there is no cost effective means to remove CO₂ from combustion gases. And large scale switching to lower carbon fuels to cut CO₂ emissions will drive up natural gas prices, distorting energy markets.

The allocation and trading of permits would require strict oversight, management and enforcement. For international trading this would require unprecedented regulation and rationing of world energy markets by the United Nations. A tradable permit needs to be a financial instrument that can be bought and sold, requiring financial and volume integrity no different than that of a crude oil futures contract. However, there is no identifiable third party at this time to guarantee that the permit traded on the market is the equivalent of a ton of carbon reduced and guarantee the ton was actually reduced!

Proponents suggest that emissions reductions in developing nations can be achieved at less cost than equivalent reductions in developed nations. That is likely. However, this would require developing nations to accept an emissions cap, something they have refused to do.

Conclusions

A GHG cap and trade system of this scale has never been tested and imposing it on the world's economies would be risky and premature. It would distort energy supply and demand, and rather than being "market-oriented" is in the truest sense "command and control". A permit system picks energy winners and losers based on the number of carbon atoms in a fossil fuel molecule. Sound policy should instead encourage voluntary actions, technology development, energy market liberalization, energy price transparency, diversity of energy supply, competition among and between fuel sources, and optimal use of natural resources.

An emissions cap and trade system will limit economic growth not only among industrial energy consumers but for the U.S. economy as a whole. It will bring hardship to American workers whose jobs will be exported to developing nations not subject to the system.

In summary, cap and trade is not market-based, but amounts to energy rationing; it will put industrial energy consumers at a competitive disadvantage and is not workable. Worse yet, it diverts capital from the only true long term solution to climate change concerns — new technology.

For more information contact: International Federation of Industrial Energy Consumers, 1110 North Glebe Road, Suite 610, Arlington, VA 22201, phone (703)276-0600, fax (703) 276-7662



A Global Energy Technology Strategy

To Address Climate Change

November 25, 1997

Mr. Jeffrey A. Frankel
Member Council of Economic Advisors
17th & Pennsylvania Avenue, NW
Room 314
Washington, DC 20502

Dear Mr. Frankel:

We wanted to thank you for your participation in the kick-off meeting of Battelle's Technology Strategy Project in Washington. We believe that it was a highly successful first meeting and hope that the presentations and discussions provided guidance on what we are seeking to accomplish.

At the end of the meeting, three participants summarized the days proceedings. Several areas of consensus appeared to emerge and are described below.

I. Strategic Emphasis

- The project must be extremely focused. Given the enormity of the task in developing a technology strategy to address climate change, it is essential the project not attempt to address every issue that is raised.
- Following the proceeding point, the project must be niche-oriented.
- The project should be strategically oriented and not be overly proscriptive. It was stated that if the documents that evolve from the effort provide general guidance, the market-place and the entities responsible for addressing the climate issue would get it right.

II. Realism is Important

- The economic and technological assumptions that are utilized during the knowledge building and strategy development must be realistic. For example, the IS92a scenarios utilized by the IPCC are extremely optimistic and it is not clear as to whether these scenarios are being achieved.
- The project should not pay undue attention to the politics surrounding the climate issue. As mentioned early in the day, the staff of the project believes that the climate issue is a long-term issue and that technology development and diffusion is an essential component of any strategy to address greenhouse gases, regardless of what emerges from Kyoto.

III. Do Not Pick Winners and Losers

- There was lengthy discussion on this point. Most project participants articulated that this project should not be on record in support or opposition to specific technologies. However, there appeared to be some agreement that the project could provide some value by identifying areas of unproductive resource allocation.

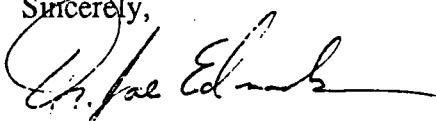
IV. Partnerships Are Key

- The project believes that this effort is unique because there is participation from such a broad array of affected communities. Results of the effort will only have a major impact if all interests are represented and are reasonably comfortable with the strategy that is ultimately developed. We are attempting to form partnerships between industry, government, non-governmental organizations and the scientific and economic communities.

These were the broad areas of agreement that were reached during the discussion. During the meeting, several participants inquired about the products which would be developed during the effort. Attached for your review is a description of the products and timelines for their completion.

Once again, thank you for your time in attending the first meeting of the technology strategy project. If you have additional questions, please do not hesitate to contact either one of us. We look forward to your continued participation in this effort.

Sincerely,



Dr. Jae Edmonds



Richard H. Rosenzweig

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**ACTIVITIES TO DEVELOP
AN ENERGY TECHNOLOGY STRATEGY
FOR RESPONDING TO CLIMATE CHANGE**

**An Outline of Projects to Be Undertaken Within
A GLOBAL ENERGY TECHNOLOGY STRATEGY
TO ADDRESS CLIMATE CHANGE**

An International, Public/Private Collaboration

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August, 1997

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ACTIVITIES TO DEVELOP AN ENERGY TECHNOLOGY STRATEGY FOR RESPONDING TO CLIMATE CHANGE

I. TECHNOLOGY ASSESSMENT

• GLOBAL ENERGY SCENARIOS

Objective:

This task will develop reference global emissions scenarios which could be used as an external point of reference for regional studies. The focus of this activity will be to map out the variety of different technology backgrounds against which regional scenarios might develop. The first half of the next century will be characterized by an energy transition to one of three alternative regimes: coal, oil & gas, or non-carbon energy forms. The purpose of this activity will be develop a set of scenarios which can be used by regional analysis teams. Scenarios will include both reference and policy scenarios.

Products:

- 1) Report on reference scenarios – different energy regimes, different growth assumptions

Approach:

This activity will employ a single integrated assessment modeling team with the charter to develop an new scenarios.

Coordination:

- EMF-98 Scenario Development
- IPCC Emissions Scenario Development

• R&D TRENDS

Objective:

The goal of this activity is to assess the present and recent trends in energy R&D.

Products:

1. Report

Approach:

This activity will employ a small research team charged with surveying the literature.

Coordination:

- IEA/OECD

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• REGIONAL TECHNOLOGY ASSESSMENT

Objective:

The goal of this activity is to lay down the statistical foundations for the development of regional energy projections and subsequent analysis.

Products:

1. Technology Data Base—A description of current technologies by sector, average age, average efficiency, and efficiency of new investments
2. Technology Analysis—Comparison of current technology characteristics to OECD average and best available technology.

Approach:

This activity will reach out to regional partners, particularly in the non-OECD nations, to develop the statistical basis for technology analysis. Countries which have been identified as potential partners include:

- ∞ **China**
- ∞ **Russia**
- ∞ **India**
- ∞ **Korea**
- ∞ **Mexico**
- ∞ **Brazil**
- ∞ **Indonesia**
- ∞ **South Africa**

The SGM model will be used as a common format in which data can be assembled. Partners will be chosen which can collaborate in the development of exercise of the SGM.

Coordination:

- **IPCC**--*The IPCC has developed technology inventories, but these have not been regional in character.*
- *Harvard China Project*

• REGIONAL ENERGY PROJECTIONS

Objective:

The goal of this activity is to develop a new set of baseline emissions scenarios relevant in the absence of further climate policies, and incorporating explicit technology assumptions, and capable of addressing macro emissions and cost implications of alternative technologies and policy regimes.

Products:

- 1) Reference scenarios – high, best guess, low (at least);
- 2) Qualitative description of the factors affecting high, best guess and low scenarios;

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- 3) Technology characteristics of the scenarios; and
- 4) Analysis of where technology development could make a difference in stabilizing the atmosphere.

Approach:

This activity will develop a better assessment of the role of capital stock turnover, and the mechanisms by which technology diffuses. Regional modeling teams will be engaged to consider the value of technologies and technology development and diffusion. The activities of the regional participants will reference the "Global Emissions Scenarios" component of the project.

International teams of researchers will be sought in such nations as:

- ∞ **China**
- ∞ **Russia**
- ∞ **India**
- ∞ **Korea**
- ∞ **Mexico**
- ∞ **Brazil**
- ∞ **Indonesia**
- ∞ **South Africa**

Emphasis will be placed on regions which are of particular importance to achieving the goal of the Framework Convention on Climate Change (FCCC).

Relationship to the IPCC and EMF Emissions Scenario Development Projects—The IPCC is currently engaged in the development of new, interim scenarios. These scenarios are intended to reflect the dispersion of emissions scenarios observed in the open literature and to incorporate information that has come to light since the 1992 scenarios were developed, especially developments in Transition economies. This activity will support the work of an EMF subgroup developing a forum in which regional and global scenarios can be assembled. That process will eventually supplant the IPCC interim scenarios.

Coordination:

- *EMF-98 Scenario Development*
- *IPCC Emissions Scenario Development*
- *Harvard China Project*

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• TECHNOLOGY OPPORTUNITIES—GAP STUDIES

Objective:

This task will examine the potential for technology developments to make a difference in the cost of emissions mitigation.

Products:

1. Analysis of different technology paths for areas in which technology could make a difference—near-term, mid-term, long-term.
2. Macro analysis quantifying the potential impacts of different technology developments

Approach:

This activity will identify R&D opportunities associated with carbon management technologies, at various stages in the development process – market oriented, intermediate, and basic research – which show the potential for reducing cost and enhancing performance in the delivery of energy services. Workshops including leading analysts will be convened to consider the state of the science and to make recommendations. Activities which will be considered include:

- ∞ Carbon Capture Sequestration
- ∞ Biomass
- ∞ Solar—Wind, PV, etc.
- ∞ Nuclear Fission – can we say anything new?
- ∞ Fuel Conversion—H₂, membrane technology, fuel cells, batteries
molecular science
- ∞ New Technologies – Geothermal, Fusion, or Solar Power Satellites
- ∞ Transportation

Coordination:

- MIT, *Technologies for a Greenhouse Constrained World*
- IPCC Technology Project
- Princeton University

II. TECHNOLOGY STRATEGY

• POLICY & INDUCED TECHNOLOGICAL CHANGE

Objective:

This activity will explore the relationship between energy policy and induced technological change.

Products:

- 1) Technology Life-cycle--Timing of technology production and diffusion
- 2) Assessment of endogenous technological change.

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Approach:

This activity will examine the problem of induced technological change. It will consider the stages of technology development, the inherent time requirements for technology to penetrate, and the degree to which policy affects technology development and diffusion.

Coordination:

- *Resources for the Future*

• **HISTORICAL ENERGY TECHNOLOGY POLICY**

Objective:

This activity will review the success of past energy technology policies. It will seek lessons that may be useful in developing a new energy technology initiative.

Products:

- Reports—Reviewing energy and technology policy since World War II
 - a) US
 - b) Japan
 - c) Europe
 - d) China
 - e) Korea
 - f) India
 - g) Mexico

Approach:

A series of analyses will be chartered taking a retrospective look at energy policy in a variety of national settings. Researchers will employ a historical perspective, examining such policy initiatives as Project Independence, the synfuels program, the development of the new gas turbine technology, and the PINGV. A similar examination will be undertaken for Japan, Europe, and developing nations. The activity will include both research and workshops to examine the question.

Coordination:

• **ENERGY TECHNOLOGY POLICY ANALYSIS**

Objective:

This activity will examine the implications for energy technology of a variety of policy instruments.

WORKING DRAFT—NOT FOR DISTRIBUTION

Products:

- 1) Report on the implications of the Kyoto COP-4
- 2) Reports on technology focused protocols
 - Targets & timetables for technology
 - Technology regulatory protocols
- 3) Reports on other analysis as appropriate

Approach:

This activity will examine the implications for energy technology of various policy instruments. It will begin by considering the implications of FCCC Conference of the Parties meeting in Kyoto in December of 1997. It will give particular emphasis to the problem of stranded assets, including both capital stocks, and resources such as conventional oil and gas. It will move to extend consideration of the implications of a variety of alternative technology based protocols, again giving particular emphasis to the problem of stranded assets, including both capital stocks, and resources such as conventional oil and gas. Given the evolving nature of the climate issue, this activity will take up other policy and technology issues as they arise.

Analysis will employ integrated assessment models (IAM) to understand the relationship between energy, technology, economic activity, and climate.

Coordination:

- EMF

- **ENERGY TECHNOLOGY DIFFUSION POLICY**

Objective:

This activity will explore the relationship between energy technology and energy policy.

Products:

1. Making JI work

- **THE TECHNOLOGY STRATEGY**

This activity will produce a technology strategy by bringing together a group of senior, thoughtful individuals who are presented the findings of the assessment, and who are charged with the responsibility of framing a strategy.

Products:

1. The technology strategy.

WORKING DRAFT—NOT FOR DISTRIBUTION

PROJECT BUDGET

ESTIMATED LEVEL OF EFFORT FOR THE PROJECT

1998	\$2,000,000
1999	\$2,000,000
2000	\$1,500,000

FUNDING

The project is a multi-sponsored activity with two levels of sponsorship. Major sponsors are those sponsors who provide \$250,000 per year or more over the life of the project. Major sponsors help guide the development of the project and participate in the creation of the Technology Strategy Document as well as participate in the annual description of progress and receive the analytical products of the project.

Contributing sponsors are those which provide support at less than \$250,000 per year or more over the life of the project. They participate in the annual description of progress and receive the analytical products of the project.

Support from both public and private sponsors is welcome.

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Where We Stand:

BP's Climate Change Principles

INTERNATIONAL AGREEMENTS:

- The solution to climate change requires a global long-term framework that encompasses industrialized and draws in developing nations.
- The framework should allow space for differing national circumstances and should give equitable weight to the developing world's particular interests.

BINDING COMMITMENTS:

- We all have a responsibility to take constructive, precautionary action.
- Any legally binding commitment on emission levels should include a package of flexible international mechanisms to enable efficient implementation.
- Adequate time should be provided to allow for effective turnover of capital stock.

TARGETS AND TIMETABLES:

- Targets and timetables are useful tools to help business deliver long-term results.
- Targets and timetables for greenhouse gases should be realistic and achievable for all nations.
- There should be a thorough and comprehensive target setting process for international negotiations. BP does not seek a role in setting specific targets.
- Nations should earnestly pursue specific targets and timetables but recognize that finding solutions is a lengthy journey, with success defined by numerous decisions taken over a series of international conferences.

MONITORING AND REPORTING:

- An international measurement protocol for greenhouse gases is required.
- Emission levels should be reported in an open and transparent manner.

