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Subseries:

OA/ID Number: 19208
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Congressional Testimony on Climate Change 2/4/98 - 6/4/98 [2]

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STATEMENT FOR THE RECORD

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for the

**HEARING ON THE KYOTO PROTOCOL TO THE UNITED NATIONS
FRAMEWORK CONVENTION ON
CLIMATE CHANGE**

HOUSE COMMITTEE ON SMALL BUSINESS

JUNE 4, 1998

INTRODUCTION

On behalf of the Small Business Survival Committee (SBSC) and its more than 40,000 members across the nation, I appreciate the opportunity to offer the following comments regarding the potential impact of the Kyoto Protocol, or "Global Warming Treaty," agreed to this past December by the Clinton Administration in Kyoto, Japan.

SBSC is an advocacy and information organization that supports policies which promote the survival and growth of the entrepreneurial sector of our economy.

As I will more fully explain in a moment, SBSC opposes the Global Warming Treaty for several reasons, but primarily due to the crushing costs that would be imposed on businesses of all sizes and in practically all industries, as well as on consumers and the economy in general.

As most studies of the Global Warming Treaty indicate -- whether performed by private industry or by the Clinton Administration itself -- this treaty will be an indiscriminate killer of businesses and jobs. And this will be the case no matter what the means utilized to reduce so-called "greenhouse gas emissions" -- primarily CO₂ -- that is, whether through higher taxes, increased regulations, an emissions "cap and trade" system, or some combination of these options.

Like other Americans, we also have other concerns about this treaty, such as national security implications, the fact that it is based on, to be generous, debatable science, the exclusion of "developing" nations, the foreign aid and transfer of wealth implications among nations, as well as the often secretive and at times misleading methods used by the Clinton Administration in seeking to advance its global climate policies.

BACKGROUND

Make no mistake, government-imposed costs inflict considerable harm on smaller enterprises.

Small businesses often operate on tight margins, struggling to stay alive month to month and year to year. This is perhaps best illustrated by the fact that more than half of new businesses fail or reorganize within five years, as noted by the U.S. Small Business Administration (SBA).

At the same time, however, small businesses have long proven to be the wellspring of innovation, invention and job creation in our economy. In any given year, smaller businesses also account from anywhere from two-thirds to more than 100 percent (large firms often shed more jobs than they create) of net job creation. So, these high-risk ventures are critical to the economy.

Unfortunately, increased government-imposed costs weigh heavily around the necks of entrepreneurs. For example, according to an SBA study, the annual per employee costs of federal regulations range from \$2,979 for businesses with 500 or more employees to \$5,195 for businesses with 20 to 499 employees to \$5,532 for businesses with fewer than 20 employees. Regulatory economist Thomas Hopkins estimates that the real costs of federal regulations are expected to rise by more than 30 percent between 1988 and 2000.

Starting up and investing in businesses are high-risk ventures. If government imposes weighty taxes and regulations, then fewer enterprises will be created, fewer will survive, and job creation will wane.

If implemented, the Kyoto Protocol would guarantee that governmental burdens on entrepreneurs -- indeed, on businesses of all sizes -- would continue to rise, thereby damaging economic growth and job creation.

QUESTIONABLE SCIENCE

When it comes to global warming, a major question persists: Does it make sense from either an economic or environmental viewpoint to impose weighty costs (as will be illustrated later) given the current state of science on the issue?

While we at SBSC are not climate scientists, a general review of the literature and results of various polls show that a scientific consensus on the existence of global warming and its potential effects simply does not exist.

For example, according to ground-level measurements, the earth's average temperature has increased by 0.5C over the past 100 years. However, much, if not all of that increase occurred before 1940. Meanwhile, satellite measurements indicate no warming trend over the past two decades, but a slight cooling.

Meanwhile, in the December 15, 1997 issue of *Insight* magazine, reporter Jennifer Hickey noted the following findings:

* Only 13 percent of scientists polled by Greenpeace believe that there will be catastrophic consequences if consumption remains at present levels.

* A recent Gallup Poll of members of the American Geophysical Society and the Meteorological Society found that just 17 percent believe that greenhouse-gas emission have been responsible for global warming.

* Citizens for a Sound Economy found that 89 percent of the scientists they polled agreed that "current science is unable to isolate and measure variations in global temperatures" caused by humans.

* The United Nations' Climate Change Bulletin surveyed 400 climate scientists and found they could not agree that "global warming is a process that is already under way."

In addition, S. Fred Singer, an atmospheric physicist and president of the Science & Environmental Policy Project, noted the following in the May 5, 1998 *Washington Times* ("Scientists Add to Heat Over Global Warming"):

"The Global Warming Treaty and its shaky science are under attack by the largest group of scientists ever. A petition, initiated by the Oregon Institute of Science and Medicine and endorsed by more than 15,000 scientists, urges President Clinton not to sign the Climate protocol negotiated in Kyoto, Japan, last December....

"The 15,000-plus signers, about two-thirds of whom hold advanced academic degrees, question the uncertain science underlying the protocol, noting it does not agree with atmospheric data."

Singer goes on in his article to also note how some top proponents of global warming -- including the National Academy of Sciences -- were warning of a drastic cooling of earth temperatures in the 1970s.

Writing in *The Wall Street Journal* on December 4, 1997 ("Science Has Spoken: Global Warming Is a Myth"), Arthur Robinson and Zachary Robinson, chemists at the Oregon Institute of Science and Medicine, simply declare:

"The global warming hypothesis ... is no longer tenable. Scientists have been able to test it carefully, and it does not hold up. During the past 50 years, as atmospheric carbon dioxide levels have risen, scientists have made precise measurements of atmospheric temperature. These measurements have definitively shown that major atmospheric greenhouse warming of the atmosphere is not occurring and is unlikely ever to occur.

"The temperature of the atmosphere fluctuates over a wide range, the result of solar activity and other influences. During the past 3,000 years, there have been five extended periods when it was distinctly warmer than today. One of the two coldest periods, known as the Little Ice Age, occurred 300 years ago. Atmospheric temperatures have been rising from that low for the past 300 years, but remain below the 3,000-year average."

In contrast, the myth that the scientific community has arrived at a consensus on global warming is supposedly buttressed by a letter circulated by a group called Ozone Action and signed by 2,600 scientific experts. However, an analysis by Citizens for a Sound Economy indicates that less than 10 percent of signees possess expertise in any scientific discipline related to climate science.

Also, it is quite interesting that Janet Yellen, chairwoman of President Clinton's Council of Economic Advisers, has raised the issue regarding the "futility" of econometric models to predict the future -- specifically, "the economic impacts of a given climate change policy" -- but the Administration raises no questions about models predicting future climate changes.

Meanwhile, Frances B. Smith reports in the September 1997 issue of *Consumers' Research Magazine* that "as computer models are adjusted and new data are incorporated, the predicted

temperature rise has gotten smaller and smaller -- from about 5C over the next century to the current prediction of less than 2C."

THE EXCLUSION OF DEVELOPING NATIONS AND FOREIGN AID

In the November-December 1997 issue of *Foreign Affairs*, Thomas C. Schelling, a Distinguished Professor of Economics and Public Affairs at the University of Maryland, and a believer in the potential woes of global warming, acknowledged the following: "Any costs of mitigating climate change during the coming decades will surely be borne by the high-income countries." He continued: "Any action combating global warming will be, intended or not, a foreign aid program."

Therefore, problems with the Kyoto Protocol are two-fold. First, "developing" countries are not required to reduce their "greenhouse-gas" emissions, and therefore, businesses in those nations will avoid the draconian costs heaped onto the backs of U.S. firms. These "Third World" companies will possess clear cost advantages in international markets, hurting U.S. exports, as well as advantages in U.S. markets themselves, cutting consumption of domestically produced goods and services by U.S. consumers.

Under this treaty, U.S. industry also will possess the perverse incentives to move manufacturing facilities -- and therefore jobs -- to these nations. (Environmentally, one has to ask whether this makes any sense, given the fact that these nations will be jacking up their CO2 emissions considerably one way or another?) However, small firms rarely, if ever, shift their operations overseas, and will therefore bear a heavy burden under the global warming treaty here

at home.

Salt is rubbed into these U.S. economic wounds by the fact that under any kind of international system of CO2 credits (a system approved in Kyoto but in no way detailed) the U.S. will wind up sending resources to other nations in a kind of foreign aid payment.

ADMINISTRATION TACTICS

Another concern regarding the Kyoto Protocol has been the Clinton Administration's tactics in advancing their agenda. For example, in order to reach an agreement in Kyoto, Administration negotiators set a dangerous precedent regarding national sovereignty and security. The Center for Security Policy explains in a December 15, 1997 Perspective ("The Senate Must Insist on an Early Vote on the Kyoto Treaty"):

"... the GCCT [Global Climate Change Treaty] sets a totally unacceptable precedent that must be repudiated at once. According to *The Washington Times*, in order to get agreement on Al Gore's treaty, the U.S. delegation was obliged to abandon 'its plan to exempt U.S. military training and overseas operations from fuel cutbacks that would be needed for the United States to reach its target.' The Times goes on to report that, 'In the draft treaty, only overseas actions approved by the United Nations would remain exempt as would training and combat in international waters.'"

My SBSC colleague, Christopher Horner, noted in recent congressional testimony another worry, i.e., that the Clinton Administration might not wait for Senate approval before implementing the Global Warming Treaty:

"Recently uncovered internal EPA documents disclose that as far back as 1994 the Administration began cataloguing ways to reduce 'greenhouse gases.' As the

documents also show, the effort expressly was to focus on those efforts most likely not requiring legislative approval. Included among the recommendations are a shocking assortment of big government dream programs: 1) a 50 cent per gallon additional gas tax, to be implemented without congressional approval under Section 232 of the Trade Expansion Act of 1962 (estimated cost to motorists-\$47 billion in the year 2000 alone); 2) seven individual energy taxes, including a carbon tax, 'greenhouse tax,' and the failed Btu tax; 3) ways to encourage an increase in state taxes to fund the highway Trust Fund, to 'fully price roads,' at an estimated cost per household of \$400 per year, 4) further auto emission reduction requirements; 5) increased fees on automobile inspection and maintenance."

Another issue is the Administration's cavalier treatment of U.S. Senate concerns. In July 1997, the U.S. Senate had expressed unanimous approval (95-0) of the "Byrd/Hagel Resolution," which expressed the Senate's position that the Administration should neither sign a treaty, nor send one to the Senate for ratification if such a treaty would a) harm the U.S. economy, or b) not include binding commitments by "developing countries" to reduce greenhouse gases. The Administration then promised the Senate "meaningful participation" from developing nations currently exempt from the treaty. However, in mid-May at the Birmingham Summit of the G-8, the Administration signed a communiqué stating, "We look forward to increasing participation from developing countries, which are likely to be most affected by climate change and whose share of emissions is growing. We will work together with developing countries to achieve voluntary efforts and commitments, appropriate to their national circumstances and development needs."

Finally, Janet Yellen, chairwoman of the White House Council of Economic Advisors, claims that a new Administration study shows the Kyoto protocol having only "modest" impacts on the U.S. economy and jobs. However, while the Administration is reportedly using this analysis to negotiate with developing nations in order to get them to "meaningfully participate"

in the Global Warming Treaty, this information is not being released to the American public for evaluation. This, despite the fact that the Administration promised the Congress and the American public a full economic impact analysis on reduced greenhouse gas emissions to 1990 levels a year prior to the Kyoto negotiations. Now, of course, emissions are to drop to 7 percent below 1990 levels, but still no economic analysis.

As a result, SBSC filed a Freedom of Information Act request with the Council of Economic Advisors on May 18 for any and all of the economic analysis developed, utilized and cited by the Clinton Administration in the context of the Kyoto Protocol. The American public has a right to know what taxpayer-financed economic studies conclude and why top advisors at the White House were and are so divided on the issue of the Global Warming Treaty.

COSTS

Still, as a small business group, SBSC's primary concerns grow from the massive costs that would have to be imposed on businesses, consumers, and the economy in order to implement the Kyoto Protocol. And even if such costs were imposed, it is highly doubtful that emissions reduction goals could ever actually be met.

In his aforementioned November-December 1997 *Foreign Affairs* article, Professor Thomas C. Schelling of the University of Maryland exhibited incredible cavaliness regarding the costs of dealing with global warming by offering a declaration that only could be made by a cloistered ideologue: "Slowing global warming is a political problem. The cost will be relatively low: a few trillion dollars over the next 30 or 40 years..." Of course, those lost trillions of dollars

in GDP across the globe translate into lost businesses, jobs, consumer goods for adults and children, and continued or increased poverty for many.

At least one can say that Schelling is honest. Proponents of the Global Warming Treaty must be aware of the costs that would be inflicted, but, like Schelling, they cannot really care all that much. For the United States, the cost of emission reductions will be particularly brutal because, as Professor Richard Cooper points out in the March-April issue of *Foreign Affairs*, emissions are expected to grow by 30 percent between 1990 and 2010. That means, given the Administration's Kyoto pledge that U.S. emissions would be decreased to 7 percent below 1990 levels by 2012, the U.S. will have to reduce emissions by almost 40 percent.

Indeed, most studies attempting to assess the impact of the Global Warming Treaty -- whether performed by private industry or by the Clinton Administration itself -- indicate this treaty will be an indiscriminate killer of businesses and jobs. And this will be the case no matter what the means utilized to reduce so-called "greenhouse gas emissions" -- primarily CO₂ -- that is, whether through higher taxes, increased regulations, an emissions "cap and trade" system, or some combination of these options.

Taxes. The most often cited tax that would be implemented in order to reduce energy consumption and therefore "greenhouse gas" emissions is a carbon tax.

The administration of such a tax is fairly simple-boosting its appeal to those advocating a tax increase -- as it would be levied at the wholesale level on fossil fuels based on carbon content. However, it is not necessarily efficient in terms of controlling CO₂ emission because different uses of fuel produce different emission levels. Yet, the costs would be massive.

Emissions "Cap and Trade" System. Another method for reducing energy

consumption and emissions would be a CO2 trading program which would require the purchase of CO2 credits in order to maintain current or possibly expand emissions. In a 1994 document, the EPA noted the troubles facing an overt energy tax, and then cynically noted the following about a "cap and trade" system: "A cap would likely not be as unpopular as a tax, since people are generally less familiar with the concept."

The administration of such a tradable credit system would be nearly impossible both domestically and internationally. In an October 1997 study for the Center for the Study of American Business, Frank Reuter notes:

Even within a single nation, administering a tradable emission permit policy would be difficult and expensive. It would involve monitoring the emissions of greenhouse gases from all sources, comparing the measured emissions with the amounts authorized for individual sources by the permits that they possess after all trading has been completed, and enforcing compliance with the terms of their permits by sources that have discharged excess emissions. These tasks would be exacting even if greenhouse gases were released only from stationary sources.

"A substantial portion of CO2 emissions, however, is discharged from mobile sources. The administrative feasibility and cost-effectiveness of applying emission permits to mobile sources are doubtful. More than 200 million motor vehicles are currently registered in the United States alone....

"Moreover, administering the implementation of an emission permit policy would be even more difficult if the permits were tradable internationally. Different nations perceive different risks from prospective climate change, and face different domestic issues that are competing for their scarce resources and attention....

"As a result, negotiating suitable inducements to achieve universal participation in such a policy among a group of sovereign nations and establishing adequate international sanctions to ensure uniform compliance with the policy by all nations would be arduous tasks. Obtaining full cooperation among developing nations would be particularly daunting. Yet, such cooperation is essential to coherent policy."

Bottom line, the purchase of such tradable credits will raise costs to businesses,

consumers and the economy. Auctioning off such credits assures that the "cap and trade" system carries the same costs as straightforward taxes, with the same detrimental economic effects.

Smaller businesses would be at a distinct disadvantage under such a scheme as bidding -- perhaps international bidding -- raised the price of credits. Particularly perverse, such a system could have the effect of protecting entrenched businesses by jacking up costs for smaller and new enterprises. Indeed, many businesses would not come into existence at all due to higher energy costs.

In addition, manufacturers exposed to international competition at home and in foreign markets -- which most are today -- would suffer due to lower energy costs in developing nations.

Estimating the Economic Costs. A wide range of studies show tremendous losses in output and jobs resulting from the Global Warming Treaty. For example:

□ WEFA (formerly Wharton Economic Forecasting Associates) analyzed the potential economic impact of reducing U.S. carbon emissions to 1990 levels by 2010. They found the following:

* Lost GDP, just in the year 2010, would equal \$227 billion (in 1992 dollars).

* "On a per person or per household basis, the cost of adopting the Administration's carbon abatement policy results in a real GDP loss by 2010 of \$838 per person and \$2,061 per household. Cumulatively, for the period 2001 to 2020, the loss of aggregate income (real GDP)

per household would average almost \$30,000 (in 1996)."

* Steep price increases would be felt by both consumers and businesses. For example, consumer's would face price increases of 55 percent on home heating oil by 2010, and 79 percent by 2020; 50 percent on natural gas by 2010, and 79 percent by 2020; 48 percent on electricity by 2010, and 71 percent by 2020; 36 percent on motor gasoline by 2010, and 65 percent by 2020 (translating in an additional 44 cents per gallon by 2010, and 65 cents by 2020).

* Commercial establishments would see price hikes of 74 percent on distillate fuel oil by 2010, and 106 percent by 2020; 58 percent on natural gas by 2010, and 90 percent by 2020; and 52 percent on electricity by 2010, and 77 percent by 2020.

* Industrial facilities would witness price increases of 139 percent on residual fuel oil by 2010, and 200 percent by 2020; 91 percent on natural gas by 2010, and 132 percent by 2020; and 73 percent on electricity by 2010, and 101 percent by 2020.

* Trucking and rail would see a 42 percent increase in the price of diesel by 2010, and 61 percent by 2020 (translating into 51 cents per gallon by 2010, and 76 cents by 2020).