FLEXIBLE MECHANISMS:

- Flexibility is necessary to allow for innovation and creative solutions; to maintain competitiveness; to handle new and changing information; and to allow approaches to remain relevant over time.
- Better and more efficient solutions, employing both technology and sequestration, flow from responsible behavior and the marketplace. Emissions trading and joint implementation are two flexible international mechanisms that should be employed.
- Voluntary actions can be integrated into business plans and substantially reduce emissions. Rewards and incentives can enhance delivery. Ultimately, they may not be enough, with some mandatory steps required.
- Any mandatory national approaches should be performance-based with governments setting broad objectives and businesses delivering creative, cost effective results that continually improve, while ensuring accountability.

EARLY ACTION AND CREDIT:

- Although managing emission levels is a long term process, near term reductions will have a positive contribution and should be encouraged.
- Governments should give incentives for near term reductions and provide credit against future obligations that may arise.

TECHNOLOGY DEVELOPMENT AND DEPLOYMENT:

- Moving the world toward less carbon intensive emissions requires technology that should become available for broad application.
- A comprehensive international strategy is needed to effectively develop and deploy technology that can transform the world to a low-carbon emission structure. Present solutions involve a substantial cost premium. A concerted effort is required to find and apply cost effective technology.
- A strategy developed through international collaboration and public/private partnerships can lead to better resource allocation for finding climate solutions.

INCLUSIVE DECISION-MAKING:

- All parts of society should have the opportunity to have their needs and priorities taken into account.
- BP will continue to be available to contribute to the debate.

For more information contact:

Ken Blower 212-421-5010 or visit our home page: <http://www.bp.com>

AUTO MAKERS PLAN CUTS IN EMISSIONS OF SPORT VEHICLES

CRITICISM IS ADDRESSED

Ford Says '99 Models Will Be 40% Cleaner Than in '98; Chrysler Soon Follows

A1 By KEITH BRADSHER

DETROIT, Jan. 5 — The Ford Motor Company announced today that this autumn it would start selling sport utility vehicles and Windstar mini-vans that would produce as little air pollution as cars. The Chrysler Corporation, after initially expressing reservations, said this evening that it would match that move in its most popular sport utility vehicle.

Ford said it would install larger and more effective catalytic converters and fine-tune its engines so all of its 1999 model-year sport utility vehicles and Windstars — nearly a million vehicles — emit roughly 40 percent less in smog-causing gases like nitrogen oxide than the comparable 1998 models now on the market.

"On emissions, anyway, there will be nothing to feel apologetic about in driving a sport utility vehicle," said Alexander Trotman, chairman and chief executive of Ford, the world's second-largest auto maker. Mr. Trotman was addressing recent criticism that, because of special favors from Washington, sport utility vehicles are allowed to emit as much as 175 percent more nitrogen oxides than even the largest cars.

Ford said it did not plan to charge extra for its cleaner vehicles, choosing instead to look for other cost savings, said Jacques Nasser, Ford's president of worldwide automotive operations.

The Ford initiative initially drew little enthusiasm from rival auto makers. Thomas Stallkamp, Chrysler's president, said he doubted that Americans wanted cleaner vehicles enough to pay the \$50 to \$200 extra per vehicle that he estimated it would take to reduce emissions from existing engines. "Keeping our manufacturing costs as low as possible is important to us," he said.

But later in the day, Chrysler announced that all 1999 Jeep Cherokees

and Grand Cherokees, which will have new engine designs, would be as clean as Ford's sport utility vehicles. Chrysler sold roughly 130,000 Cherokees and 260,000 Grand Cherokees last year.

Michael A. Grimaldi, vehicle line executive for pickup trucks and sport utility vehicles at the General Motors Corporation, the world's largest auto maker, said his company had the technology to reduce emissions as much as Ford, in some cases for the 1999 model year. Executives are reviewing whether to do so, he added. G.M., Ford and Chrysler together produce five of every six light trucks, a category including sport utility vehicles, mini-vans and pickups.

All of Ford's sport utility vehicles — including the Ford Explorer and Expedition, the Mercury Mountaineer and the Lincoln Navigator — will be cleaner next year. Ford sold 650,000 such vehicles last year, as well as 200,000 Windstars, and expects to sell even more sport utility vehicles in the coming years.

Ford's 1998 model light trucks are already the cleanest in the industry because of recent advances in engine technology. Other auto makers produce sport utility vehicles that are far dirtier and could have a harder time following Ford's example. A Chevrolet Suburban, for example, produces three times as much in smog-causing nitrogen oxides as a Ford Expedition, which is only slightly smaller. G.M. is close to introducing more advanced engines.

Mr. Nasser of Ford declined to discuss the company's costs for the move, which will include some investments in new factory equipment and greater purchases of precious metals like platinum and palladium, which are used in catalytic converters.

Industry experts estimated Ford's costs at a little over \$100 per vehicle, or about \$100 million in the first year, and possibly less thereafter. Ford earns up to \$14,000 apiece on the Navigator and more than \$3 billion a year in profits on light trucks but loses money on its cars.

In addition to producing more air pollution than cars, sport utility vehicles typically burn a lot more gasoline. Because of that, they produce more gases that are thought to contribute to global warming. And because they weigh more than cars and ride higher off the ground, they tend to be particularly deadly to occupants of other vehicles in crashes.

Mr. Trotman said Ford was working to develop lighter, fuel-efficient sport utility vehicles.

Mr. Nasser said in a speech here that Ford's decision to build cleaner sport utility vehicles would do more to clean up the air in the United States than recent plans by the industry to offer cars running on electricity and other nontraditional fuels early in the next century. "This year we'll offer cleaner, gasoline-powered

vehicles that in the near term should have a greater impact on urban smog problems because of their much higher sales volumes," he said.

Mr. Nasser made clear in an interview that Ford wanted to maintain the acceptability of sport utility vehicles as alternatives to cars, while gaining an advantage over rival auto makers in catering to environmentally aware families. "Anybody who has concerns about the environment can set them aside," Mr. Nasser said, adding that Ford had also been influenced by recent articles in The New York Times on the environmental problems of light trucks.

Ford is not planning to reduce emissions immediately for its slow-selling Mercury Villager mini-van, an old design, or for its pickup trucks, which are locked in a fierce competition on price with G.M. and Chrysler pickups.

Federal emissions regulations on

Changes that could clear the consciences of some gasoline guzzlers' drivers.

cars and light trucks are likely to be tightened, but not until 2004. Auto makers had also been considering unilateral improvements in emissions for cars and light trucks in exchange for a commitment from state governments not to impose even tougher standards in the future.

Ford and Chrysler said they would proceed with their plans regardless of those talks but said they were not committing themselves to further improvements nationwide. Toyota, the largest foreign brand seller of sport utilities in the United States, said tonight that it would wait to see what became of those negotiations before changing its vehicles' emissions.

Loretta M. Ucelli, an associate administrator of the Environmental Protection Agency, welcomed today's move by Ford, while cautioning that the agency wanted to study the technical details.

Ford said that no matter where in the nation these vehicles are sold, all will meet the stringent emissions standards being phased in by California for light trucks. Those standards are not as strict as the state's standards for cars. But the California light truck standards are similar to Federal standards for cars, and allow less than half as much pollution as Federal standards for light trucks.

California proposed last month to require light trucks to meet its even stricter air pollution standards that will be in force for cars in 2004. Ford remains opposed to such a measure, said Kelly M. Brown, Ford's director of vehicle environmental engineering.



Stephen Crowley/The New York Times

President Clinton credited the hard work of the American people, and his own policies, for the deficit reductions that led to his announcement that he would propose a balanced budget for 1999. He met with his economic advisers yesterday, from left, Franklin D. Raines, the budget director; Erskine B. Bowles, his chief of staff, and Vice President Al Gore.

2/17

The New York Times

TUESDAY, JANUARY 6, 1998

Relief Teams Say North Korea Faces Vast Drought Emergency

Millions May Now Be at Brink of Starvation, Specialists Report

By BARBARA CROSSETTE

UNITED NATIONS, Aug. 4 — Relief officials allowed to visit North Korea over the last several weeks say that a drought may be pushing millions of people in the reclusive country to the brink of starvation and that they have not seen such severe malnutrition since the famines in Ethiopia and Somalia.

The drought — more than 60 days with no rain and temperatures in the 90's — arrived after food stocks were already severely depleted by two years of floods and decades of economic ruin wrought by the most bizarre of Communist systems, which is now struggling to feed itself without allies.

The relief officials acknowledged that they could not move freely in North Korea and that their visits were tightly controlled by Communist authorities, making the extent of what some experts have called an "invisible" catastrophe hard to gauge. North Korean officials themselves, who have long tutored their population in a philosophy of self-reliance, often appear ambivalent about how dire a picture they want to paint for the outside world.

Foreign reporters are barred from visiting the country.

There have been mounting reports in recent months of widespread food shortages. But the drought of the last two months, American Government and relief officials said, has significantly worsened the situation.

"It appears the North Koreans are going from bad to worse," a senior American official in Washington said today. "They were dead on their feet economically for years. Then came the floods. Then a drought."

The official acknowledged that the United States does not yet have a full grasp of the extent of the food shortages, but he said, "What we do know is that there is serious malnutrition across the country. I have no doubt that there are people on the verge of starvation, no doubt at all."

The reports of the aid specialists who visited Korea were uniformly bleak. In interviews since their return, officials from international groups and private agencies described skeletal people living each day on "a fistful" of rice and children too weak to stand.

"We saw children in institutions who are at the level of malnutrition comparable to the mid-80's drought in Ethiopia," said Dr. Milton Amayun, a physician who had just returned from conducting the first systematic measurements of children to determine their level of malnutrition.

Trevor Rowe, spokesman for the

Continued From Page A1

United Nations World Food Program, came to a similarly grim conclusion. "The difference is that in Ethiopia and Somalia you had pockets that were affected because of drought or war, but it wasn't a generalized phenomenon," he said. "In North Korea it is far more generalized. As the food goes down, everyone is suffering."

Most relief specialists permitted to enter were limited to seeing institutions where their own aid money was spent, and spontaneous visits to private homes were rare. But most aid officials now returning from a third or fourth trip say they have seen the health of North Koreans deteriorate on each visit.

"During winter, malnutrition is sometimes camouflaged" by many layers of clothing, said Dr. Amayun, who toured the country for World Vision, a private group. "But now in summer, we could really tell how stunted they were and how thin were their arms and legs."

Today four United Nations agencies and two independent groups said in a joint statement that the drought had already cost North Korea 70 percent of this year's corn crop, withering virtually all plants not irrigated. Falling water levels will soon threaten rice crops as well, they said.

The country of 24 million people, most of whom are already subjected to strict food rationing, had hoped to harvest four million tons of food this year. Projections now show that at least 1.5 million tons will be lost.

The United States has given North Korea \$60.4 million in food aid since September 1995 and is prepared to contribute more if necessary, a State Department official said. But the

Children are being abandoned by their parents because they cannot be fed.

United States, which has no diplomatic representation in North Korea, is also pressing Pyongyang to allow Americans to monitor future shipments and to assess the situation in the country. Officials in the United States, South Korea and other Asian nations have expressed concern that a potentially huge number of people could try to flee North Korea in desperation.

The relief officials who recently returned from North Korea said that in July the sights in the countryside were startling.

"Flying over the northeast in a chopper from Pyongyang to Hamhung and Chongjin provides stark visual data on the extent and severity of the drought," an official from the World Food Program wrote to the group's headquarters in Rome. "Vast expanses of parched, arid land; fields with barely a hint of green crops; fields that were planted in the past lying barren and deserted; much of the hillside and mountainside stripped of trees, exposing sandy soil, rocky outcrops and scrub vegetation."

"The sense I got was one of exhaustion — parched, dried, exhausted land," he added.

In an telephone interview today from Pyongyang, Bergitta Kalgren, the World Food Program's representative in North Korea, said that reservoirs were drying up everywhere, and that residents of the capital were experiencing breaks in the urban water supply.

A Food and Agriculture Organization specialist said today that the

situation is "absolutely disastrous."

Today, North Korea will for the first time be taking part in preliminary talks with South Korea, China and the United States that could lay the ground for a peace conference to reduce tensions in the Korean Peninsula. Relief officials familiar with North Korea, suggest that the talks, to be held at Columbia University's School of International and Public Affairs, are more important to the North Koreans than they have admitted publicly.

Although the United States and other governments say that their aid is not politically conditioned, many officials say they believe that only if North Korea appears more cooperative in dealing with South Korea, Japan and other nations, will Pyongyang have a hope of getting major international aid.

The World Food Program, which has raised more than \$120 million in emergency aid to North Korea from governments and private donors, has developed a monitoring system to insure that the food reaches the right people.

North Korea's two million government officials and army soldiers have their own system of acquiring and distributing food for themselves — siphoning off much of what is produced within the country — and they never go without.

The relief group has thus so far focused on supplying mostly children up to six years old, hospitals and some geographic areas where crops were lost to floods in 1995 and 1996. Another \$75 million in aid or commodities has been provided directly by governments and private groups.

Relief officials say that famine and starvation occur only after a confluence of failures — economic, environmental and political — but that no single event, like drought alone, would be enough to cause such widespread calamity.

Continuing economic mismanagement and decades of outdated agricultural policies, including a lack of crop rotation and the inadequate use of fertilizers, have made North Korea vulnerable to such a disaster.

This summer's monsoon rains arrived in South Korea in June, but then veered away from the peninsula and into the Sea of Japan just as they neared the border with the North. Even still, though there is no crisis in South Korea, its economic and agricultural policies would allow farmers there far greater flexibility in responding to such a drought.

No one can estimate what will be needed if famine and starvation appear on a mass scale and among all age groups. Some relief officials believe that older people, no longer seen on the streets, may be too weak to leave home — or may be dying.

Relief officials also said they fear that if starvation occurs on a mass scale it will be difficult to arouse public sympathy around the world, as the crises in the Horn of Africa did, or that an effective response would come too late.

At the World Food Program in Rome, Mr. Rowe, the spokesman, said that the crisis is very visible to aid workers and organizations, who have made videos and taken many photographs of the steadily deteriorating condition of the population. Mr. Rowe said that his program had seen a "record response" to appeals from governments.

But North Korea, whose government has been hostile to the outside world and has a record of supporting terrorism, is not an easy country to win sympathy for among the general public, said Ted Yamamori, a doctor and president of Food for the Hungry, who has just returned from Pyongyang. He estimated that at least five million people were already being afflicted by famine.

"What we are seeing is not enough pictures on the screen," Dr. Yamamori said in a telephone interview

from Scottsdale, Ariz., where the group is based. "People are not really able to understand what is going on."

"They are mobilizing soldiers to carry water to the cornfields," he continued. "You see women lining up to carry water on their heads to irrigate the crops. Fields are scorched. The plants are wilting." He said that people have begun making porridge of wheat gruel and grass.

Dr. Amayun, the specialist who toured for World Vision, said in an interview that increasing numbers of children are being given up to government orphanages by their relatives, who can no longer feed them.

"Children of primary school age are now showing stunting, which means they are chronically malnourished," Dr. Amayun said. "We see a lot of children given up by their parents, who cannot guarantee normal feeding. Most of the children in the Government centers I saw were abandoned."

"But we know there are children born in hospitals who are not being taken home by their families. There are a lot of newborns being brought to orphanages directly from the district hospitals."

"We saw diarrhea, kwashiorkor and pneumonia. We were told there are cases of measles, and that they have stopped immunizing children in a systematic way."

"The children we saw were apathetic, lethargic," he continued. "Many had no strength to stand. They had no energy. The severely malnourished had the faces of old men, with nothing but skin and bones in their arms and legs."

World Vision plans to airlift high-protein food to North Korea this week. For many, said Dr. Amayun, it

The New York Times

TUESDAY, AUGUST 5, 1997

INDUSTRIES REVISIT GLOBAL WARMING

Some Producers Now Support Curbing Greenhouse Gases

AI By WILLIAM K. STEVENS

BONN, Aug. 4 — Early in this decade, as the nations of the world negotiated a treaty to head off man-made global warming, industry lobbyists spoke with virtually one voice on the issue of climate change. They just said no — no to any binding agreement obligating countries to control emissions of heat-trapping greenhouse gases like carbon dioxide, and no to the very idea that there was serious cause for concern.

But times have changed, and the industry stance has changed as well. Though hard-liners still see no need to force anyone to limit emissions of greenhouse gases, a whole new spectrum of industry voices has joined the policy debate as businesses have examined more closely how they might win or lose.

At least one big crack has developed in the once-monolithic front presented by the producers of fossil fuels, like coal and oil, the very people who might be expected to hold out most strongly against any change.

At meetings here, where delegates from around the globe have gathered under the five-year-old treaty, these changes have surfaced as a more widespread willingness to accept the view of mainstream scientists that the problem is real and to take at least some action to solve it.

The heads of several large corporations met with President Clinton in Washington today to discuss the problem. The President has promised a strong American proposal for specific levels of greenhouse gas reductions that is still being drawn up.

In what may be the most telling

Continued on Page A4

Continued From Page A1

change, British Petroleum, the world's third-largest oil company, broke ranks with other fossil fuel producers recently and announced that it believes that there is now enough scientific evidence to warrant concern about whether human activity — primarily the burning of fossil fuels like coal, oil and natural gas — is changing Earth's climate.

The time to contemplate action "is not when the link between greenhouse gases and climate change is conclusively proven, but when the possibility cannot be discounted and is taken seriously," John Browne, the company's chairman, said in a recent speech. British Petroleum, he said, "has reached that point."

Delegates to the meeting here are negotiating reductions in emissions of greenhouse gases. The most important of these is carbon dioxide, which is produced by burning fossil fuels. The negotiations will conclude in Kyoto, Japan, in December.

In the conference rooms, corridors and coffee bars of the Bonn Maritim Hotel, where the talks are taking place, the spectrum of industry opinion runs from hard-liners in the coal and oil industries who want no agreement in Kyoto to companies that produce alternatives to fossil fuels and want strong action immediately. In the middle is a broad group with a range of positions.

The dominant scientific view is that greenhouse gas emissions are probably responsible for at least part of a rise of 1 degree Fahrenheit in the average global temperature over the last century. Mainstream scientists predict that if emissions are not reduced, there will be a further rise of perhaps 3.5 degrees in the next century and more after that, with accompanying disruptions in climate. These include, for instance, more frequent and severe floods and droughts and a rise in the sea level. By comparison, the world has warmed by 5 to 9 degrees since the last ice age.

There is considerable uncertainty in these estimates. Nevertheless, Mr. Browne said in a telephone interview, "it seems to us it's time we should do something" about greenhouse gas emissions. "Just because there are uncertainties," he said, "it doesn't mean you just stand still and do nothing."

In that spirit, the company is formally collaborating with the Environmental Defense Fund, a private group, to test practical, market-based approaches to emission reduction. It is taking steps to control its own emissions and to develop alternative fuels and energy technologies. It is undertaking cooperative efforts to reduce emissions in developing countries. And it has assumed the rotating leadership of a broad Washington-based coalition of industry moderates on climate, many of them multinational companies.

The Clinton Administration is looking to the moderates for support as part of a campaign to win public acceptance of Mr. Clinton's pledge at the United Nations in June to seek strong action in Kyoto. Mr. Browne was one of the chief executives who discussed the subject with the President today.

Mr. Clinton's United Nations speech appears to have infused the climate debate with new zest — and to have increased the lobbying from all points on the industry spectrum.

"The status of industry has dramatically changed," said Dan Esty, who directs the Yale University Center for Environmental Law and Policy, alluding to the period since the climate treaty was negotiated in 1992, when he was a member of the American negotiating team. "There was only one position in '92; today there is a flowering of industry positions." And back then, he said, "you didn't have a major industrial powerhouse like B.P. coming in and saying the time for action is now."

As views have proliferated, so have industry lobbyists. Connie Holmes, a lobbyist for the National Mining Association who opposes any but voluntary action to reduce greenhouse gases, said that when she began lobbying in 1988, there were "maybe three or four people" from industry doing the same. Here in Bonn, there are scores. Mrs. Holmes acknowledges that they consist of "a much broader range of people, a wide spectrum of opinion."

The shift in outlook should not be overstated, though. Mr. Browne, for instance, does not see climate change as a crisis and argues that there is time to head off the problem in a deliberate, step-by-step fashion that balances economic growth and environmental protection. Any targets and timetables for emission reduction, he says, should be realistic and achievable.

Further, industry is virtually unanimous in insisting that developing countries share in emission reductions. Otherwise, it fears, companies in industrialized countries will be at a competitive disadvantage. As of now, the richer countries are obligated under the treaty and subsequent international policy decisions

to take the first steps.

Developing countries say those first steps have not been taken, since most of the richer countries have not even been able to fulfill a voluntary pledge under the treaty to stabilize emissions at 1990 levels.

Most companies and industry groups do not go as far in the direction of strong action as does an American organization called the Business Council for Sustainable Energy. Its members include several utilities — whose leaders have found it in their interest to promote energy conservation, which reduces fossil-fuel burning and greenhouse gas emissions — as well producers of solar power, wind power and natural gas. The last, while it is a fossil fuel, is viewed as a preferred alternative in the near term because it produces less carbon dioxide than coal or oil.

This group as a whole stands to benefit from controls on greenhouse emissions since its members put a premium on the more efficient use of energy. Michael Marvin, the group's executive director, said "we've got the technology right now" to produce energy more efficiently. Not surprisingly, his organization favors an early stabilization of greenhouse gas emissions, by 2005, followed by progressive reductions beginning in 2010.

A larger group, the Washington-based International Climate Change Partnership, now under the chairmanship of British Petroleum and including a wide range of industries, accepts the existence of a scientific consensus that some measure of man-made global warming is likely. "We think that appears to be relatively strong," said Kevin J. Fay, the group's executive director.

But, he said, climate change is a highly complex, long-term problem that need not necessarily be attacked with immediate targets and timetables for emission reductions. The Kyoto deadline is an artificial one, he said, adding that it is more important to achieve a lasting solution that allows both environmental protection and economic growth rather than a quick "feel good" result. There are probably many pathways by which the objective of heading off dangerous climatic change can be achieved, he said.

Still another group, consisting of electric utilities and represented by the Edison Electric Institute, is collaborating with the Administration to reduce greenhouse emissions by promoting more efficient use of electricity. This program, the institute says, has already brought significant reductions. All of this is voluntary, and the group favors that approach in any Kyoto agreement. It also is determined to get credit for reductions already achieved as part of such an agreement.

The hard-liners have not changed their position. Several of them are to be found in the Global Climate Coalition, a Washington-based lobbying group representing core energy and manufacturing industries. Gail McDonald, the new president of the coalition, formed zeros with her fingers when asked what her group would like to see happen in Kyoto.

The coalition continues to question the science of global warming. It argues that the impact of climate change is too uncertain and that the risk of economic damage is still too high to justify stronger, mandatory action.

The Administration's present course toward mandatory targets and timetables is "an unjustified rush to judgment," the coalition's chairman, William F. O'Keefe, told Congress recently. He likened it to driving too fast in a thick fog. This, he said, "risks a fatal crash."

Wash Int En. Group. G.L.C.C.

4/1/97

_____ AER Richards, Edwards, _____
summer 93

AEP The climate challenge voluntary response.

from utilities \approx 60% cut 15 m mtons of carbon

AEP Don't know date of retirement 50 coal fired 19 hydro 2 nuclear

EIA by 2010, 30% 2020. 42% higher emission

want as long budget ^{period} as possible .

want heavier penalty for borrowing
credit for early reductions

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REDEFINING PROGRESS

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HOW BUSINESS COULD PROSPER FROM A TAX SHIFT:

A Case Study Process

WHAT IF A NEW TAX SYSTEM...

could be good for both the bottom line and the environment? Economists have long argued that market-based approaches to environmental policy, such as energy taxes or pollution charges, could help protect the environment while promoting greater economic efficiency. Traditionally, many business leaders object to such proposals as antithetical to their core objectives. New research suggests, however, that the goals of business leaders and environmentalists need not be at odds.

THE ECONOMIC & POLITICAL LANDSCAPE

The new economic opportunities of the future will require the substitution of information and high value-added for raw material inputs, but America's current tax system continues to subsidize the industries and resources of the past. Changes in the American political system, however, have created a unique set of circumstances that may finally pave the way toward environmentally-sound fiscal policy. For example, consider recent trends: fundamental tax reform has emerged as a prominent issue; there is growing recognition that the command-and-control regulatory structure has run its course, and partisans in Congress have reaffirmed their commitment to a healthy environment but are looking for a new approach to environmental policy.

A NEW APPROACH TO FISCAL POLICY

Redefining Progress (RP) is proposing a revenue neutral tax shift that would entail introducing a series of environmental-based taxes or tradable permits *and* reducing other taxes in the economy to offset the increases. From the perspective of business, a large part of the potential appeal of the tax shift idea is what is untaxed (and deregulated) as well as what is taxed. RP's approach is different from the traditional call for environmental taxes in three important ways: (1) We use the market-based approach to environmental policy as a lever to reduce other taxes; (2) The primary focus is on improving the performance of the U.S. economy; and (3) We believe that the best way to develop the tax shift idea is to work closely with the corporate sector.

THE NEED FOR CASE STUDIES

Although analyses of market-based environmental policy have been done at the macro level, it is essential to understand how a tax shift will affect the decision-making process of individual firms. We view business as a key ally, and want to help business people see how tax shifting could help their bottom line. Therefore, over the next 18 months, we are committed to carrying out detailed case studies with five to seven major companies. Several Fortune 500 members have already expressed strong interest in participating in this process.

R

**MIT Joint Program on the
Science and Policy of Global Change**



Needed: A Realistic Strategy for Global Warming

Henry D. Jacoby, Ronald G. Prinn and Richard Schmalensee

July 1997

The MIT Joint Program on the Science and Policy of Global Change is an organization for research, independent policy analysis, and public education in global environmental change. It seeks to provide leadership in understanding scientific, economic, and ecological aspects of this difficult issue, and combining them into policy assessments that serve the needs of ongoing national and international discussions. To this end, the Program brings together an interdisciplinary group from two established research centers at MIT: the Center for Global Change Science (CGCS) and the Center for Energy and Environmental Policy Research (CEEPR). These two centers bridge many key areas of the needed intellectual work, and additional essential areas are covered by other MIT departments, by collaboration with the Ecosystems Center of the Marine Biology Laboratory (MBL) at Woods Hole, and by short- and long-term visitors to the Program. The Program involves sponsorship and active participation by industry, government, and non-profit organizations.

To inform processes of policy development and implementation, climate change research needs to focus on improving the prediction of those variables that are most relevant to economic, social, and environmental effects. In turn, the greenhouse gas and atmospheric aerosol assumptions underlying climate analysis need to be related to the economic, technological, and political forces that drive emissions, and to the results of international agreements and mitigation. Further, assessments of possible societal and ecosystem impacts, and analysis of mitigation strategies, need to be based on realistic evaluation of the uncertainties of climate science.

This paper is intended to improve public understanding of the climate issue, and thereby contribute to informed debate about the climate issue, the uncertainties, and the economic and social implications of policy alternatives.

Henry D. Jacoby and Ronald G. Prinn,
Program Co-Directors

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Needed: A Realistic Strategy for Global Warming

Henry D. Jacoby, Ronald G. Prinn and Richard Schmalensee*

As the United States, along with other nations, struggles to develop a response to climate change, a swirl of overheated rhetoric and short-term political maneuvering is obscuring the basic features of this issue. One day we hear that all responsible scientists agree that global warming is a dagger at the heart of human civilization and that emissions of carbon dioxide (CO₂) and other greenhouse gases must be slashed immediately to save our planet. The next day we're told that global warming is the illegitimate offspring of sloppy science and green fanaticism and that laying a finger on U.S. CO₂ emissions would wreck our economy and enrich our foreign competitors.

This debate is motivated by intense, ongoing international negotiations on possible near-term CO₂ emission limits. The agenda for these negotiations, the so-called Berlin Mandate, was adopted at the first conference of Parties to the Framework Convention on Climate Change, held in Berlin in 1995. Diplomats were told to devise a set of national ceilings for greenhouse gas emissions for the early years of the next century. To make agreement more likely, developing countries were not to be asked to control emissions, although they account for roughly half the greenhouse emissions now and will emit a larger share in coming decades. These complex negotiations were to be completed in just two years, in time for the third Conference of Parties this December in Kyoto, Japan. Negotiations have become focused on a single question: how much will each of the developed nations promise to cut CO₂ emissions by 2010?

Our aim here is not to settle this near-term question, though the answer (if any) agreed to in Kyoto may be of great environmental and economic importance. Instead, we will show, through a brief look at the science and economics of climate, that if climate change turns out to be a serious threat, an effective response will require a substantial and very long-term global effort. Today's focus on near-term emissions reductions will be counter-productive if it delays development of the institutions and policy architectures that would be necessary to mount and sustain such an effort over much of the next century.

What Do We Know About Global Warming?

Global warming or cooling can be driven by an imbalance between the energy the Earth receives from the sun, largely as visible light, and the energy it radiates back to space as invisible infrared light. The "greenhouse effect" is caused by the presence in the air of gases and clouds that absorb some of the infrared light flowing upward and radiate it back downward. This warming effect is opposed by substances at the surface and in the atmosphere that reflect sunlight directly back into space. These include snow and desert sand, as well as clouds and aerosols from smog and volcanic action. (Aerosols are very tiny, submicroscopic solid or liquid particles suspended in the air. Smoke and fog are familiar examples.)