□ A May 1998 report by CONSAD Research Corporation ("The Kyoto Protocol: A Flawed Treaty Puts America at Risk") estimated that the Kyoto Protocol would devastate the U.S. economy. Specifically:

* By 2010, employment losses would range between 1.6 million and 3.1 million. Lost output in 2010 would register between \$178 billion and \$316 billion (in 1995 dollars).

* The analysis estimates job and output losses by state and region as well. For example, regionally, by 2010, New England could lose up to 133,000 jobs and \$12.5 billion in output (again, in 1995 dollars); the Mid-Atlantic states up to 400,000 jobs and \$39.8 billion in output; East North Central 524,000 jobs and \$49.9 billion in output; West North Central 184,000 jobs and \$17.8 billion in output; South Atlantic 533,000 and \$45.4 billion in output; East South Central 180,000 jobs and \$19 billion in output; West South Central 523,000 jobs and \$65.2 billion in output; Mountain 201,000 jobs and \$20.8 billion in output; Pacific Contiguous 522,000 jobs and \$45.2 billion in output; and Pacific Noncontiguous 24,000 lost jobs and \$2.3 billion in lost output.

* Also, the study estimates lost jobs and output by industry sectors. By 2010, manufacturing could see as many as 695,000 lost jobs and \$137 billion in lost output; mining 260,000 jobs and \$47.6 billion in output; construction 117,000 jobs and \$9.3 billion in output; finance, insurance and real estate 180,000 jobs and \$22.8 billion in output; trade 738,000 jobs and \$47.9 billion in output; services 1,118,000 jobs and \$41.9 billion; and agriculture/forestry/fishing services 30,000 jobs and \$533 million in output. Also, transportation and public utilities would be estimated to actually gain 11,000 jobs, but still lose \$9.9 billion in output.

□ **In March 1998, the American Petroleum Institute (API) released a blunt and alarming**

report assessing the costs of reaching the Kyoto Protocol goal of reducing U.S. "greenhouse gas" emissions to 7 percent below 1990 levels by 2008-2012. API senior economist Ronald A. Sutherland notes in "Achieving the Kyoto Protocol: An Analysis of Policy Options," "If the U.S. were to achieve this target by the year 2010, carbon emission would have to decline by 2.32 percent per year from the year 2000, instead of increasing by 1.5 percent per year as in the [Energy Information Administration's] Reference Case projection."

The author shows that altering the carbon/energy ratio or the development of new technologies will not come close to being enough to reduce carbon emissions. Indeed, continued economic growth and capital stock renewal will ensure that carbon levels continue rising.

The author notes only two avenues that will allow the U.S. to meet its Kyoto Protocol goals: "A decline in GDP of about 4 percent per year would reduce the demand for energy and thereby carbon emissions sufficient to achieve the Kyoto target. Alternatively, an increase in the price of energy of about 12 percent per year for a ten year period also would achieve the Kyoto target."

He concludes: "Either of these changes would impose unacceptable costs on the American economy." To say the least. According to these estimates, in effect, an extended U.S. economic depression would be necessary in order to meet Kyoto Protocol goals.

□ A DRI-McGraw Hill study by Dr. Lawrence Horowitz found the following:

* a \$100 per ton carbon tax could lower emission levels close to 1990 levels by 2010 and would cost the economy \$203 billion annually in lost output;

* a \$200 per ton carbon tax would be required to reduce emissions below 1990 levels, and would cost the economy \$350 billion in lost products and services;

* annual job losses from 1995 to 2010 under a \$100 per ton carbon tax would hit 520,000, and would leap to 1.1 million annually under a \$200 per ton carbon tax;

* gasoline prices could jump by as much as 60 cents per gallon, and electricity costs could increase by 50 percent, and home heating oil by 50-100 percent.

□ Resources Data International Inc. (RDI) was retained last year by Peabody Holding Company Inc., reportedly the world's largest private coal producer, to study the economic impact of a new global warming treaty. RDI estimated that a \$100 per ton carbon tax imposed in order to reduce CO2 emissions to 1990 levels would:

* limit the annual growth rate in the supply of electricity between 1995 and 2015 to 0.83% from a projected 1.45%;

* place up to \$1.314 trillion, or 14% of GDP, at risk in 2010 and up to \$16.823 trillion cumulatively from 2005 to 2015.

RDI estimates that any kind of CO2 trading program would mimic the effects of a carbon tax, with the federal government collecting at least \$133 billion annually.

□ As the Heritage Foundation notes in a recent report ("The Road to Kyoto" by Angela Antonelli, Brett D. Schaefer and Alex Annett, October 1997), the U.S. Department of Energy had the Argonne National Laboratory perform a study on the Kyoto Protocol under consideration. In February 1997, the study found that it would cause:

*** 20 to 30 percent of the basic chemical industry to move to developing countries within 15 or 20 years;**

*** all primary aluminum smelters to close by 2010;**

*** a 30 percent decline in the number of steel producers at a cost of 100,000 jobs;**

*** domestic paper production to be displaced by imports;**

*** a 20 percent reduction in the output of petroleum refiners; and**

*** the closing of between 23 percent and 35 percent of the cement industry, which is significant because many cement plants are major employers in small communities.**

□ However, as noted above, recent statements by the Chairwoman of the White House's Council of Economic Advisers, Janet Yellen, claim a "modest" impact on the economy.

J.T. Young, chief economist for the Republican Policy Committee in the U.S. Senate,

explained the woes of Ms. Yellen's assertions in a recent Washington Times article ("Kyoto Treaty's Ultimate Costs," May 11, 1998):

"... hyperbolic assumptions allowed Mrs. Yellen to give the lowest estimate of the Kyoto agreement's costs ever released [in March 4, 1998 congressional testimony]. 'Our overall assessment is that the economic cost to the United States will be modest; an emissions price in the range of \$14 to \$23 per ton of carbon equivalent. This translates into an increase in gasoline prices of 3 to 4 percent (or around 4 to 6 cents per gallon).'

"Strangely enough, the administration is known to have done three recent studies of the economic costs arising from lowering greenhouse gas emissions just to the 1990 level: the Interagency Analytical Team (IAT) estimate done in June 1997; the Department of Energy (DOE) estimate done by five of its laboratories (the Five lab Study) in September 1997; and the estimate by the Energy Information Administration (EIA) of DOE done in October 1997.

"All three studies were conducted by the administration within the last year. In contrast to Mrs. Yellen's statement, all three provide a detailed list of assumptions and calculations on which their estimates are based. All three also assume less emissions reduction-only to 1990 levels, not 7 percent below it. Yet all three assume anywhere from double (the Five lab Study) to nine times (EIA study) the cost cited by Mrs. Yellen."

□ Frederick H. Reuter notes in his study for the Center for the Study of American Business ("Framing a Coherent Climate Change Policy," October 1997) that "estimates from standard, multi-industry econometric models indicate that stabilizing annual CO2 emissions at their 1990 levels by 2010 will reduce GDP by 0.2 to 0.7 percent and will decrease total employment by 900,000" by 2005. In addition, Reuter finds:

"Although the proposed economic incentive mechanisms would encourage firms to undertake pertinent technological research and development, they also would reduce firms' net revenues. The decline in net revenues would diminish firms' ability to fund research, development, and implementation of new technologies. Thus, on balance, the economic incentive mechanisms may impede crucial technological advancement instead of stimulating it."

□ A 1997 study by Gary W. Yohe for the American Council for Capital Formation found

that reducing CO2 emissions to 1990 levels by 2010 would:

- * cause a 1% cut in the nation's annual rate of GDP growth rate;**
- * cut real annual wages and income by 5%;**
- * reduce fuel oil/coal consumption by 25% overall;**
- * cut electricity consumption by 20% overall; and**
- * reduce vehicle purchases by 3% overall.**

□ In a chapter in the 1997 book *The Costs of Kyoto*, edited by Jonathan Adler and published by the Competitive Enterprise Institute, W. David Montgomery offers a chapter based on a study by Charles River Associates, which found that if emissions from OECD countries were to be reduced to 1990 levels by 2010 and maintained at that level through 2030, then:

- * combined OECD GDP would decline by an estimated 2.8 percent in 2030;**
- * U.S. GDP in 2030 would fall by better than 3 percent.**

□ In a report for the Center for the Study of American Business, Christopher Douglass and Murray Weidenbaum note the following possible perverse effects from a global warming treaty that excludes developing nations ("*The Quiet Reversal of U.S. Global Climate Change Policy*," November 1996):

"Whichever means of curtailing carbon emissions is used, limiting emissions will degrade living standards. Moreover, if a carbon tax fell solely on industrialized nations and not on developing nations, as is currently the plan in every protocol before the Framework Convention, total worldwide greenhouse gas emissions would be likely to rise, not fall. If emission reduction standards become law in industrialized nations, total consumption of carbon-emitting goods will fall.

Thus, the price of goods such as oil is likely to substantially decline on the world market. However, the lower prices of these goods would encourage poorer developing countries -- with much less fuel efficient technology -- to increase their use of fossil fuels, resulting in a net increase in greenhouse gas emissions."