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The most important greenhouse gas is water vapor, which typically remains for a week or so in the atmosphere. Central to the climate change debate, however, are less important but much longer-lived greenhouse gases, most notably CO₂. Concern arises because the atmospheric concentrations of CO₂ and other long-lived greenhouse gases have increased substantially over the past century. When this happens, the flow of infrared energy to space is reduced, so that, *all else equal*, the Earth receives slightly more energy than it radiates to space. This imbalance, which is often called “radiative forcing,” tends to raise temperatures at the Earth’s surface. These aspects of the greenhouse effect are not controversial. It is also generally accepted that emissions of CO₂ from combustion of fossil fuels (primarily coal, oil, and natural gas) are the most important way humans can affect radiative forcing, and that this emitted CO₂ remains in the atmosphere for a long time, on the order of a century or so. Thus today’s radiative forcing reflects, in small part, the CO₂ emitted when coal was burned to keep President William McKinley warm in the White House.

What is much more uncertain, and the cause of serious scientific debate, is the response to radiative forcing of the complex system that determines our climate. “Climate” is usefully defined as the average of the weather we experience over a ten- or twenty-year time period. In this context, it is important to emphasize that year-to-year changes in weather patterns or storm tracks should not be, but often are, confused with climate change. Some poorly understood processes in the climate system tend to amplify the warming effect of radiative forcing, while others, equally poorly understood, tend to counteract or delay that effect.

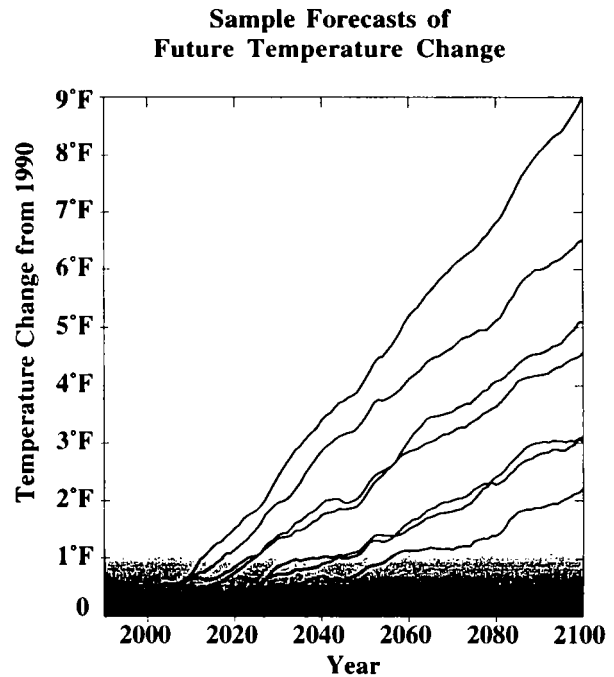
To take a familiar example, clouds in the daytime provide a cooling mechanism by reflecting sunlight back to space. But abundant clouds and high humidity at night help keep temperatures high because they contribute to the greenhouse effect. This is why on clear, cloud-free nights we can get rapid lowering of temperatures by tens of degrees Fahrenheit. Unfortunately, the processes that drive long-term changes in daytime and nighttime humidity and cloud cover are not well understood. Similarly, we know that any global warming will tend to be delayed because it takes a lot of heat to warm the oceans, but we’re quite uncertain exactly how rapidly heat is carried into the deeper parts of the ocean.

Computer models used to predict climate attempt to simulate these and many other important processes on regional and global scales. These models are remarkable in their complexity and are invaluable tools for scientific research. However, their complexity taxes the capabilities of the world’s largest computers. Moreover, they are based on incomplete knowledge about the key processes that control clouds, the ocean circulation, the natural cycles of greenhouse gases, and natural (volcanic) and manmade (smog) aerosols. Current climate models cannot reproduce the succession of ice ages and warm periods over the last 250,000 years, let alone the smaller climatic changes observed over the last century. In addition, climate models are driven by forecasts of emissions of greenhouse gases, and these rest on highly uncertain long-term forecasts of population and economic growth and of technological advance.

To help quantify the uncertainty in climate forecasts, a group of scientists and economists at MIT have recently developed a coupled model of global economic development, climate processes, and ecosystems. This model is unique in its combination of detailed treatments of the relevant natural and economic processes. Within this model, the researchers have explored the consequences of a range of plausible assumptions about future economic development (assuming no regulations are enacted to restrict future greenhouse gas emissions) and about fundamental

climate processes, to produce a family of seven forecasts of climate change over the next century. Each forecast in the family can be defended as reasonable given current knowledge.

To illustrate the range of uncertainty involved in climate forecasts, the first figure shows the predictions for the change in global average surface temperature from its 1990 value. Temperature increases by the year 2100 as small as two degrees Fahrenheit or as large as nine degrees Fahrenheit can be defended as plausible. About two thirds of the overall difference here is due to uncertainty about climate processes; the other third reflects uncertainty about emissions. Despite a great deal of research, we simply do not know which of these paths (or indeed other plausible paths) we are now on. Indeed, there may be rapid climate changes driven by purely natural processes that are not well handled by any current climate models and are not reflected in any of the forecasts shown here.



Unfortunately, we know less about the likely impacts of plausible changes in climate than about either future emissions or the natural processes determining climate. Warming may increase storm damage, for instance, but it may also decrease it. Almost nothing is known about likely (as opposed to possible) impacts on human health or about the ability of unmanaged ecosystems to adapt to climate change. Civilization has adapted to climate change in the past and can, to at least some degree, adapt to future changes. What we do know suggests that the changes summarized by the lowest path in the figure would do little harm over the next century and might even be beneficial on balance for some countries. Most analysts would agree, however, that the highest path would correspond to significant risks to a variety of important natural processes (including ocean circulation, polar glaciers, and unmanaged ecosystems) as well as to agriculture and other human activity.

In some respects the most important finding of climate research is that the range of possible outcomes is enormous. We believe it is impossible to make sound policy decisions in this field without taking explicit account of this profound uncertainty. In addition, it is plainly vital to continue research aimed at improving emissions forecasts, climate models, and impact estimates in order to narrow the range of plausible forecasts. An important component of this work is the search for a so-called “fingerprint” that would reveal human influence on the climate system.

Has Human-Induced Warming Begun?

Last year, the Intergovernmental Panel on Climate Change (IPCC) declared in its *Summary for Policymakers* that “the balance of evidence suggests a discernible human influence on climate.” There were some qualifications and hedging in the *Summary* and much more in the detailed Working Group Report upon which it was based. Nevertheless this statement, largely in isolation,

was widely reported and has since shaped policy discussions around the world. But was this isolated, unqualified summary statement, written by governments' representatives, a scientifically defensible conclusion?

To establish a human influence on the global climate, we would ideally want to show that the observed global patterns of climate change over the past 100 years, say, are consistent with those predicted by climate models which include human activities such as production of CO₂ and aerosols from fossil fuels, but are not consistent with the patterns predicted when those activities are omitted. The latter predictions would reflect the natural variability of climate—the “noise” out of which the human “signal” (or “fingerprint”) must arise for a definitive detection. Unfortunately, current climate models are both uncertain predictors of the climate response to human influences and inadequate tools for assessing natural variability. In addition, data on the global climate and human influences in past decades, and our understanding of the cooling effects of manmade aerosols, are far from ideal.

For these and other reasons, some scientists have been skeptical about the IPCC's “balance of evidence” statement from the beginning. This group has grown substantially over time. Even some scientists who were significantly involved in producing the IPCC statement are now publicly expressing doubts. In an important news report on this subject in the journal *Science* in May 1997, Richard A. Kerr describes the growing skepticism about the original IPCC *Summary* conclusion, and the growing realization that it may be a decade or more before the human effects can be discerned above the noise of natural climate variability.

This does not mean that we should wait to take action until and unless human effects on climate are definitively detected. As the discussion above indicates, we know enough to know that significant global warming, with significant adverse impacts, may occur in the future. It would be irresponsible to ignore such a risk, just as it would be irresponsible to do nothing when you smell smoke at home until and unless you see flames. It would also be irresponsible, of course, to call the fire department and hose down all your belongings at the slightest whiff of what might be smoke.

Nevertheless, the search for a definitive detection of human-induced climate change can provide valuable information for the policy process. The figure above provides a simplified illustration of the point involved. The shaded region at the bottom represents a plausible estimate of the range of natural variability or noise in global mean temperature over the course of a century. As the figure shows, the greater the eventual warming, the sooner observed temperatures will rise above this range, and the signal of a human influence will emerge from this noise. (This conclusion holds whatever the noise level; higher noise levels simply imply later detection, all else equal.) The larger the human effects on climate, the sooner it should be possible to find definitive evidence of those effects, and the stronger will likely be the case for substantial emissions reductions.

Should Global Warming Be Stopped?

If climate change turns out to be a serious problem, the sorts of emissions reductions being fiercely debated in the run-up to the Kyoto meeting will not *by themselves* do much to solve it. Under the Berlin Mandate, emission reductions are to be sought only from countries listed in Annex I to the original climate treaty: the members of the Organization for Economic Cooperation

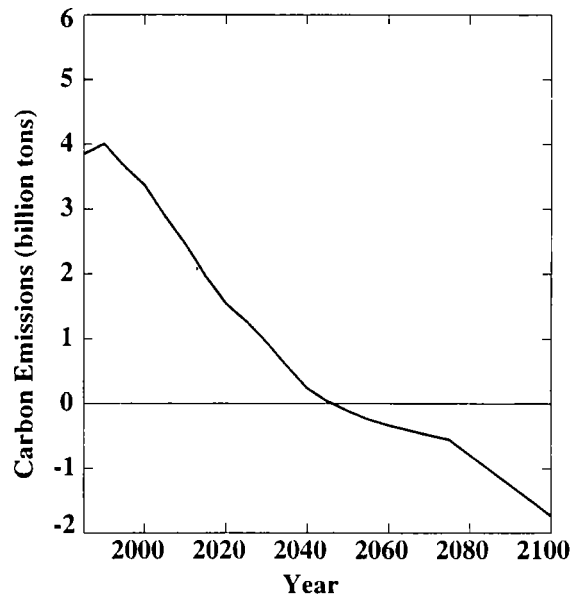
and Development (OECD) as of 1990 (Western Europe, the United States, Canada, Australia, New Zealand, and Japan) and the “economies in transition” (Eastern Europe and most of the Former Soviet Union). To illustrate the effects of restrictions limited to these nations, let us consider one of the toughest proposals now on the table: the call by the European Union (EU) to cut Annex I CO₂ emissions to 15% below 1990 levels by 2010.

When measured not in relation to 1990 but against emissions today or those expected in another 13 years, this proposal would require much more than a than a 15% reduction in most countries. There is little doubt that such sharp cuts in CO₂ emissions over little more than a decade would be very expensive, even if economic growth were to slow from its pace in recent decades. It would be even harder for Annex I nations to maintain the proposed 2010 level of emissions for the rest of the next century. Yet, largely because of projected emissions growth in the developing world, the MIT climate model shows that such a costly effort by the Annex I countries would reduce projected warming in 2100 by only about 20 percent in the mid-range of the forecasts illustrated in the first figure. If climate change turns out to be a serious threat, this response, by itself, would be inadequate; if it turns out not to be a threat, this response would be a large-scale waste of resources.

A policy aimed at reducing near-term emissions may, if properly designed, be a valuable first step toward a more serious (and even more expensive) response strategy that could be used if we learn that human-induced warming is a serious threat. The Framework Convention on Climate Change calls for stabilizing atmospheric concentrations of greenhouse gases at levels that will avoid “danger” to economies and ecosystems. The European Union, among others, has recommended stabilizing the concentration of CO₂ in the atmosphere at 550 parts per million, which is roughly twice pre-industrial levels. Doing this would substantially slow (but not stop) climate change. Following the particular path to stabilization at this level that was estimated by the IPCC would lower the projected warming in 2100 in the mid-range forecast in the earlier figure by only about 30%, though it would have larger relative effects in the following century.

Following this EU recommendation would require sharp cuts in global CO₂ emissions, however, and the Annex I nations almost certainly could not do the job by themselves. We can illustrate the magnitude of the task using a mid-range forecast from the set shown in the first figure, along with the IPCC’s estimate of a global emissions path that would lead to the 550 parts per million target. The second figure shows the maximum Annex I emissions consistent with this path, assuming that non-Annex I nations accept no restrictions. (To calculate the emissions allowed to Annex I countries, we simply subtracted the forecasted non-Annex I emissions from the global total.) Without participation by the developing world, emissions by Annex I nations would somehow

Allowed Annex I Emissions Under Stabilization



have to become negative around the middle of the next century! Even a total ban on all use of fossil fuels in all developed nations within a few decades would not do the job.

Of course, if the richer nations continue to reduce emissions over time some voluntary abatement by non-Annex I nations would probably occur. Over the coming decades, some non-Annex I nations will no doubt become wealthy enough to join the Annex I emissions reduction club voluntarily. But the countries most likely to do this account for only a small fraction of projected non-Annex I emissions. In China, India, Indonesia, Brazil, and other high-population, high-emissions countries, income growth seems unlikely to stimulate voluntary abatement much before the end of the next century. Until then, these nations will be more concerned with feeding themselves and their children than with protecting their grandchildren from potential global warming. Thus, if the rich countries want to stabilize greenhouse gas concentrations, they will have to pay poor countries to reduce their emissions. Rough estimates of the costs that would be involved, even assuming fully efficient abatement policies and neglecting costs of monitoring and enforcement, imply massive international transfers of wealth on a scale well beyond anything in recorded history.

What Should We Do Now?

There is little or no political support today for a long-term commitment to such a Herculean effort. Moreover, since climate change could turn out to be relatively harmless, making such a commitment now would make little economic sense. On the other hand, since climate change may also be a significant threat, it would make no more sense to do nothing. Unfortunately, there are no simple rules that can be relied upon to tell us what to do. We must consider costs and risks and take actions in the face of profound uncertainty about their consequences.

In such a setting, it is important not to lose the long-term perspective. Today's actions should aim to reduce the costs of massive global emissions reductions, in case advances in climate science show such reductions to be desirable. Investments in new technology and in the development of policy architectures and institutions are particularly attractive in this regard. While it is almost certainly too late to agree on investments of this sort before December's Kyoto meeting, that meeting is but one step in what will very likely be a long political and diplomatic process. Whatever else happens there, the participants will produce some sort of "Kyoto Mandate" to guide the next round of international negotiations. That Mandate should focus the process on investments with long-term benefits.

The potential value of investments in new technology is clear. It may well prove impossible to slow warming appreciably without condemning much of the world to poverty unless carbon-free energy sources become roughly competitive with conventional fossil sources. Further, a serious attempt to produce important new technological options would be cheap relative to the cost of controlling emissions resulting from the use of current technologies. The range of possible options is wide, stretching from solar electricity to the continued use of fossil fuels with capture and sequestration of the CO₂ their combustion produces.

Unfortunately, we know too little about what produces fundamental technical change. The available evidence points to the importance of marketplace incentives for private sector research and development and (with somewhat more controversy) to public expenditure on basic research and fundamental technologies. Politicians love to call for more research instead of more regulation, but

we see only a tiny and diminishing commitment to the development of greenhouse-friendly technology by those countries most capable of performing it.

It is at least as important to begin the development of an institutional structure for managing global emissions agreements that can evolve easily over time. Such a structure must be able to adjust the stringency of abatement effort to the evolving science, giving incentives for national participation but accommodating failures along the way, and to provide compensation to induce participation by the developing world.

This is a tall order, and we do not pretend to know the best design. Some useful insight and perspective can be gained from the international trade regime developed under the General Agreement on Tariffs and Trade (GATT), now the World Trade Organization. This regime has grown and evolved over time, adding countries and goods along the way, peacefully resolving substantial conflicts in national economic interests, contributing importantly to global economic growth, and producing a stunning success by the standards of international affairs. But it has taken 50 years of hard work to do this!

In this connection, experimenting with national emission ceilings of the type that are the near-total focus of the Berlin Mandate process may be of long-term value. Naturally, one objective of such an effort is to make actual reductions in the quantities of greenhouse gases we would otherwise put into the atmosphere over the next decade or two. We do not belittle this motivation. But it should not be allowed to completely dominate the design of international agreements in this area. Such experiments will be of long-term value only to the extent that they facilitate development of sets of possible policy measures, a policy architecture if you will, that can, if necessary, contribute to effective and cost-efficient stabilization of greenhouse gas concentrations. This architecture would need to address all important sources and sinks of significant greenhouse gases, not just CO₂ produced from fossil fuels. Such a system would need to provide for reliable emissions monitoring and for some system of sanctions for those who violate their obligations. A host of other important issues must also be confronted.

For example, since global participation will be necessary if global emissions are to be reduced, it is important to structure any Annex I targets and timetables to facilitate the inclusion of non-Annex I countries. This involves, at a minimum, development of a regime to govern climate-related international wealth transfers. In this regard, the Berlin Mandate's exclusive focus on Annex I countries is a double-edged sword. On the one hand, unless the rich nations control their emissions first and support abatement by poor nations, the latter are unlikely even to slow their emissions growth. On the other hand, CO₂ emissions controls will raise the cost of producing energy-intensive goods in Annex I countries, tending to encourage the development of energy-intensive industries in non-Annex I nations. (This is sometimes referred to as "emissions leakage.") Once this has happened, non-Annex I nations will be more reluctant to take actions to curb the CO₂ emissions that have become a more important source of wealth. Attempts by the rich Annex I countries to use trade policies to slow the migration of energy-intensive industries to poorer nations may create major international tensions.

In order to minimize the global cost of CO₂ emissions reductions, the cheapest abatement opportunities should be exploited first. In principle, a regime involving emissions trading, like that used to control sulfur dioxide pollution in the U.S., could contribute substantial savings. But this approach, which has been advanced by the U.S. in the ongoing negotiations, runs into a problem

if participation is restricted to Annex I countries. Trading can only work effectively among countries that have agreed to emissions caps. Without the participation of the developing countries, where most observers agree that many of the cheaper emissions reductions are to be found, the advantages of trading are drastically reduced.

Finally, agreeing to lower future emissions may increase incentives to develop energy-saving consumer devices, along with low-carbon energy sources. But commitments to modest, short-term emissions reductions may focus R&D efforts on small advances over current technologies. Credible commitments to substantial, long-term reductions may be necessary to stimulate the fundamental research necessary to produce needed breakthroughs in energy technology. Lack of adequate political support seems to rule out making such commitments now, however, and the inability of any government to bind its successors would limit the credibility of any long-term commitments that were made.

* * *

Unless climate scientists discover soon that greenhouse warming is definitely not a threat, the struggle to devise a global response will occupy our children, along with their children and grandchildren. We have discussed three legacies that our generation could leave that would make this struggle easier: (1) an international climate agreement that could, if necessary, reduce greenhouse gas emissions substantially, at least cost, while being responsive both to changes in our scientific understanding and to evolving political and economic conditions, (2) enhanced technical options that could, if necessary, ease the task of maintaining economic growth while controlling greenhouse gas emissions, and (3) an international system that could, if necessary, transfer substantial sums to developing countries to assist their participation in an emissions control effort. Building these legacies is a huge challenge, but this task merits at least the same sense of urgency that has motivated pre-Kyoto negotiations about short-term CO₂ emissions reductions.



CA:FO ✓
United States Department of State

*Under Secretary of State
for Global Affairs*

Washington, D.C. 20520-7250

July 28, 1997

Dear Climate Change Luncheon Participant,

As the climate issue heats up, the relevance and importance of our Climate Luncheon series becomes greater, for meeting and learning from experts, and for developing a better understanding of each other and the issues.

These are the next scheduled events; please note the very recent addition of John Browne from British Petroleum (this session will be held jointly with the members of the President's Council on Sustainable Development).

John Browne
Group Chief Executive, BP
Monday, August 11
1:00-2:30
Main State, TBA

Harry Pearce
Vice President, General Motors
Tuesday, August 26
12:00-1:30 p.m.
Henry Clay Room, Main State

James Wolfensohn
President, World Bank
Wednesday, September 3
12:30-2:00 p.m.
Henry Clay Room, Main State

We also have invitations to Dale Jorgenson, Kenneth Arrow, Michael Oppenheimer, Richard Cooper, and Robert Stavins. I look forward to any ideas you may have for guests.

Attached is a list of guests to date and a list of luncheon attendees and their contact points within the Administration. We agreed that the luncheon works best without substitutes.

You will note that the number of participants in the Climate Luncheons exceeds our space for 22 at the table. In order to assure your spot at the upcoming luncheons, please respond as soon as possible to Debbie Jones at 647-6205.

With best regards,

Sincerely yours,

Timothy E. Wirth

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John Browne

John Browne became BP's group chief executive on 1 July 1995, having been a managing director since 1991.

Since joining the company in 1966, Browne has held a variety of posts in oil and gas exploration and production and in corporate finance, working in Britain and North America. He is a former chief executive of BP's exploration and production business.

A non-executive director of SmithKline Beecham and the Intel Corporation, Browne is also a trustee of the British Museum and a member of the governing body of the London Business School.

He is a Fellow of the Royal Academy of Engineering and a Fellow of the Institute of Mining and Metallurgy.

Climate change: the new agenda

John Browne

Group Chief Executive
The British Petroleum Company p.l.c.

A presentation to Stanford University, California
19 May 1997

Climate change: the new agenda

A presentation to Stanford University, California,
19 May 1997

It is always marvellous to come back to Stanford, and it is a pleasure and a privilege to speak to you today on a subject which I believe is of the utmost importance.

I can't think of anywhere better than Stanford to discuss in a calm and rational way a subject which raises great emotion and which requires both analysis and action.

I think it's right to start by setting my comments in context

Following the collapse of communism in Europe and the fall of the Soviet Empire at the end of the 1980s, two alternative views of the consequences for the rest of the world were put forward. Francis Fukuyama wrote a book with the ironic title, 'The End of History'. Jacques Delors, then president of the European Commission, talked about the 'acceleration of history'.

In the event, history has neither accelerated nor stopped. But it has changed. The world in which we now live is one no longer defined by ideology. Of course, the old spectrums are still with us – of left to right, of radical to conservative – but ideology is no longer the ultimate arbiter of analysis and action.

Governments, corporations and individual citizens have all had to redefine their roles in a society no longer divided by an Iron Curtain separating capitalism from communism. A new age demands a fresh perspective on the nature of society and responsibility.

The passing of some of the old divisions reminds us we are

History has neither accelerated nor stopped. But it has changed

The people who work in BP are people with beliefs and convictions

all citizens of one world, and we must take shared responsibility for its future, and for its sustainable development.

We must do that in all our various roles – as students and teachers, as business people with capital to invest, as legislators with the power to make law, as individual citizens with the right to vote, and as consumers with the power of choice.

These roles overlap, of course. The people who work in BP are certainly business people, but they're also people with beliefs and convictions, individuals concerned with the quality of life for themselves and for their children. When they come through the door into work every morning they don't leave behind their convictions and their sense of responsibility.

And the same applies to our consumers. Their choices determine our success as a company. And they too have beliefs and convictions.

The global environment

Now that brings us to my subject today – the global environment. That is a subject which concerns us all, in all our various roles and capacities. I believe we've now come to an important moment in our consideration of the environment. It is a moment when, because of the shared interest I talked about, we need to go beyond analysis to seek solutions and to take action. It is a moment for change and for a rethinking of corporate responsibility.

A year ago, the Second Report of the Inter-Governmental Panel on Climate Change was published. That report and the discussion which has continued since its publication show that there is mounting concern about two stark facts. The concentration of carbon dioxide in the atmosphere is rising, and the temperature of the earth's surface is increasing.

Karl Popper once described all science as being provisional. What he meant by that was that all science is open

There is now an effective consensus that there is a discernible human influence on the climate

to refutation, to amendment and to development. That view is certainly confirmed by the debate around climate change.

There's a lot of noise in the data. It is hard to isolate cause and effect. But there is now an effective consensus among the world's leading scientists and serious and well-informed people outside the scientific community that there is a discernible human influence on the climate, and a link between the concentration of carbon dioxide and the increase in temperature.

The prediction of the IPCC is that, over the next century, temperatures might rise by a further 1 to 3.5 degrees centigrade, and that sea levels might rise by between 15 and 95 centimetres. Some of that impact is probably unavoidable, because it results from current emissions.

Those are wide margins of error, and there remain large elements of uncertainty – about cause and effect and, even more importantly, about the consequences. But it would be unwise and potentially dangerous to ignore the mounting concern.

The time to consider the policy dimensions of climate change is not when the link between greenhouse gases and climate change is conclusively proven, but when the possibility cannot be discounted and is taken seriously by the society of which we are part.

BP's role

We in BP have reached that point. It is an important moment for us. A moment when analysis demonstrates the need for action and solutions.

To be absolutely clear, we must now focus on what can and what should be done, not because we can be certain climate change is happening, but because the possibility can't be ignored.

If we are all to take responsibility for the future of our

planet, then it falls to us to begin to take precautionary action now.

But what sort of action? How should we respond to this mixture of concern and uncertainty ?

I think the right metaphor for the process is a journey. Governments have started on that journey. The Rio conference marked an important point on that journey. So was the Berlin review meeting. The Kyoto conference scheduled for the end of this year marks another staging post.

It will be a long journey because the responsibilities faced by governments are complex, and the interests of their economies and peoples are diverse, and sometimes contradictory. But the journey has begun, and has to continue.

The private sector has also embarked upon the journey, but now that involvement needs to be accelerated. This too will be long and complex, with different people taking different approaches. But it is a journey that must proceed.

Alternative responses

As I see it, there are two kinds of actions that can be taken in response to the challenge of climate change.

The first kind of action would be dramatic, sudden and surely wrong. Actions which sought, at a stroke, drastically to restrict carbon emissions or even to ban the use of fossil fuels would be unsustainable because they would crash into the realities of economic growth. They would also be seen as discriminatory, above all in the developing world.

The second kind of action is that of a journey taken in partnership by all those involved. A step-by-step process involving both action to develop solutions and continuing research that will build knowledge through experience.

BP is committed to this second approach, which matches the agreement reached at Rio, based on a balance between the needs of development and environmental protection. The Rio

BP is committed to an approach which matches the Rio agreement

What we propose to do is substantial, real and measurable

agreements recognise the need for economic development in the developing world. We believe we can contribute to achievement of the right balance by ensuring that we apply the technical innovations we're making on a common basis, everywhere in the world.

What we propose to do is substantial, real and measurable. I believe it will make a difference.

Before defining that action I think it is worth establishing a factual basis from which we can work.

The facts

Of the world's total carbon dioxide emissions, only a small fraction comes from the activities of human beings, but it is that small fraction which might threaten the equilibrium between the much greater flows.

You could think of it as the impact of placing even a small weight on a weigh-scale which is precisely balanced. But in preserving the balance we have to be clear where the problem actually lies.

Of the total carbon dioxide emissions caused by burning fossil fuels, only 20% comes from transportation. 80% comes from static uses of energy – the energy used in our homes, in industry and in power generation. Of the total, 43% comes from petroleum.

We've looked carefully, using the best available data, at the precise impact of our own activities.

Our operations in exploration and in refining produce around 8 megatonnes of carbon. On top of that, a further 1 megatonne is produced by our chemical operations. If you add to that the carbon produced by the consumption of the products we produce, the total goes up to around 95 megatonnes.

That is just one per cent of the total carbon dioxide emissions which come from all human activity.

Let me put that another way, to be clear. Human activity accounts for a small part of the total volume of emissions of carbon, but it is that part which could cause disequilibrium.

Only a fraction of the total emissions come from the transportation sector, so the problem is not just caused by vehicles. Any response which is going to have a real impact has to look at all the sources.

As a company, our contribution is small, and our actions alone could not resolve the problem. But that does not mean we should do nothing.

We have to look at both the way we use energy, to ensure we are working with maximum efficiency, and at how our products are used.

That means ensuring our own house is in order. It also means contributing to the wider analysis of the problem – through research, technology and engagement in the search for the best public policy mechanisms – the actions which can produce the right solutions for the long-term common interest.

We have a responsibility to act, and I hope that through our actions we can contribute to the much wider process which is desirable and necessary.

Specific steps

BP accepts that responsibility and we're therefore taking some specific steps:

- To control our own emissions
- To fund continuing scientific research
- To take initiatives for joint implementation
- To develop alternative fuels for the long term
- And to contribute to the public policy debate in search of the wider global answers to the problem.

First, we will monitor and control our own carbon dioxide emissions.

This follows the commitment we've made in relation to

First, we will monitor and control our carbon dioxide emissions

other environmental issues. Our overall goal is to do no harm or damage to the natural environment. That's an ambitious goal which we approach systematically.

Establishing priorities

Nobody can do everything at once. Companies work by prioritising what they do. They take the easiest steps first – picking the low-hanging fruit – and then they move on to tackle the more difficult and complex problems. That is the natural business process.

Our method has been to focus on one item at a time, to identify what can be delivered, and to establish monitoring processes and targets as part of our internal management system and to put in place an external audit to confirm delivery.