Douglass and Weidenbaum also note interesting results from another study examining the impact that economic growth has on carbon emissions:

"A study by Douglas Holtz-Eakin and Thomas Selden of Syracuse University finds that the marginal propensity to emit carbon shrinks as economies grow and develop. According to their report, if economies continue to grow at their present rates, the annual emissions growth will fall from its 1955-87 average of 3.2 percent a year to 1.8 percent annually for the period 1990-2025. Thus, any efforts which limit economic growth unwittingly slow down progress toward carbon emissions reduction."

□ The Coalition for Vehicle Choice has noted that various economic studies on the impact of a global warming treaty predict price increases at the gas pump of up to 60 cents per gallon. The Coalition has noted:

"Annually, U.S. cars and light trucks are driven more than 2 trillion miles, getting an average of 17 miles per gallon. A 50-cent hike in gas prices could therefore skyrocket the price of driving by \$66 billion. On an individual basis, every licensed driver in America could face a \$381 increase in the cost of driving."

□ *The Washington Times* reported the following on October 4, 1997 regarding Administration plans for complying with a global warming treaty:

"Administration documents show it is considering phased-in fees ranging from \$25 to \$100 per ton of carbon in fuels such as coal, oil and gas. The fees would raise gasoline prices by as much as 25 cents per gallon and add hundreds of dollars a year to the average homeowner's heating and electricity bills, analysts say."

□ At a conference of financial analysts sponsored by the Edison Electric Institute, Todd Myers, a senior consultant at Resources Data International Inc., noted that U.S. electric utilities may be forced to close some 58 coal-fired power plants due to more stringent

federal air pollution standards (as reported by Reuters on May 15, 1998). If the U.S. signs on to the Global Climate Treaty, compliance would force the closure of even more plants. In such a case, Myers declared: "You are cutting 50 percent of coal-fired generation according to the Kyoto accord." He warned that resulting cuts in coal-fired generation and the boost in the demand for natural gas could add a ten percent premium on electricity prices by 2010.

□ **In the November 3, 1997 *Forbes* ("Bill and Al's Global Warming Circus" by Ronald Bailey), the following chart provided a summary of the major economic forecasts regarding a reduction in "greenhouse gas" emissions.**

Model	Real GDP Change	Jobs Change (\$ per metric ton carbon ³) 1995 dollars	Carbon tax/permit fee (percent below emissions baseline in parentheses)	Emissions in 2010
Abare1 (6/97)	-0.25% in 2010	not in model	not in model	1990 levels (12%)
DRI (Administration IAT, 5/97)	-1.1% in 2005; -0.4% in 2010	unemployment rate up 0.2%	\$95	1990 levels (26%)
DRI (Labor: Management Group, 9/97)	-1.6% to -2.0% 2005-2007	1.2-1.75 million jobs lost (2005-2010)	180-190	1990 levels (30%)
DRI (US Dept. of Commerce, 1/92)	-4.6% in 2010	average loss of 0.6 million jobs	384	10% below 1988 (24%)
Charles River Associates	-1% in 2010	not in model	177	1990 levels (20%)
Economic Policy Institute (9/97)	-1.8% to -2.0% in 2007	1.5-1.8 million jobs lost in 2007	not in model	1990 levels
Markal-Macro (Administration IAT, 5/97)	-0.2% in 2005; -0.8% in 2010	not in model	145	1990 levels (30%)
MIT	-0.5% in 2010 ²	not in model	150	1990 levels (28%)
SGM (Administration IAT, 5/97)	-0.1% for 2005-2010	not in model	81	1990 levels (28%)
WEFA	-2.4% in 2010	1.8 million jobs lost in 2010	200	1990 levels (21%)

1. Australian Bureau of Agriculture & Resource Economics. 2. Consumption. 3. In 2010.
"Administration IAT" refers to the Clinton Administration's Interagency Analytical Team.

Note that only one study out of the ten cited called for emission levels to come in below 1990 levels, when in reality the Kyoto Protocol calls for U.S. emission levels to be 7 percent below 1990 levels. Also, each study may be optimistic in terms of the total amount emissions need to be cut, as emissions may have to be reduced by as much as 40 percent below baseline levels. Therefore, these dismal scenarios for the U.S. economy will become even more dire.

And make no mistake, all industry sectors and businesses -- from home-based businesses to the largest U.S. corporations -- will be adversely impacted.

For example, for argument sake, let's cut the prestigious WEFA firm's estimates in half.

Under such a scenario, by 2010, home-based businesses will still be confronted by a 27 percent increase in home heating oil costs, a 25 percent hike in natural gas, a 24 percent increase in electricity costs, and a price hike of 22 cents at the gas pump.

As for commercial establishments, price hikes on distillate fuel oil would register 37 percent, 29 percent for natural gas, and 26 percent on electricity.

Industrial facilities would be confronted by price increases of 70 percent on residual fuel oil, 46 percent on natural gas, and 37 percent on electricity.

Trucking and rail firms would face a 21 percent increase in the price of diesel (translating into 51 cents per gallon) -- all half of WEFA's estimates.

Absolutely no businesses will escape these costs and their economic fallout; many will not survive; and countless will never come into existence. Imagine the devastation, for example, wrought on truckers, delivery companies and cab drivers due to higher diesel and gas prices; bakeries, grocery stores, and delis due to higher electricity costs; and small manufacturers due to across-the-board higher fuel costs. The damage to the economy and devastating job losses should be obvious to all.

However, no good reason exists to believe that WEFA's estimates -- or any of the others above -- need to be cut at all. In fact, the American Petroleum Institute's projects that in order to reach Kyoto Protocol emission goals would require either a decline in GDP of about 4 percent per year or an energy price hike of about 12 percent per year for a ten year period. These numbers are frightening and compelling.

Resulting Deaths. Of course, even more sobering than lost businesses and jobs are the possibility of lost lives if officials decide to boost CAFE standards. Again, Frances B. Smith

explains:

"Most critically, climate change policies will have a lethal effect on people. They will kill more people through raising the federal Corporate Average Fuel Economy (CAFE) mandate for cars from 27.5 mpg to 45 mpg -- a proposal pushed by several environmental groups. President Clinton recently one-upped this by promising to triple auto fuel efficiency over the next few years.

"But the human cost of CAFE is already too high; CAFE causes manufacturers to downsize cars in size and weight to meet the federal standard for their fleets, and smaller cars are much less safe than large cars in crashes.

"According to a 1989 Harvard-Brookings study by Bob Crandall and John Graham, the current CAFE standard causes nearly 2,000 to 4,000 additional traffic deaths per year. If the standard were raised to 40 mpg, a 1992 study by Graham estimated, there would be an even greater increase in highway deaths -- resulting in a total of 3,800 to 5,800 fatalities each year. Each day, from 10 to 16 people would die unnecessarily."

In conclusion, I leave you with this thought offered by Cornell University political scientist Jeremy Rabkin, as quoted in the December 15, 1997 Wall Street Journal ("Shanghaied in Kyoto"): "One way or another, the climate control system means a global plan for reducing energy consumption or, in other words, a scheme for rationing energy use. If the world can have global governance to ration energy -- the lifeblood of modern economies -- what might global governance not attempt. Indeed.

The Kyoto Protocol choices are clear: devastate U.S. businesses, consumers and the economy because of a dubious theory; or allow entrepreneurs to flourish and innovate, create jobs, boost the economy, and thereby aid, rather than hinder, environmental health.

Thank you for this opportunity to address the Kyoto Protocol, or "Global Warming Treaty." I look forward to answering any of your questions.

Raymond J. Keating

Raymond J. Keating serves as chief economist with the Washington, D.C.-based Small Business Survival Committee, a small-business advocacy group with more than 40,000 members across the nation.

Also, Keating and Matthew Carolan of National Review are weekly columnists -- "Carolan & Keating" -- for *Newsday*. In addition, he is a principal with Capital Hill Research -- a political and economic research service for the investment community.

Keating's second book, New York by the Numbers: State and City in Perpetual Crisis, was published in May 1997 by Madison Books. His first book, D.C. by the Numbers: A State of Failure, was published by University Press of America in January 1995. He also was a contributor to Private Means, Public Ends: Voluntarism vs. Coercion published by the Foundation for Economic Education in 1996.

Keating has written hundreds of policy studies and articles, published in such periodicals as *The Wall Street Journal*, *The New York Times*, *National Review*, *Newsday*, *Investor's Business Daily*, *Policy Review*, *The Journal of Commerce*, *The Washington Times*, *New York Post*, *Daily News* (New York City), *Detroit Free Press*, *Indianapolis Star*, *Times Union* (Albany, N.Y.), *Record* (Troy, N.Y.), *Buffalo News*, *Insight*, *The Freeman*, *Human Events*, *The City Journal*, and many more. His areas of expertise include taxation; federal, state and city budget issues; monetary policy; regulation; supply-side economics; the economics of sports stadiums and arenas; the U.S. economy; a host of small-business issues; and various cultural issues.

Keating holds an MA in economics from New York University, an MBA in banking and finance from Hofstra University, and a BS in business administration and economics from St. Joseph's College.

Keating lives with his wife, Beth and their son, David, on Long Island.