In most cases the approach has meant that we've been able to go well beyond the regulatory requirements. That's what we've done with emissions to water and to air.

In the North Sea, for instance, we've gone well beyond the legal requirements in reducing oil discharges to the sea. And now at our crude oil export terminal in Scotland at Hound Point, which handles 10% of Europe's oil supplies, we're investing \$100 million to eliminate emissions of volatile organic compounds. These VOCs would themselves produce carbon dioxide by oxidation in the atmosphere.

No legislation has compelled us to take that step. We're doing it because we believe it is the right thing to do.

Now, as well as continuing our efforts in relation to the other greenhouse gases, it is time to establish a similar process for carbon dioxide.

Our carbon dioxide emissions result from burning hydrocarbon fuels to produce heat and power, from flaring feed and product gases, and directly from the process of separation or transformation.

In most cases we've been able to go well beyond the regulatory requirements

So far our approach to carbon dioxide has been indirect and has mainly come through improvements in the energy efficiency of our production processes. Over the last decade, efficiency in our major manufacturing activities has improved by 20%.

Now we want to go further.

We have to continue to improve the efficiency with which we use energy. And in addition we need a better understanding of how our own emissions of carbon can be monitored and controlled, using a variety of measures including sequestration. It is a very simple business lesson that what gets measured gets managed.

It is a learning process, just as it has been with the other emissions we've targeted, but the learning is cumulative and I think it will have a substantial impact.

We have already taken some steps in the right direction. In Norway, for example, we've reduced flaring to less than 20% of 1991 levels, primarily as a result of very simple, low-cost measures. The operation there is now close to the technical minimum flare rate which is dictated by safety considerations.

Our experience in Norway is being transferred elsewhere, starting with fields in the UK sector of the North Sea, and that should produce further progressive reductions in emissions.

Our goal is to eliminate flaring except in emergencies. That is one specific goal within the set of targets which we will establish.

Some are straightforward matters of efficient operation, such as the reduction of flaring and venting. Others require the use of advanced technology in the form of improved manufacturing and separation processes that produce less waste and demand less energy.

Other steps will require investment to make existing facilities more energy efficient. For instance, we're researching ways in which we can remove the carbon dioxide from large

Our goal is to eliminate flaring except in emergencies

compressors and reinject it to improve oil recovery. That would bring a double benefit – a cut in emissions and an improvement in production efficiency.

The task is particularly challenging in the refining sector, where the production of cleaner products requires more extensive processing and a higher energy demand for each unit of output. It means that to make gasoline cleaner, with lower sulphur levels, takes more energy at the manufacturing stage. That's the trade-off.

In each case our aim will be to establish a database, including benchmark data, to create a monitoring process, and then to develop targets for improvement through operational line management.

Monitoring and controlling emissions is one step.

The second is to increase the level of support we give to the continuing scientific work which is necessary.

As I said a few moments ago, there are still areas of significant uncertainty around the subject of climate change. Those who say they know all the answers are fools or knaves.

More research is needed on the detail of cause and effect, on the consequences of what appears to be happening, and on the effectiveness of the various actions which can be taken.

We will increase our support for that work. That support will be focused on finding solutions and will be directed to work of high quality which we believe can address the key outstanding questions.

Specifically, we've joined a partnership to design the right technology strategy to deal with climate change. That partnership, which will work through the Batelle Institute, includes the Electric Power Research Institute and the US Department of Energy. We're also supporting work being done at MIT in Cambridge, Massachusetts, and through the Royal Society in London.

We're also joining the greenhouse gas programme of the

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International Energy Agency, which is analysing technologies for reducing and offsetting greenhouse gas emissions from fossil fuels.

The third area is the transfer of technology and the process of joint implementation

The third area is the transfer of technology and the process of joint implementation, which is the technical term for projects which bring different parties together to limit and reduce net emission levels of greenhouse gases.

Joint implementation is only in its infancy, but we believe it has great potential to contribute to the resolution of the climate change problem. It can increase the impact of reduction technology by reducing the overall cost of abatement actions.

We need to experiment and to learn, and we'd welcome further partners in the process. The aim of the learning process must be to make joint implementation a viable and legally creditable concept that can be included in international commitments.

We've begun by entering into some specific programmes of reforestation and forest conservation programmes in Turkey and now in Bolivia, and we're in discussion on a number of other technology-based joint implementation projects.

The Bolivian example, I think, shows what can be done.

It's a programme to conserve 1.5 million hectares of forests in the province of Santa Cruz. It is sponsored by the Nature Conservancy and American Electric Power and sanctioned by the US government.

We're delighted to be involved, and to have the chance to transfer the learning from this project to others in which we are involved. Forest conservation projects are not easy or simple, and that learning process is very important.

Technology transfer is part of the joint implementation process but it should go wider. We're prepared to engage in an open dialogue with all the parties who are seeking answers to the climate change problem.

So those are three steps we can take – monitoring and controlling our own emissions, supporting the existing scientific work and encouraging new work, and developing experiments in joint implementation and technology transfer.

Why are we doing all those things? Simply because the oil industry is going to remain the world's predominant supplier of energy for the foreseeable future.

Given that role, we have to play a positive and responsible part in identifying solutions to a problem which is potentially very serious.

The fourth step – the development of alternative energy – is related but distinct.

Looking ahead, it seems clear that the combination of markets and technology will shift the energy mix. The world's population is growing by 100 million every year. By 5,000 just since I began this speech.

Prosperity is spreading. By the end of the century 60% of the world's economic activity will be taking place in the South, in areas which 10 years ago we thought of as Third World countries.

Both these factors will shape a growing level of demand for energy.

At the same time technology moves on. The sorts of changes we've seen in computing, with continuing expansion of semiconductor capacity, are exceptional but not unique.

I think it is a reasonable assumption that the technology of alternative energy supplies will also continue to move forward. One or more of those alternatives will take a greater share of the energy market as we go into the next century.

But let me be clear. That is not instead of oil and gas. It is additional.

We've been looking at alternative energies for a long time, and our conclusion is that one source which is likely to make a significant contribution is solar power.

I'm convinced
that we can make
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competitive in
supplying peak
electricity
demand within
the next 10 years

At the moment solar is not commercially viable for either peak or base load power generation. The best technology produces electricity at something like double the cost of conventional sources for peak demand.

But technology is advancing and, with appropriate public support and investment, I'm convinced that we can make solar competitive in supplying peak electricity demand within the next 10 years. That means, taking the whole period from the time we began research work, that 25 to 30 years will have elapsed. For this industry that is the appropriate timescale on which to work.

We explore for oil and gas in a number of areas where production today wouldn't be commercially viable at the moment. Thirty years ago we did that in Alaska.

We take that approach because we believe that markets and technology do move, and the frontier of commercial viability is always changing.

We've been in solar power for a number of years and we have a 10% share of the world market. The business operates across the world, with operations in 16 countries. Our aim now is to extend that reach, not least in the developing world, where energy demand is growing rapidly.

We also want to transfer our distinctive technologies into production, to increase manufacturing capacity and to position the business to reach \$1 billion in sales over the next decade.

Solar investment

I am happy to report there will be significant investment in the USA and we'll be commissioning a new solar manufacturing facility here in California before the end of this year.

The result of all that is that, gradually but progressively, solar will make a contribution to the resolution of the problem of carbon dioxide emissions and climate change.

So, a series of steps on the journey. These are the initial

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energy – is related
but distinct**

steps. We're examining what else we should do, and I hope to be able to announce some further steps later in the year.

Of course, as I said at the beginning, nothing we can do alone will resolve the concern about climate change. We can contribute, and over time we can move towards the elimination of emissions from our own operations and a substantial reduction in the emissions which come from the use of our products. The subject of climate change, however, is a matter of wider public policy.

A wider debate

We believe that policy debate is important. We support that debate, and we're engaged in it, through the World Business Council on Sustainable Development, through the president's own Council here in the United States, and in the UK where the government is committed to making significant progress on the subject.

Knowledge in this area is not proprietary, and we will share our expertise openly and freely.

Our instinct is that, once clear objectives have been agreed, market-based solutions are more likely to produce innovative and creative responses than an approach based on regulation alone.

Those market-based solutions need to be as wide-ranging in scope as possible, because this is a global problem which has to be resolved without discrimination and without denying the peoples of the developing world the right to improve their living standards.

To try to do that would be arrogant and untenable, when what we need are solutions which are inclusive, and work through co-operation across national and industry boundaries.

There have been a number of experiments, all of them partial, but many of them interesting because they show the way in which effective markets can change behaviour.

We're working, for instance, with the Environmental Defence Fund to develop a voluntary emissions trading system for greenhouse gases, modelled on the system already in place in respect of sulphur.

Of course, a system which just operates here in the United States is only a part of the solution. Ideally such structures should be much wider. But change begins with the first step and the development of successful systems here will set a standard which will spread.

Sustainable growth

I began with the issue of corporate responsibility, the need for rethinking in a new context.

No company can be really successful unless it is sustainable, unless it has capacity to keep using its skills and to keep growing its business.

Of course, that requires a competitive financial performance. But it does require something more, perhaps particularly in the oil industry.

The whole industry is growing because world demand is growing. The world now uses almost 73 million barrels of oil a day – 16% more than it did 10 years ago.

In another 10 years, because of the growth of population and prosperity, that figure is likely to be over 85 million barrels of oil a day, and that is a cautious estimate. Some people say it will be more.

For efficient, competitive companies that growth will be very profitable. But sustainability is about more than profits. High profitability is necessary but not sufficient.

Real sustainability is about simultaneously being profitable and responding to the reality and the concerns of the world in which you operate. We're not separate from the world. It's our world as well.

I disagree with some members of the environmental

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science and of
enterprise must
work together**

movement who say we have to abandon the use of oil and gas. They think it is the oil and gas industry which has reached the end of history. I disagree because I think that view underestimates the potential for creative and positive action.

But that disagreement doesn't mean that we can ignore the mounting evidence about climate change and the growing concern. As business people, when our customers are concerned, we'd better take notice.

To be sustainable, companies need a sustainable world. That means a world where the environmental equilibrium is maintained, but also a world whose population can all enjoy the heat, light and mobility which we take for granted and which the oil industry helps to provide.

I don't believe those are incompatible goals. Everything I've said today, and all the actions we're taking and will take, are directed to ensuring that they are not incompatible.

No easy answers

There are no easy answers. No silver bullets. Just steps on a journey which we should take together because we all have a vital interest in finding the answers.

The cultures of politics, of science and of enterprise must work together if we are to match and master the challenges we all face.

I started by talking about the end of history. Of course it hasn't ended. It's moved on.

Francis Fukuyama, who coined that phrase, describes the future in terms of the need for a social order – a network of interdependence which goes beyond the contractual. An order driven by the sense of common human interest. Where that exists, societies thrive.

Nowhere is the need for that sort of social order – at the global level – more important than in this area. The achievement of that has to be our common goal.

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CLIMATE CHANGE RISKS AND POLICIES: AN OVERVIEW

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6/26/97
TO: JEFF FRANKEL

FYI - Rosina Bierbaum
thought you'd be
interested in this.

CLIMATE CHANGE RISKS AND POLICIES: AN OVERVIEW

Michael Toman, Senior Fellow, Resources for the Future

INTRODUCTION AND SUMMARY

A great deal of controversy surrounds the issue of climate change. Some participants in the debate say that climate change is one of the greatest threats facing humankind, one that calls for immediate and strong controls on greenhouse gases, particularly carbon dioxide emissions from fossil fuel burning and releases of other gases such as methane. Others say that the risks are weakly documented scientifically, that adaptation to a changing climate will substantially reduce human vulnerability, and that consequently little action is warranted other than further study and development of future technological options. The same kinds of divides arise in discussing policy options to reduce greenhouse gas emissions, with some predicting net benefits to the economy and others fearing the loss of several percentage points of national income.

These disagreements surface in the ongoing efforts of the international community to negotiate goals and actions under the 1992 Framework Convention on Climate Change. They reflect not only different interpretations of the evidence but different interests as well. Article 2 of the Framework Convention requires signatories to take actions to “prevent dangerous anthropogenic interference with the climate system” from greenhouse gas emissions (and other actions such as deforestation). However, the term “dangerous” in Article 2 does not have an unambiguous, purely scientific definition; it is inherently a question of human values.

To help sort through the tangle, in this paper I attempt to summarize some ways to think about climate change risks and policies that can be useful for considering both international agreements and actions by the United States. The paper starts with some background on the current state of the knowledge and then presents a six-step decision framework. The steps include the following:

- Think comprehensively about risks and costs.
- Think long term.
- Address adaptation.
- Think internationally.
- Keep distributional issues in mind.
- Estimate control costs realistically.

Using this framework, I also suggest some points for enhancing the effectiveness of climate policies:

- Allow flexibility in the timing of cumulative emissions reductions to reduce overall costs.

- Incorporate economic incentives into emissions-reduction policy.
- Provide opportunities for emissions reductions wherever possible.
- Encourage development of the climate change knowledge base and improved technology for emissions reduction.
- Increase the emphasis on adaptation.

Each of these points is elaborated on in the paper. However, as an overview, the discussion necessarily is somewhat abridged. Other Issues Briefs to be produced for RFF's Climate Economics and Policy Program will explore in greater detail the issues raised here. I conclude with some brief comments on the draft protocol promulgated by the Clinton Administration in January 1997.

BACKGROUND

In its recent Second Assessment, Working Group I of the Intergovernmental Panel on Climate Change (IPCC)—a body of several hundred distinguished scientists established by the United Nations—concluded that a human cause for the climate change now observed is likely, not just possible. This is a much stronger conclusion than the one the IPCC reached in its First Assessment several years ago, although it is dogged by skepticism from some who feel that dissenting views were not adequately represented in the process. In its First Assessment, the IPCC stated that although all signs pointed to human-induced climate change, crucial evidence for cause and effect was not yet available. The evidence at the time indicated that atmospheric greenhouse gas concentrations had increased in the previous 130 years and that the global climate had warmed; however, when applied retrospectively, complex computer simulations of climate change predicted a larger warming than had actually occurred and did not adequately represent climate changes in different regions and at different altitudes.

The latest generation of models can now replicate the past with greater realism. In particular, new models include analysis of the cooling effect of aerosols—tiny particles—in the air formed during the burning of fossil fuels. By including in their analyses the cooling effects of aerosols and stratospheric ozone depletion, most of the latest studies have detected a significant climate change. The Summary for Policymakers of the Working Group I report states that “the observed warming trend is unlikely to be entirely natural in origin.... The balance of evidence suggests a discernible human influence on global climate.”

While the improved capacity of climate models to track past events increases confidence in their capacity to explain observed changes, future changes in climate could depart from the models' predictions. In particular, the change may be neither gradual nor continuous, but abrupt and surprising. Despite recent improvements, however, climate models are still unable to project the details of climate change on a regional scale, complicating assessment of potential impacts and response options.

In the latest assessment, Working Group II of the IPCC addresses many potential impacts of climate change, including the effects on agriculture, forestry, terrestrial and marine

ecosystems, hydrology and water resource management, human health, human infrastructure, and financial services. While the potential impacts of climate change are broad, some aspects of human society are more sensitive than others. In particular, more highly managed systems like agriculture, where skills and resources for investing in adaptation are available, may be less sensitive than less managed systems like wilderness areas. By the same token, some of the adverse effects of climate change may fall disproportionately on poorer parts of the world where adaptation capacity is more limited. Particularly if climate change were very rapid, damage could be severe and long-lived, perhaps irreversible. However, such rapid change may be unlikely and is difficult to predict.

In any event, the ability to quantify future damage and adaptation potential varies greatly across sectors. The physical consequences of a given magnitude of sea level rise, or the impacts of climate change on agricultural yields and forest conditions, can be projected with higher confidence than, say, impacts on wetlands and fisheries. Yet even when confidence is high that a certain effect will occur if climate changes, its magnitude cannot be predicted precisely. In addition, already significant damage to ecosystems and human structures arising from population growth, industrial expansion, and changes in land use may be of more immediate concern than how best to respond to climate change risk. Over the longer term, however, these forces could combine with the effects of climate change to push already stressed systems “over the edge.”

In evaluating the context for climate change policies, several points need to be kept in mind.

Some degree of climate change appears inevitable. Given current emissions trends and the inertia of the climate system, even if emissions were stabilized or substantially reduced, the scientific models suggest that climatic changes and their consequences would continue. To stabilize atmospheric concentrations of greenhouse gases and thus their effects would eventually require very large cuts in emissions from current levels (let alone future levels implied by continued economic growth under a “business as usual” scenario). For example, to stabilize carbon dioxide concentrations at something over twice pre-industrial levels would require emissions ultimately to fall by over 70 percent from their *current* level.

The problem is global. Rich and poor countries argue over how the burden of greenhouse gas emissions reductions should be allocated. However, no solution can be effective in the long term unless it ultimately leads to reductions in total *global* emissions, not just emissions in selected countries.

It is the human consequences of climate change that will animate public support for policies. The findings of climate scientists or studies of physical impacts from climate change cannot drive policy alone. This simple but important point often seems to be overlooked in debates about “what the science says,” and it leads to our next major topic—what kind of framework is useful for evaluating climate risks and policies?

DECISION FRAMEWORK

Although substantial scientific and socioeconomic uncertainties exist about the risks that climate change poses, these uncertainties do not justify taking no action. At the same time, priorities must be set in how the public's scarce resources will be used. At the broadest level, there must be some weighing and balancing of the benefits and costs of different actions in response to climate change risks. The values served by reducing the risks from climate change can only be appreciated in comparison with other values to which society devotes its scarce resources.

The need for such balancing casts doubt on the usefulness of a strict "safety first" framework that puts a high premium on any and all forms of risk reduction. We cannot devote disproportionately huge amounts of resources to reducing climate change risks while, for example, utterly ignoring health care needs. Moreover, not all the effects of climate change are likely to be equally serious, so it is not helpful simply to argue that the risks of climate change should be minimized.

Some analysts argue that we can enjoy the benefits of reduced climate change risks without significant economic costs or even with net benefits from economic and environmental improvements arising from greenhouse gas control. They suggest that pervasive but latent markets exist whose failure to operate, once fixed, will yield substantial economic and environmental benefits. Many people who have examined this argument—including participants in IPCC Working Groups II and III—seem to agree that some low-cost reductions in greenhouse gases are feasible through revitalized markets for new product development. However, for reasons discussed below, I believe that some skepticism is warranted regarding sweeping claims about the potential for low-cost emissions reductions.

If a strict "precautionary principle" of the type sketched above is of limited practical use for evaluating the risks of climate change, there are also limits to what can be gleaned from conventional benefit-cost analysis. Climate change risks and policies inherently have substantial distributional effects that may operate both within generations (who bears what share of response costs) and across generations (how much the future benefits from our actions to reduce climate change risks). In addition, uncertainty surrounding the risks and costs of climate change is especially large, and there is at least the possibility of very large-scale impacts that human responses will have a hard time mitigating. These issues are not easily handled through normal benefit-cost calculations that calculate expected net benefits over time.

While there is no easy cookbook answer to what should go into a climate change decision framework, and no approach that commands universal agreement, several elements seem useful.

Think comprehensively about risks and costs. Given the number of risks associated with climate change, efforts to gauge the benefits of reducing them should be as broad as possible. Elements to consider include the impacts on market goods like agriculture; effects on human health; effects on nonmarket resources like wilderness areas and wetlands that provide both recreational values and ecological functions; and the ancillary benefits of greenhouse gas reduction such as improved air quality.

Given the current state of knowledge, it will be difficult to attach monetary values to many of these risk reductions. This uncertainty is likely to persist for many risk categories (especially those related to ecological impacts) even if uncertainty about the physical manifestations of climate change declines. Nevertheless, these risks are important to consider: lack of information about a risk should not be confused with that risk being negligible. Where economic assessments are problematic, information about the likelihood, potential magnitude, and timing of impacts still is useful for decisionmakers. In this connection, an assessment of climate change risks should go beyond a sequence of “best guess” estimates of atmospheric changes, biophysical impacts, and socioeconomic impacts. It is necessary to consider the variability of possible consequences as well. At the same time, the assessment should not be limited only to severe but unlikely effects in “worst case” scenarios.

Assessments of the costs of response options should similarly be broad and sensitive to uncertainties. For example, the overall economic costs of abatement policies that distort existing patterns of employment, investment, and innovation may be a multiple of direct out-of-pocket compliance costs. By the same token, technical progress over time in reducing greenhouse gases can lower abatement costs. Cost assessment should also address ancillary effects of policy responses—some positive, like reduction of conventional air pollutants with reduced energy use, and some negative, like increased indoor air pollution from tighter insulation, or increased pressures to develop hydroelectric capacity on scenic rivers. Finally, a comprehensive approach must be concerned with other greenhouse gases besides carbon dioxide (such as methane from pipeline leaks and landfills), and with changes in carbon sequestration in forests due to shifting land use patterns.

Think long-term. The risks posed by climate change depend on the path of changes in the atmospheric concentration of greenhouse gases over many decades and centuries, not just on the emissions of these gases over a relatively short period of time. The long-term aspect of climate change means that we are dealing with the cumulative effect of many smaller influences on the biosphere, a process with a great deal of natural inertia. Having to deal with the distant future greatly complicates risk assessment and the development of consensus for policy actions. To be effective, at least some actions must be taken in anticipation of long-term impacts, before all of the scientific evidence is clear. Our political system arguably is less effective at responding to such issues than to a single large and immediate concern. On the other hand, the long-term nature of climate change risks means we also have time to hone our scientific understanding and policy responses over time; we need not do everything right away.

Address adaptation. In a number of areas such as agriculture, managed forestry, and human settlements, intuition and experience in other contexts suggest a medium-to-high degree of potential adaptability to natural changes, given enough lead time and investment. Adaptation possibilities include development of new plant varieties and crop patterns, changes in irrigation technology, relocation of coastal infrastructure, and expanded protection of wetlands to compensate for their potential future damage. Failure to account for adaptation as a viable response to climate change will cause climate change risks to be overstated.

Adaptation may be difficult in other cases, for example in response to potential damage to natural ecosystems whose functions are not well understood. Even where adaptation seems

problematic, it should not automatically be treated as negligible. Improving the capacity to adapt where it is weak—as in many poor developing countries—may be the one of the most effective ways to respond to some climate change risks, at least until the cost of stabilizing atmospheric concentrations of greenhouse gases falls.

Think internationally. Long-term global climate change risks will not diminish to any significant degree until total *global* emissions are reduced. This will require global cooperation, not just action by today's rich countries. This point deserves to be underscored in light of the likely future decline in the share of total emissions from advanced industrial countries (currently about 50 percent) as economic growth proceeds in other areas. The efficacy of any policies the United States pursues to reduce climate change risks thus will depend on the actions taken by others.

No simple rules of thumb exist as to how the international burden of emissions control should ultimately be allocated. Developing countries note that rich countries are responsible for the vast bulk of emissions to date. They assert that allowing developed countries to maintain high emissions levels while constraining the growth of emissions in developing countries to reduce climate change risks would impose unacceptable burdens on the latter countries' economic development. Developed countries note that most emissions growth will occur in developing countries, that past economic progress has had at least some global benefits, and that simply treating all countries as having equal rights to carbon emissions (after adjusting for population differences) would impose unacceptably high control costs on developed countries. The ongoing tension over the responsibilities of different parties to the Framework Convention can only be resolved by negotiation among the parties themselves.

Keep distributional issues in mind. Climate change risks and response capacities vary with income level. There is also a fundamental asymmetry between the timing of response costs—which will be borne to a significant extent by the current generation—and the benefits of reduced climate change—which will largely accrue to future generations. This asymmetry complicates a comparison of benefits and costs, since we cannot simply compare the costs of reducing the risk with the value of enjoying the ultimate benefits. Instead, we must assess both the costs members of the current generation would bear and the strength of our concerns for the well-being of future generations—not just our own descendants, but all those who would be vulnerable in the future. These are economically and ethically complex questions about which we know little and which require a very mature political debate.

Some analysts have argued that intergenerational equity concerns should be incorporated into climate risk assessments by applying a lower "philosophical" discount rate to the evaluation of benefits received by future generations, so as to not trivialize these benefits relative to current costs. A weakness of this approach is that it attempts to reduce a very complex ethical debate to the value of a single parameter. A more general approach is to carry out the best possible assessment of the costs to be borne in the short to medium term (taking into account various effects on productivity and economic growth as well as such benefits as reduced air pollution), combined with the best possible enumeration of the potential advantages (physical and economic) of our actions for future generations. Such an approach would give policymakers the

information they need to make more explicit, well-informed judgments about the desired level of risk reduction.

Estimate control costs realistically. As already noted, some people argue that market inefficiencies are so rife, and opportunities for innovation so plentiful, that emissions abatement is actually a low-cost proposition that might even benefit the economy. This point of view is in sharp contrast to the outputs of economic models indicating that stabilizing emissions may cost as much as several percent of a country's gross domestic product (implying that deeper cuts in emissions to reduce greenhouse gas concentrations in the atmosphere would be even more expensive). This divergence of opinion reflects in part a long-standing disagreement about the cost of improving energy efficiency. Energy analysts have argued that opportunities for large and low-cost improvements in technical efficiency have been missed because of market failures that require government action, while economists have generally assumed that most of the supposed failures to act were actually rational responses to factors such as the likelihood that a new technology was not going to perform as expected.

Most people who have looked at the debate seem to agree that some low-cost improvements in energy efficiency exist. Reducing subsidies and other distortions in energy markets that encourage excess energy use can reduce greenhouse gas emissions while improving economic and environmental well-being. However, it is open to question whether these opportunities are substantial compared to, say, the amount of abatement needed to stabilize greenhouse gas emissions. Against the backdrop of future increases in global energy demand, the cost of longer-term reductions in greenhouse gas emissions cannot help but rise unless further progress occurs in the development of nonfossil energy alternatives. In assessing medium-to-long-term costs, it is a mistake to treat technical progress as a panacea for reducing abatement costs, or to assume no technical progress.

Another argument offered in the debate over the cost of greenhouse gas emissions reductions is that our tax system is so distorted that we can use energy taxes to reduce greenhouse gas emissions and use the proceeds to lower other taxes that hamper economic growth. However, recent analysis calls into question this "double dividend. While the technical details can be complicated, the basic point is that broader-based taxes like the income tax tend to cause less overall economic distortion than narrower-based taxes like energy taxes. Adjusting other taxes might soften the economic bite of an added carbon tax, but not to negligible levels. Moreover, any tinkering with the tax system is possible only if politicians take the difficult step of imposing higher energy taxes in the first place.

Most studies of greenhouse gas abatement costs assume the application of idealized least-cost policy measures like a comprehensive "emissions trading" program or a comprehensive carbon tax. The costs of meeting any particular emissions reduction goals likely will be significantly higher if less well-designed measures are followed. The debate about which greenhouse gas reduction targets are appropriate cannot be conducted independently of discussions about what concrete measures can and should be used to actually restrict emissions.

POLICY LESSONS

In assessing climate change policies, we must consider complex “portfolios” of actions that include abating emissions, investing in technical innovations to reduce emissions sources and increase adaptation capacity, and improving risk assessment. In putting together a portfolio of policies, it is important to consider the synergies among them, such as the effects of economic incentives to reduce greenhouse gas emissions on the rate of innovation for new energy sources and other types of emissions reduction options. Because of the long-term nature of the climate change problem, the ultimate goals for responding to it also must be long-term. Such a perspective offers increased opportunities for implementing low-cost strategies to reduce emissions and promote adaptation opportunities through new investment.

Beyond these general observations, the decision framework developed above has several implications for how to formulate policy.

Allow flexibility in the timing of cumulative emissions reductions to reduce overall costs. This approach takes into account the inertia in the economic system that makes rapid adjustments more costly; for example, it may be cheaper to replace long-lived electricity generating capacity more slowly while also achieving improved energy efficiency when the capital is replaced. It also provides increased scope over time for investments in knowledge to enhance technological change. The cost savings from intertemporal flexibility in meeting long-term emissions reductions goals depend on the assumptions made, but it appears that savings of at least 20 percent or more are possible.

Taking this approach does not mean that all or even most policy actions are deferred to the future. It simply means that the emphasis is placed on sequential decisions that add up to avoiding unacceptable damage from anthropogenic greenhouse gas emissions. Some actions will be appropriate in the short term as first steps down the policy path, or to enhance the domestic or international credibility of policy agreements. Other actions may be more useful later. Unless we start with a longer-term perspective, it is impossible to consider these tradeoffs.

Incorporate economic incentives into emissions-reduction policy. Such incentives are crucial to both short- and long-term policy successes because they make emissions limitations less expensive. Both a large body of analysis and a small but growing body of evidence in areas other than greenhouse gas control show that incentive-based policies help bring about the lowest-cost options and stimulate innovative new methods for abatement. (Both Articles 3 and 4 of the Framework Convention support the concept of such cost-effective policies.)