NAM TELLS CONGRESS KYOTO PROTOCOL IS FLAWED AND WILL DEVASTATE ECONOMY

WASHINGTON, D.C., June 4, 1998 – In testimony given today before the House Small Business Committee, the National Association of Manufacturers reaffirmed that the Kyoto Protocol to the Convention on Global Climate Change is inherently flawed in its omission of developing countries and will “devastate the U.S. Economy.”

In his testimony on behalf of the NAM, C. Frederick “Fritz” Dahlberg, Jr., president of St. Mary Galvanizing Company, Inc., told committee members that his company will be one of thousands sacrificed if the Administration attempts to mandate greenhouse-gas emission reductions without Senate ratification or enactment of specific authorizing statutes.

“The Administration’s willingness to exempt China, India, Korea, Mexico, Brazil and other powerful economies is a fatal flaw because without those countries the Kyoto Protocol will not stop the increase in greenhouse-gas concentrations in the atmosphere,” said Dahlberg. “Moreover, it will also be fatal to me and my employees because galvanizing that is produced by those countries will be substantially cheaper than in the United States. Thus, my raw material and production costs go up, but my foreign competitors’ costs do not, which prevents me from raising my prices to cover increased expenses.”

According to Dahlberg, “If you assume that the Administration contends that Americans use 33 percent less energy in 2010 than today, and there isn’t the technology, the capital or the time enough to conserve our way to 33 percent less energy use by 2010, then we all have big problem. This means that I will be paying \$180,000 per year more for the same amounts of electricity and natural gas that I would have paid without the protocol.”

-MORE -



NAM SAYS KYOTO PROTOCOL IS FLAWED/Page Two

“Will this problem be solved, as the Administration has been suggesting, by efficiencies of carbon permit trading?” asked Dahlberg. “I propose that all permit trading means is that I have to buy permits from someone – on a commodity market, from an international broker, or from a neighboring company that is closing its doors.

“There may be some Americans who want to throw all U.S. industry into the ocean and let this be a country of insurance agents and stockbrokers. Well, I won’t be buying any insurance or having any stock to sell if the Kyoto Protocol goes into effect,” concluded Dahlberg.

The National Association of Manufacturers is the nation’s oldest and largest broad-based industrial trade association. Its 14,000 member companies and subsidiaries, including approximately 10,000 small manufacturers, are in every state and produce about 85 percent of U.S. manufactured goods. The NAM’s member companies and affiliated associations represent every industrial sector and employ more than 18 million people.

-NAM-

TESTIMONY OF TERRY F. STEINBECKER
PRESIDENT AND CHIEF EXECUTIVE OFFICER
ST. JOSEPH LIGHT & POWER COMPANY
AND ON BEHALF OF THE EDISON ELECTRIC INSTITUTE
BEFORE THE HOUSE SMALL BUSINESS COMMITTEE
JUNE 4, 1998

Good morning, Mr. Chairman and members of the committee. Thank you for the opportunity to appear today to discuss the Kyoto Protocol and the significant impacts the treaty would have on the electric utility industry, my company, and our small business customers that would be affected by higher electricity rates.

My name is Terry Steinbecker and I'm president and chief executive officer of St. Joseph Light & Power Company, a small, investor-owned electric and natural gas utility headquartered in St. Joseph, Missouri. The company has served in Northwest Missouri for 115 years. Today, our 350 employees proudly serve 61,000 electric and 6,300 natural gas customers in that part of the state.

In our service territory, the largest community is St. Joseph, a city of 73,000 just north of Kansas City. Many of our customers are small businesses that employ a significant number of people in northwestern Missouri.

I'm also pleased to represent today the Edison Electric Institute (EEI). EEI is the association of the U.S. investor-owned electric utilities and industry affiliates and associates worldwide, with 200 member companies in the U.S. and 43 affiliate members in 18 countries. Our U.S.

members serve more than 90 percent of all the customers served by the investor-owned segment of the industry. They generate approximately three-quarters of all electricity produced by electric utilities in the country and serve about 70 percent of all ultimate customers in the nation.

We at St. Joseph Light & Power Company, like many other EEI member companies, have been successful in the past by giving our customers two things – excellent service and reasonable, competitive prices. Today, our prices – the lowest in the state – are reasonable and affordable. They certainly won't remain that way if the Kyoto Protocol is ratified by the Senate or if it is implemented through regulatory means prior to Senate approval.

We in the electric utility industry take seriously our responsibility to protect the environment and have made significant strides in meeting that responsibility. Between 1994 and 1997, my own company has invested more than \$10 million in fulfilling the Phase II requirements of the Clean Air Act Amendments of 1990. We are on target to meet those requirements and will invest an additional \$7.6 million in our units before those requirements go into effect in 2000.

Our industry also is active in voluntary efforts to enhance and protect the environment. In 1993, Edison Electric Institute initiated, with the Department of Energy, a voluntary, collaborative effort involving more than 600 electric utilities to address greenhouse gas emissions. That program, the Climate Challenge, is the world's largest and most successful

voluntary environmental initiative. In fact, the Department of Energy projects that in the year 2000, Climate Challenge participants will reduce, avoid or sequester 172 million metric tonnes of carbon dioxide-equivalent greenhouse gases.

The Climate Challenge program consists of numerous activities by 643 individual utilities and 9 industry-wide initiatives to achieve the reduction, avoidance, or sequestration of greenhouse gas emissions. My own company participates in the Utility Forest Carbon Management Program, which manages carbon through domestic and international forestry projects. We also participate in the National Earth Comfort Program, which aims to increase the installation of geothermal heat pumps to 400,000 annually by the year 2000. Another Climate Challenge program is the EnviroTech Investment Funds. Under this initiative, two venture capital funds have more than \$52 million in investments designed to commercialize emerging electrotechnologies and renewables. Another program, the International Utility Efficiency Partnerships, focuses on international power and renewable projects.

In addition to our Climate Challenge participation, St. Joseph Light & Power Company has undertaken its own programs to enhance the environment. For instance, we've adopted a method of line clearance for trees that promotes and protects the health of the trees. Our line clearance program recently received an award from the National Arbor Foundation which recognized our company as a Tree Line USA Utility, one of only 27 nationally. In addition, we promote the planting of trees through our Friendly Foliage program by awarding

matching grants to nonprofit organizations in our service area who undertake tree-planting projects.

At St. Joseph Light & Power Company, we take pride in our environmental stewardship and the service and prices we offer our customers. However, when confronted with the requirements inherent in the Kyoto Protocol, I have serious concerns about our ability to maintain that level of service and that level of prices.

The Administration, last December in Kyoto, negotiated a protocol that, according to numerous studies and analyses¹ would place great stress on the U.S. economy, lead to a significant loss of jobs, and force a reduced lifestyle on our citizens. These studies indicate that electricity prices could increase substantially and point to a scenario dramatically different from the Administration's own recent economic testimony. While Dr. Janet Yellen, head of the Council of Economic Advisors, has stated repeatedly that she expects the economic impact and electricity price increases to be minimal, those predictions are based upon extremely optimistic – and unlikely – assumptions.

One of the underlying assumptions in Dr. Yellen's testimony is developing country participation in the Clean Development Mechanism (CDM), a new program included in the

¹ For example: Resource Data International, Inc. *At What Cost? Federal Environmental Regulations in a Competitive Electricity Marketplace*, May 1998, and *The Kyoto Protocol: Putting U.S. Electricity Supply and GDP at Risk*, February 1998; WEFA, Inc. *The Kyoto Protocol: Severe Economic Consequences*, Testimony of Mary H. Novak, Sr. Vice President, WEFA, Inc., March 5, 1998, and *Global Warming: The Economic Cost of Early Action*, 1997; and Charles River Associates, *Economic Implications of the Adoption of Limits on Carbon Emissions from Industrialized Countries*, November 1997.

Kyoto Protocol. However, the success of that program is not assured. Furthermore, regardless of the CDM, developing countries, especially China and India, have steadfastly refused to make any commitments to limit or reduce their emissions – and even have refused to agree to any talks about future participation in any voluntary or mandatory initiatives.

Without the participation of developing countries, it is doubtful that reductions by the United States and other developed nations will have any positive impact on atmospheric concentrations of greenhouse gases. Bert Bolin, former chairman of the Intergovernmental Panel on Climate Change (IPCC) – the United Nations body charged with the science of climate change – first raised this point in February 1995 when he stated that the impact of proposals under consideration then for reductions only by developed nations “would not be detectable on projected temperature increases.”

The Administration further assumes in its economic testimony that international emissions trading will reduce economic impacts in the U.S. While such a program could potentially reduce the cost of achieving the Kyoto requirements, trading is only a concept in the protocol and key details about principles, rules, and methods of verification and accountability are not addressed. The way the trading program is structured and administered will affect its usefulness in reducing costs. Given the difficulties that the U.S. negotiators had in Kyoto in simply getting a placeholder for trading in the protocol, it is far from certain that an international emissions trading program can be structured so as to render true benefits.