The main alternatives for incentive-based policies (beyond “no regrets” actions like reductions in energy subsidies) are carbon taxes on energy sources, and various forms of “tradable permits” systems. The latter approach would effectively establish quotas on emissions but allow trade in emissions, so that sources with higher control costs could (in effect) pay emitters with lower control costs to assume more of the reduction burden. A full discussion of the pros and cons of different tax and tradable permit schemes is beyond the scope of the paper. It should be noted, however, that both types of policies have advantages, and neither should be written off. Moreover, there are many policy combinations that might be relevant in future policy

debates (such as a mixture of emissions trading with command and control for different sectors) whose performance is largely unknown.

Provide opportunities for emissions reductions wherever possible. Given the international nature of the problem and the need for international action to solve it, policies should seek to provide abatement opportunities everywhere, not just in the industrialized countries that constitute the “Annex I” group under the Framework Convention—the group that already is committed to emissions reductions targets. One example of such opportunities is “joint implementation” (JI) programs, whereby emitters in, say, the United States, can satisfy any emissions reductions requirements they face through actions that reduce emissions in non-Annex I countries. The emissions reductions are achieved through the transfer of technology and investment to a host country in order to reduce emissions below some established baseline level. Formal emissions trading programs among sources in countries with quantified emissions reduction targets also are possible.

A number of analyses indicate that the cost savings from using JI and other forms of international emissions trading to meet emissions reduction goals could be very large. As with intertemporal flexibility, the savings depend on the assumptions made, but savings of 50 percent or more seem possible. At the same time, properly designed JI projects should convey considerable economic development and environmental benefits to host countries.

A number of practical problems need to be addressed in pursuing JI. There must be international agreement that such actions count toward meeting emissions reduction requirements, or else incentives to generate the reductions will remain weak. Procedures must also be established to ensure that large-scale JI trading volumes could occur without excessive red tape, while also ensuring that credible emissions reductions occur relative to some well-defined baseline. Last but not least, the credibility and appeal of JI to potential host countries in the developing world must be increased.

Encourage development of the climate change knowledge base and improved technology for emissions reduction. The flow of technology transfer and new investment occurring as a matter of course in world markets presents plenty of opportunities for greenhouse gas limitations. Particularly in a number of developing countries and economies in transition to market systems, many opportunities exist to improve energy and economic efficiency at the same time. Even where there are some costs to upgrading capital stock and improving energy efficiency, they may be more than offset by the gains from improved environmental quality. To realize these gains requires policymakers worldwide to come to grips with broader handicaps that thwart economically sound and environmentally sustainable development.

Even if we do all the best things possible to reduce emissions given the current state of knowledge, economic growth—especially in developing countries—will continue to push up greenhouse gas emissions and atmospheric concentrations. Unlike limiting pollutant gases such as sulfur dioxide, for which a variety of technical control options is available, limiting carbon dioxide emissions requires either reduced energy use (greater energy efficiency) or substitution of energy sources with lower carbon content. To avoid unacceptable climate change risks ultimately will require a fundamental change in our energy systems toward much greater reliance

on other energy sources—solar, biomass, and possibly nuclear. Such a transition would be too costly now, given the current state of knowledge. To make the transition economically manageable will require continued or enhanced investments in basic and applied knowledge.

The government has an inescapable role to play, not just in creating the incentives for private parties to seek better technologies but also in funding the development of basic knowledge about technology as well as climate change impacts. At the same time, we must recognize that our understanding of what policy can actually do to induce climate-friendly innovation is weak at best. We must also recognize that diverting resources from other areas to research on low-carbon energy systems may well reduce innovation elsewhere in the economy—technical progress is not a free good.

Increase the emphasis on adaptation. Adaptation is part of an optimal response strategy in any event. Indeed, it is the means of transcending the narrow concern about our vulnerability to climate change from greenhouse gas emissions to a broader concern with global-scale changes that place stress on natural systems and pose threats to human well-being. Furthering human capacity to adapt to climate change entails investment in improved understanding of the options and their international diffusion. It also entails adjusting economic and other distortions that limit adaptation potential (such as assistance programs that subsidize coastal development or water use). In many cases, the best climate policy may have little to do with greenhouse gases or climate per se, and much more to do with developing better basic social infrastructure for natural resource conservation and use and public health protection.

CONCLUDING REMARKS: THE U.S. DRAFT PROTOCOL

The “U.S. Draft Protocol Framework” which the Clinton Administration issued on January 17, 1997 embraces a number of policy ideas that, if implemented, could significantly enhance the cost-effectiveness with which any emissions reduction targets are achieved. To comply, countries agreeing to emissions limits would be allowed to average emissions over a number of years (though a precise number is not proposed in the framework). They would be able to trade emissions internally and internationally (not just within specified groups, like the European Union), and they would be able to bank emissions for future use. To smooth out the cost of emissions reductions over time, they could borrow from the future to meet current obligations. (Both unspecified limits on volumes borrowed and a significant (20 percent) “repayment premium” on borrowed emissions allowances are included to help ensure that the achievement of long-term emissions reductions goals would not be undermined. However, the use of both tools for this purpose is redundant, and the high repayment premium will cause uneconomically early emissions reductions.)

Developing countries would be encouraged to participate in several ways. Joint implementation with countries not yet accepting national emissions targets would be fully sanctioned, including fully usable and transferable credits for emissions reductions. In addition, developing countries would be required to identify and adopt “no regrets” measures for greenhouse gas reductions, and all countries would be required to “facilitate investment in climate-friendly technologies.” although these important action areas are not spelled out in any

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be lower
Just about
all countries
can borrow
from today
can we borrow?

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[Can borrowing also...]

detail. Emissions reporting procedures and practices also would be strengthened. Finally, while no future emissions targets for developing countries are specified, the proposal does call (in Article 16) for all countries to accept some quantified emissions limitation targets (which could be different from the targets accepted by developed countries) by a particular future date (2005 is suggested in the draft). This proposal is consistent with the idea that comprehensive participation ultimately is required for success in avoiding unacceptable impacts of climate change, though it is bound to be controversial among developing countries who do not currently have any emissions limitation targets.

In establishing international emissions targets among industrialized countries (a new "Annex A" group that includes the current Annex I countries), the U.S. proposal calls for all such countries to reduce their emissions over time by common (not yet specified) percentages of their respective baseline levels. Other countries that either have achieved substantially greater energy efficiency improvements earlier or believe that such reductions may simply be too costly in light of their fossil fuel use hotly contest this approach. It remains to be seen whether the United States can secure agreement for its approach or will be forced to modify it.

The U.S. Administration has stated that it will accept and support legally binding emissions reductions. The draft protocol does not specify any concrete emissions targets (although it does call for periodic review of whatever targets are established). The actual targets remain to be negotiated, and the proposal does not indicate what criteria should be used to determine acceptable targets from the U.S. perspective.

Last but not least, the draft protocol does little to address adaptation. This neglect reflects not a weakness in the proposal so much as a broader weakness in the Framework Convention, which has viewed adaptation as an individual country concern. Adaptation must gain greater prominence in the debate over climate policies.

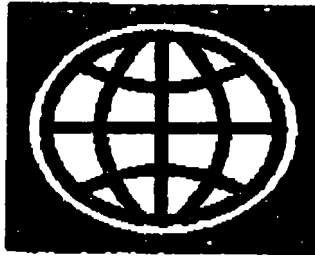
The U.S. draft protocol is an important contribution to the negotiating process and to domestic debate over U.S. climate policies. However, further discussion of the issues identified above—and of the analyses the Administration and others are performing to determine what it will cost to meet different emissions reductions targets—is a prerequisite to building broader understanding of climate change risks and policies, and political support for a new climate agreement.

FURTHER READING

For a broad overview of all climate change issues, some perusal of the three volumes of the IPCC Second Assessment Report is essential. All three have the main heading "Climate Change 1995" and the following subtitles: "The Science of Climate Change" (Working Group I), "Impacts, Adaptations and Mitigation of Climate Change: Scientific-Technical Analysis" (Working Group II), and "Economic and Social Dimensions of Climate Change" (Working Group III). Each volume contains a Summary for Policymakers that is quite informative (though not a perfect guide to the contents of the volume), and the first two volumes contain Technical Summaries as well. The main body of each report contains a wealth of information and analysis, though some

of it is quite technical and, in some cases, a little dated. The reports are published by Cambridge University Press (fax: 212-691-3239). Find out more about the IPCC at <http://www.unep.ch/ipcc/ipcc-0.html>. Find out more about RFF's Climate Economics and Policy Program at <http://www.rff.org>.

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The World Bank Group

Statement By
Mr. James D. Wolfensohn
President

At the United Nations General Assembly
Special Session

"Towards Global Sustainability"

OFFICE OF THE SECRETARY
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June 25, 1997

James D. Wolfensohn
Remarks to the United Nations Special Session
June 25th 1997
TOWARDS GLOBAL SUSTAINABILITY

1. Mr. President, Mr. Secretary-General, Distinguished Heads of State, National Delegates, and colleagues from the U.N. system.
2. Five years ago in Rio, governments from around the world came together and committed themselves to a more equitable and sustainable world.
3. Five years later the picture is very mixed. As an institution dedicated to reducing poverty, we at the Bank are more aware than ever of the continuing link between the degrading environment and the poverty still afflicting so many of the world's people. Less than a quarter of the world's people consume three-quarters of its raw materials, while 3 billion people still live on less than \$2 a day.
4. At the global level we have not achieved our objectives.
5. Today, however, at the national level, we have seen a highly positive shift toward environmental responsibility, with a third of our client countries implementing national environmental strategies.
6. On a positive note, the GEF has become an effective financing mechanism to address global environmental issues. It must be replenished generously this year. The World Bank, as an implementing agency for the GEF and Montreal Protocol and in its own lending portfolio, has worked to help countries fulfill their global commitments, but is committed to doing more, as I believe we all must. Today I will outline a plan of action in 5 areas where I believe the Bank - working in partnership with many of you here - can make a real difference.
7. **First on Climate Change.** Progress has clearly been inadequate. Only 3 of the OECD countries are likely to reach their non-binding commitments under the Convention for the year 2000. It is essential that at the Kyoto meeting later this year industrial countries make a strong commitment to significantly reduce greenhouse gas emissions -- and that these commitments be implemented.
8. Continued global warming is in nobody's interest but the simple facts of the matter are that the developing countries will suffer the most damage, and their poor will be at an even greater disadvantage. I see the Bank's role in Climate Change as providing every opportunity to developing countries to benefit from the huge investment the OECD must make in reducing climate change.

9. I believe that progress would be facilitated if Joint Implementation with crediting were permitted under the Convention. I recognize that this is a sensitive issue, but I believe the gains for both the global environment and our client countries could be substantial. Under this voluntary mechanism, which need not imply aggregate emission limitations for developing countries, tens of billion of dollars could be saved annually by 2010. Of course, the savings must be shared equitably between our client countries and the OECD countries. Developing countries could apply these savings, as they choose, to facilitate expanded development financing and technology transfer. These savings must also result in larger binding commitments to reduce emissions on the part of industrial countries.

10. To help make these gains a reality, the World Bank would be willing to launch a Carbon Investment Fund, should Parties to the Convention find this helpful.

11. In addition, to promote renewable energy, we are exploring a broader strategic partnership with the GEF and other financiers that would move us towards a large-scale program of renewable energy investment.

12. Second, on biodiversity; we simply won't succeed unless environmental values can be reflected in the marketplace.

13. With this in mind, the Bank is creating "Market Transformation Initiatives" with the private sector and NGOs to move the forest and marine products industries to a truly sustainable base.

14. As a first step, I am inviting the CEOs of some of the world's leading forest products companies and conservation organizations to join forces with the Bank to arrest the current unacceptable rate of forest degradation.

15. I am also pleased to announce a global alliance between the Bank and WWF to help arrest the loss of forests globally. We are committed to work together, and with others, towards achieving by the year 2000 a representative network of protected areas amounting to at least 10% of each of the world's forest types. And, in Bank client countries we will strive to achieve an additional 50 million hectares of forest ecosystems under strict conservation, and an additional 200 million hectares of tropical, temperate and boreal forests under genuinely sustainable management with independent certification, by the year 2005.

16. Third, let me turn to ozone depletion - the major bright spot in dealing with global environmental issues - but even here, much more needs to be done.

17. A major remaining challenge is to eliminate CFC and other ozone-depleting substance production in Russia. This accounts for nearly half of remaining CFC production world wide and, through illegal smuggling to other countries, is threatening to undermine the effectiveness of the Montreal Protocol.

18. The Bank, in collaboration with the Russian CFC producers and government, has developed a program to eliminate CFC production in Russia by 2000.

19. We now need to complete the necessary fund raising, and we seek your support in this critical endeavor.

20. Fourth, addressing desertification is essential for poverty reduction and food security in developing countries.

21. The Bank is already the largest financier of drylands investment, but we can and must do more.

22. We have embarked upon a revitalized Rural Strategy -- in which the links between poverty and land degradation are given special emphasis. We are helping introduce improved agricultural techniques to stem the spread of further desertification, and to restore degraded land.

23. We offer to assist the Desertification Convention -- in partnership with others -- in establishing mechanisms for mobilizing financing, and coordinating implementation.

24. Fifth, the water crisis. Twenty countries now are water scarce or stressed, and the number will double by 2020.

25. Developing countries will need to invest about US \$600 billion over the next decade on water. The Bank expects to lend about US \$35 billion during this period, following the Dublin principles.

26. The Global Water Partnership offers an opportunity to solve water issues in a more holistic way, and to raise additional financial resources. We are committed to make this work, and to continue working in partnership on the Regional Seas Programs.

27. In all these areas, the World Bank will work in partnerships with others.

28. We will expand our work with the private sector to promote practical business opportunities for sustainable development.

29. We will join others to promote higher standards of environmental and social performance for private and public investments around the world. As an example, with the World Conservation Union, we are launching an International Advisory Commission on Large Dams to help raise standards for all large dams.

30. I recognize that we must work harder to make absolutely sure that our own house is in order.

31. With this in mind I would like to inform you of two important changes in our own organization.

- First, we will be consolidating the supervision of our environmental and social activities across the entire World Bank Group including IFC and MIGA. With our private sector operations assuming greater prominence, it is vital that all of our activities have the same high standards.
- Second, we will be establishing a stronger system of compliance monitoring for environmental policies within our own operations. Details will be announced in the near future.

32. Mr. President, Mr. Secretary-General, Distinguished Heads of State and colleagues, the growing global problems of climate change, biodiversity, forest loss, desertification and water are seriously threatening the long-term development of many of our client countries - with the poor paying the highest price.

33. These are not fringe activities. They are central to meeting human needs and reducing poverty. I wholeheartedly commit the Bank to do all it can to forge a global partnership to promote equitable approaches to global environmental issues, and to do so quickly. Time is not on our side. This agenda cannot afford to wait.