Furthermore, there are proposals, such as one by the European Union, which would limit the percentage of a country's reduction requirements that could be achieved through non-domestic programs like the CDM and trading. So, despite reassuring promises of minimal economic impacts, the Kyoto Protocol has a very real potential to raise significantly the cost of electricity and, in the process, to wreak havoc on our economy.

The impact of the treaty on the electric utility industry is clearly illustrated in a recent study conducted by Resource Data International (RDI). The study, just released last week by the Edison Electric Institute, assesses the impact of the Kyoto Protocol, as well as all the current U.S. Environmental Protection Agency air regulatory initiatives, on the electric industry. I will first address the Kyoto portion of the RDI study.

The RDI study estimates that to meet the 7 percent reduction below 1990 levels requirements of the Protocol, a "31 percent reduction from anticipated aggregated emissions" in our industry would be necessary. For St. Joseph Light & Power Company, we estimate the reduction will be closer to 40 percent, based on data for 2007, the last year of our current forecast. Of course, this assumes that all segments of society and the economy share equally in the burden; any policy decision that would not equitably distribute the burden could increase these estimates.

The RDI study also states that:

massive reductions in coal-fired generation would be required. Given the fact that there are no commercially viable CO₂ removal technologies, replacement of coal-fired generation with lower CO₂ emitting sources of generation is the only reduction option

available to the electric industry. RDI's analysis indicates that 36 percent of current U.S. coal-fired generation may need to be removed from the generation mix in order to meet the Kyoto target.

The study points out, along with an earlier RDI study², that natural gas generation would have to fill the gap. Given that about 57 percent of electricity in the U.S. currently is produced by burning coal, that gap would be significant. The most recent RDI study indicates that "the stresses to the electricity and natural gas generation would be enormous" and that "even if wind and solar generation increase by almost 500 percent and natural gas increases by 170 percent from 1997 levels, the nation would still be faced with a 19 percent gap in available generation to meet the projected electricity supply in 2010."

Our estimates at St. Joseph Light & Power Company track closely with the RDI study. The company has a total generating capacity of 382 megaWatts, with 261 megaWatts produced by our Lake Road plant and 121 megaWatts from our 18 percent ownership in the Iatan plant operated by Kansas City Power & Light Company. The Lake Road plant is a multi-unit facility, with the largest turbine producing 95 megaWatts. All of our units use fossil fuels for generation, with coal accounting for 94 percent of our total fuel used in 1997.

Based on the 7 percent reduction below 1990 levels required in the Kyoto Protocol, my company would likely have to make a complete shift to natural gas at the Lake Road plant.

² Resource Data International, *The Kyoto Protocol: Putting U.S. Electricity Supply and GDP at Risk*, February 1998.

Such a shift to natural gas generation is a serious concern, both from a cost as well as a supply basis. One reason is that the cost of natural gas is higher than coal.

A February 1998 RDI study indicates that gas generation costs are 1.9 times higher those at existing coal-fired plants.³ The Energy Information Administration recently estimated that the cost of natural gas will be about 2.6 times the cost of coal in 2010.⁴ We anticipate that the shift at our Lake Road plant would result in an increase of nearly 150 percent increase in fuel costs by 2007, which translates into about a 41 percent increase in electricity prices for our customers. This forecasted number does not take into account higher natural gas prices that would result from increased demand as American industry as a whole shifts fuel.

Transportation of natural gas also is a concern, as the country's present pipeline network is inadequate to meet the new demand from utilities. For instance, the pipeline serving St. Joseph would not be able to meet the requirements of both the Lake Road plant and the other customers in the city.

An increase of this magnitude in fuel costs could be devastating to our small-business customers. I would like to discuss the impact on two types of customers that you find in every congressional district in the country – food markets and fast food stores.

³ Ibid.

⁴ Energy Information Administration, *Annual Energy Outlook 1998*. Calculated from Table A3, Energy Prices by Sector and Source, p. 104.

One local supermarket owner in St. Joseph, who owns a number of outlets, would see his annual bill increase from almost \$55,000 a year to nearly \$87,300 in just one store if our company had to shift to natural gas. Supermarkets operate on very narrow margins; their profit comes in volume sales. That raises the question: How many more cans of tomato soup must they sell to make up for a \$32,000 increase in annual electricity costs?

Fast food stores, such as McDonald's, Burger King, Wendy's, and Hardy's, also face similar increases. One fast food outlet, which uses more than 567,000 kiloWatt-hours of electricity annually, would see its electricity bill increase by more than \$17,700 to \$46,600 annually as a result of Kyoto.

Proponents of the treaty have said that any increase in prices to customers can be offset by implementing retail competition in the electric utility industry. In the first place, it is wrong to mix possible cost savings from restructuring of the electric utility industry with the costs of compliance with environmental regulations under global climate change treaties or the Clean Air Act. It is illogical to link restructuring of our industry to implementation of the Kyoto Protocol. Moreover, it would be unfair to single out the electric utility industry to the exclusion of other industries and other sectors of the economy. Why should our electric customers bear the brunt of the costs of compliance with international treaties addressing global climate change? Even if you assume that electric restructuring should not be decoupled from the costly economic impacts of the protocol, the laws of economics work in both directions -- prices can rise as well as fall. In that context also, prices are more likely to

increase if the supply is curtailed due to costly retrofits, reduced supply of natural gas, or pipeline constraints. As a result, the projected savings from industry restructuring would be lost.

The Kyoto Protocol is just one environmental initiative facing our utilities. The EPA has promulgated or proposed other regulations addressing ozone, ozone transport, fine particulates, and regional haze, to name a few. According to the recent RDI study, to meet the requirements of these initiatives, our industry will be required to invest \$21.8 billion dollars over the next 10 to 15 years for retrofitting pollution control technologies on existing coal-fired plants. Add to that the costs of the Kyoto Protocol and the cost pressures of a deregulated market, and you might find that some companies will be forced to shut down uneconomical plants. The RDI study estimates that 21,000 megaWatts are at risk. This result clearly would have a significant impact on the cost and supply of electricity.

As the Intergovernmental Panel on Climate Change reported in 1995, "Our ability to quantify the human influence on global climate is currently limited because the expected signal is still emerging from the noise of natural variability, and because there are uncertainties in key factors." Given the uncertainties surrounding climate change and the significant economic risks not only for our industry and our customers, but also the nation as a whole, we have to ask: Does it make sense to move forward with the requirements agreed to in the Kyoto Protocol?

On behalf of the electric utility industry, I say no. We believe that such action simply is not good public policy. We do not suggest, however, that we sit back and do nothing. Indeed, we have demonstrated our commitment to address potential climate concerns through Climate Challenge and other voluntary programs. What we do suggest is that greenhouse gas emissions be addressed through similar voluntary, cost-effective, and flexible actions by all industries and all nations. Such efforts can be effective and they can be accomplished without risking serious economic harm.

Thank you for allowing me to speak today about this very important issue.

The Kyoto Protocol does not conform with U.S. policy goals on the economy and the environment. There's a better way to address global climate concerns.

Overview

The Third Conference of Parties to the United Nations Framework Convention on Climate Change (COP-3) met in December 1997 in Kyoto, Japan, to adopt a new global climate change protocol. The Kyoto summit included 159 nations and produced the world's first legally binding targets and timetables to reduce the global output of carbon dioxide (CO₂) and five other greenhouse gases — methane, nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF₆).

The Kyoto Protocol, as the agreement is known, obligates developed countries (Annex I parties) — including the United States, Japan, Canada, and the European Union — to achieve reductions in greenhouse gas emissions approximately 5 percent below 1990 levels on average by the years 2008-2012. To reach its 7 percent greenhouse gas reduction target under the Protocol, the U.S. would have to reduce its emissions by about 31 percent from projected 2010 levels. The more than 130 developing nations (non-Annex I parties) — including China, Brazil, India, South Korea, Indonesia and Mexico — take on no obligations for emissions reductions under the agreement.

Many key issues are not addressed in any substantial or complete way in the Protocol. These include joint projects between developed countries and other parties, including developing countries, to mitigate climate change; emissions trading; and credit for early action. The agreement also does not expressly include low-cost forest conservation projects to offset emissions. These are serious deficiencies.

The Kyoto Protocol was opened for signature on March 16, 1998, and will remain open until March 15, 1999. But it will not enter into force as a legally binding document until 90 days after the date on which at least 55 percent of the Parties to the Convention, accounting for at least 55 percent of the total 1990 emissions of developed countries, have ratified it.

The U.S. Senate has shown an increased concern over the nature and direction of the position taken by U.S. negotiators. This concern is evidenced by the July 1997 adoption of Senate Resolution 98, which passed by a 95-0 vote and stipulates the Senate's conditions for ratification. (S. Res. 98 was introduced by Senators Robert Byrd (D-WV) and Chuck Hagel (R-NE) with 63 cosponsors.) S. Res. 98 expresses a sense of the Senate that the U.S. should not be a signatory to any amendment or protocol to the climate treaty which imposes new commitments on developed countries, such as the U.S., unless it also contains new commitments on developing countries within the same compliance period. S. Res. 98 also states

that the U.S. should not be a signatory to any protocol which "would result in serious harm to the economy of the United States." The Kyoto Protocol does not meet these conditions. Rather, it will impact the U.S. economy significantly, undermine the strength and competitiveness of American industries, and hurt consumers.

Voluntary, flexible and cost-effective initiatives to control greenhouse gas emissions are currently underway and are reducing greenhouse gas emissions without harming the economy or consumers. The U.S. electric utility industry is a world leader in these efforts. Through the Climate Challenge program, 643 electric utilities have pledged to reduce, avoid or sequester more than 170 million metric tons of CO₂-equivalent emissions in the year 2000. This is more than four times the goal established with the U.S. Department of Energy at the program's inception in 1993.

The Edison Electric Institute (EEI) believes that, in addition to being voluntary, cost-effective and flexible, any climate change program should also be comprehensive, including all countries, all greenhouse gases, and all sources and sinks; should recognize the important role of electricity and energy-efficient electric technologies in the mitigation of greenhouse gases; should address the increasing contribution of emissions from developing countries; and should authorize credit for early actions and joint implementation of measures to mitigate climate change between developed countries and other parties, including developing countries.

The Kyoto Protocol does not meet the standards of Senate Resolution 98.

In July 1997, the U.S. Senate adopted Senate Resolution 98 by a 95-0 vote. This Resolution was sponsored by Senators Robert Byrd (D-WV) and Chuck Hagel (R-NE) and has 63 cosponsors. Senate Resolution 98 emphatically states:

"It is the sense of the Senate that — (1) the United States should not be a signatory to any protocol to, or other agreement regarding, the United Nations Framework Convention on Climate Change of 1992, at negotiations in Kyoto in December 1997, or thereafter, which would — (A) mandate new commitments to limit or reduce greenhouse gas emissions for the Annex I Parties, unless the protocol or other agreement also mandates new specified scheduled commitments to limit or reduce greenhouse gas emissions for Developing Country Parties within the same compliance period, or (B) would result in serious harm to the economy of the United States."

The first standard in Senate Resolution 98 not met by the proposed Kyoto Protocol is the condition that any agreement that mandates new greenhouse gas limits for developed countries must also mandate commitments for new greenhouse gas limits on developing countries in the same compliance period. The Protocol exempts developing countries — more than 130 in all. The second unmet standard calls for

an agreement that would not result in serious harm to the economy of the United States. If implemented, the Protocol would cost the U.S. billions of dollars and cause millions of workers to lose their jobs. Clearly, the proposed Kyoto Protocol does not meet the conditions expressed unanimously by the Senate in Resolution 98.

The Kyoto Protocol is not fair to the U.S. It does not reflect the interests of the economy, American business or consumers.

The Kyoto Protocol directs developed countries, including the United States, to achieve reductions in greenhouse gas emissions approximately 5 percent below 1990 levels on average by the years 2008-2012. Developing nations like China, India, Mexico, Indonesia, Brazil and South Korea — which are industrial and manufacturing competitors of the U.S. — take on no obligations for emissions reductions under the Protocol.

To reach its assigned 7 percent reduction target under the Protocol, the U.S. would have to reduce its emissions by about 31 percent from projected 2010 levels. How much will this cost the nation? Reaching a less stringent stabilization at the 1990 level was estimated by the Administration in May 1997 as \$30 billion for the electric utility industry in 2010, and \$52 billion in 2020. An analysis by Charles River Associates, an economic consulting firm, projects that just to return U.S. emissions to 1990 levels by 2010 would cause electricity prices to rise 23 percent, natural gas prices to increase 46 percent, and gasoline prices to increase 38 percent, or 50 cents per gallon. The firm estimates that U.S. unemployment will increase 25 percent, and the gross domestic product (GDP) will decrease by 3.3 percent.

Implementing the 7 percent reduction target would cause even greater harm to the U.S. economy. A White House economic analysis of the Protocol forecasts that implementation will lead to a “modest” net increase in national annual energy costs of \$7 billion to \$12 billion by 2012. Janet Yellen, Chair of the President’s Council of Economic Advisers, has testified that the Protocol will “raise the average household energy bill in ten years by between \$70 to \$220 per year.”¹ A study by WEFA, Inc., however, concludes that “implementing the Kyoto Protocol would mean sharply higher prices for energy and electricity” and could cause the U.S. serious economic harm: a reduction of 3 percent or \$250 billion in GDP, loss of 2.5 million jobs, and a cost of \$2,700 per family annually.²

Attaining the stringent emissions reductions that the Administration agreed to in Kyoto would drastically alter Americans’ lifestyles and standards of living. The U.S. economy would be severely impacted; the competitiveness of American businesses would be reduced; and unemployment levels would rise as American jobs and industries shift to developing nations. Many other nations, including our trade competitors, would be required to make no changes, giving them a significant competitive advantage.

¹ Testimony of Janet Yellen, Chair, President’s Council of Economic Advisers, before the House Commerce Energy and Power Subcommittee, March 4, 1998.

² Testimony of Mary H. Novak, Senior Vice President, WEFA, Inc., before the Senate Committee on Agriculture, Nutrition, and Forestry, March 5, 1998.

The Kyoto Protocol is not global and won't achieve the results it implies. In order to achieve an appreciable effect on atmospheric concentrations of greenhouse gases, developing nations also must reduce emissions.

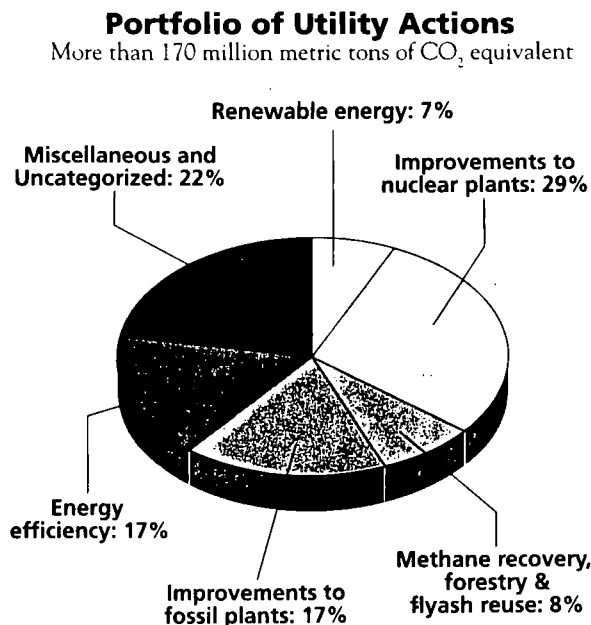
World population is projected to reach almost 7 billion in 2010; 80 percent of this growth is expected to be in developing countries, which take on no obligations for emissions reductions under the Protocol. Along with this growth will come an increase in urbanization, industrialization and the global demand for energy. Energy consumption in developing nations is expected to increase at a greater rate than in developed countries and could more than double by 2010. Likewise, the use of automobiles, trucks and other combustion-engine technologies will grow, as will factory and industrial production. All of these increases are projected to cause a corresponding increase in air emissions and greenhouse gases, particularly in the developing nations that are exempt from the Kyoto Protocol.

The Kyoto Protocol ignores the impact that developing nations will have on atmospheric global concentrations of greenhouse gases. The futility of exempting developing nations from the Kyoto Protocol is evidenced by the fact that the largest developing nation, China, is expected to become the single largest emitter of greenhouse gases by the year 2015 and yet is not required to make any changes or reductions under the treaty. Even if the treaty were ratified and fully implemented, any reductions made by the U.S. and other developed nations would be overshadowed and negated by the emissions from developing nations.

Protecting the environment is important.

We believe it is more effective to address global climate change concerns in a cost-effective and flexible manner, without undermining the strength and competitiveness of the U.S. economy.

The U.S. electric utility industry is committed to protecting the environment and is a world leader in implementing flexible and cost-effective initiatives, such as our Climate Challenge program, in response to concerns about global climate change. In fact, electric utilities account for more than 80 percent of all voluntary actions taken to mitigate greenhouse gases, according to the Department of Energy (DOE).³



The Climate Challenge Program

In partnership with DOE, the electric utility industry created the Climate Challenge program, the world's largest and most successful voluntary initiative to reduce greenhouse gas emissions. To date, 643 electric utilities have pledged to reduce, avoid or sequester more than 170 million metric tons of CO₂-equivalent emissions in the year 2000. This is more than four times the goal established with the government in 1993.

³Energy Information Administration, *Emissions of Greenhouse Gases in the United States 1996*, DOE/EIA-0573 (96) (Washington, DC, October 1997).

The Climate Challenge program includes five EEL industry-wide initiatives, in addition to a wide range of actions being taken by individual utilities:

THE NATIONAL EARTH COMFORT PROGRAM, which has a goal of increasing the installation of GeoExchangeSM technologies (high-comfort, cost-effective and environmentally sound geothermal heating and cooling units that take advantage of the Earth's ability to store renewable energy) to 400,000 annually; more than 250,000 systems are already in place. Attainment of this goal will result in annual reductions of 5.5 million metric tons of CO₂, which is equivalent to taking over half a million cars off the road.

EV AMERICA, working to accelerate the introduction of electric vehicles (EVs) into the retail marketplace and into commercial, government, transit and private fleets. Depending on the fuels used to generate electricity, EVs can reduce greenhouse gases by as much as 50 percent or more compared to gasoline-powered vehicles. EVs now are being developed by most major car manufacturers and are available to retail customers in California and Arizona.

The EnviroTechSM Investment Funds, two electric utility industry venture capital funds investing in companies that focus on emerging electric and renewable technologies that promote environmental responsibility and reduce greenhouse gas emissions. More than \$52 million has been raised for capital investment; almost \$20 million has been invested in 18 companies that are developing products in categories such as photovoltaic cell technologies, renewable power generation systems, and hydrogen-based technologies.

THE INTERNATIONAL UTILITY EFFICIENCY PARTNERSHIPS, supporting clean development energy projects and cost-effective approaches to global climate issues. Twelve projects are already under development in countries such as Argentina, Belize, Honduras, China and the Czech Republic. These projects include biomass development, generation efficiency upgrades, and forestry and hydropower initiatives, and are expected to offset more than 70 million metric tons of CO₂.

THE UTILITREE CARBON COMPANY/UTILITY FOREST CARBON MANAGEMENT PROGRAM, addressing forest carbon management activities. The UtiliTree Carbon Company, established by 40 electric companies, has funded major tree planting and forest management projects in Louisiana, Oregon, Belize and Malaysia. This project has committed over \$2.4 million to reduce more than 2 million tons of CO₂ emissions at an economical cost of only about \$1 per ton. With support from 55 electric utilities, the Utility Forest Carbon Management Program identified and evaluated these projects, and is funding an urban forestry research effort.

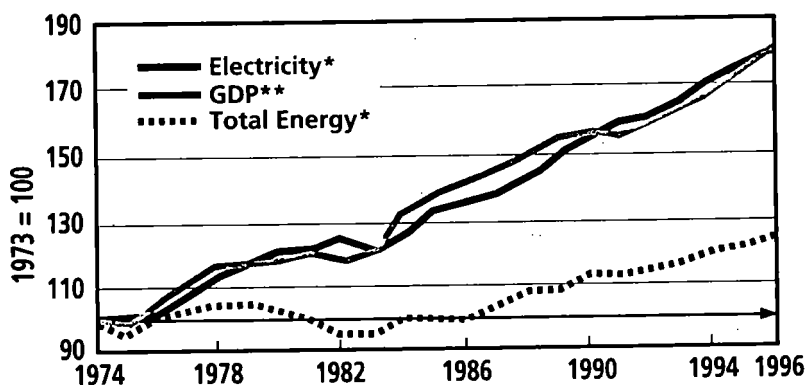
The electric utility industry continues to believe that voluntary, flexible, cost-effective and comprehensive approaches to reducing greenhouse gases are better alternatives to command-and-control regulation that would be mandated by the Kyoto Protocol.

We are proud of our Climate Challenge program and our accomplishments in mitigating greenhouse gas emissions. We know that our partnership with DOE is working, and we encourage the Administration to pursue other government-business partnerships. We also support initiatives to increase research and development funds and to provide tax incentives and credits for consumers and industries that develop and use electric technologies.

Clean and efficient electric technologies can achieve significant greenhouse gas reductions in both developed and developing nations.

The nation's economic growth is closely linked to electricity. The growing dependence on electricity is best illustrated by the continued close relationship between electricity usage and the general level of economic activity, as indicated by GDP.

U.S. Trends: 1974–1996



*Source: DOE/EIA: Annual Energy Review, 1997

**Source: U.S. Department of Commerce, Bureau of Economic Analysis

As electricity use has grown in the U.S., the economy has become less carbon intensive. A number of factors have contributed to the decrease in carbon intensity in the U.S., including the increased use of energy-efficient electric technologies that replace fossil fuel technologies in end uses. The wider use of electricity and the wiser use of electric technologies throughout the U.S. industrial, commercial, residential and transportation sectors have benefited the economy, increased energy efficiency and reduced carbon intensity. Developing nations, which now produce more than 50 percent of the world's greenhouse gases, could improve their energy efficiency and their economic competitiveness by using the same energy-efficient technologies currently used by the U.S. and other developed nations.

Let's move forward with positive programs that guarantee benefits and a stronger, cleaner world for everyone.

Given the Kyoto Protocol's potential to harm the U.S. economy and its failure both to include developing nations and to reduce global concentrations of greenhouse gases, we believe the treaty contradicts U.S. policy goals. As an alternative, we believe sound global climate policy should:

- Encourage and promote flexible, cost-effective, comprehensive (that is, all countries, greenhouse gases, sources and carbon sinks) and voluntary actions.
- Use the Utility Climate Challenge as a model for other government-business partnerships to yield significant environmental benefits without the economic and political disruptions that would accompany the imposition of binding targets and timetables.
- Make every effort to maximize the use of energy-efficient electric technologies and free market mechanisms.
- Provide mechanisms for economic flexibility (such as through Clean Development Mechanism projects for credit, international emissions trading, extended compliance periods, and credit for early projects, such as under the Utility Climate Challenge).

Edison Electric Institute (EEI) is the association of shareholder-owned electric companies, international affiliates, and industry associates worldwide. The U.S. electric utility industry is a progressive, responsible voice on global climate change in the U.S. and around the world. For more information on our industry's environmental initiatives, please contact EEI or your local electric company.

May 1998



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Americans Are Talking About Global Warming and The Kyoto Protocol. Here's What They're Saying.

In December 1997, 159 nations met in Kyoto, Japan, to adopt a new global climate change treaty. The Kyoto Protocol, as the agreement is known, produced the world's first legally binding targets and timetables to reduce the global output of carbon dioxide and five other greenhouse gases. Developed nations — including the United States, Japan, Canada, and the European Union — would be obligated to achieve reductions in greenhouse gas emissions approximately 5 percent below 1990 levels on average by the years 2008-2012. The more than 130 developing nations — including China, Brazil, Mexico, South Korea, Indonesia and India — take on no obligations for emissions reductions under the agreement.

To reach its 7 percent greenhouse gas reduction target under the Protocol, the U.S. would have to reduce its emissions by about 31 percent from projected 2010 levels. This would severely impact the U.S. economy; undermine the strength and competitiveness of American industries; and harm consumers. U.S. ratification of the Protocol will require the advice and consent of the Senate. Here's what Americans have to say about this global climate "deal."

The Kyoto Protocol does not meet the standards of Senate Resolution 98.

"It is the sense of the Senate that — (1) the United States should not be a signatory to any protocol to, or other agreement regarding, the United Nations Framework Convention on Climate Change of 1992, at negotiations in Kyoto in December 1997, or thereafter, which would — (A) mandate new commitments to limit or reduce greenhouse gas emissions for the Annex I Parties, unless the protocol or other agreement also mandates new specified scheduled commitments to limit or reduce greenhouse gas emissions for Developing Country Parties within the same compliance period, or (B) would result in serious harm to the economy of the United States."

— Excerpts from Senate Resolution 98,
adopted by a 95-0 vote of the Senate

"The draft Kyoto Protocol fails the tests expressed unanimously by the U.S. Senate in S. Res. 98. Further, the proposed Kyoto Protocol fails to meet the objectives set by President Clinton in announcing the U.S. negotiating position. The AFL-CIO Executive Council therefore calls upon the President to refrain from signing the proposed Kyoto Protocol to the U.N. Framework Convention on Climate Change."

—AFL-CIO Executive Council Statement

"The Kyoto Protocol is a flawed agreement that cannot be salvaged with bilateral Band-Aids or further negotiations."

—Constance D. Holmes, Chair, Global Climate Coalition

"The treaty won't work, and should be opposed by those who recognize that economic growth and a sound environment must go hand in hand."

—Jerry Jasinowski, President, National Association of Manufacturers

"This is a bad deal for American workers and consumers, and a complete cave-in to China, India and other rapidly growing economies which remain exempt from any greenhouse gas commitments. The President should walk away from this deal."

—Eugene Trisko, Counsel, United Mine Workers of America

"Why is there no reference in the Kyoto Accord or any other agreement reached in Kyoto that suggests a process to renegotiate or continue to renegotiate the subject of developing country commitments? As I understand it, the Protocol can't be amended until it enters into force, and the Administration won't seek ratification of it until developing countries participate meaningfully. Which leads me to wonder how we get to there from here?"

—Representative Thomas Bliley (R-VA), Chairman, House Commerce Committee

"After seeing the United Nations process in action, U.S. negotiators should have walked out of the conference rather than allow other nations to dictate an unfair treaty."

—Representative James Sensenbrenner (R-WI), Chairman, House Science Committee, and leader of the House congressional delegation in Kyoto

"In approving the Kyoto Climate Change Protocol, the Clinton-Gore administration has revealed a naivete that threatens our country's future economic well-being, and the President should not sign it."

—Representative Benjamin Gilman (R-NY), Chairman, House International Relations Committee

"Since atmospheric warming is a global problem, without the responsible action by key developing countries, we will not have a global solution, and we will not solve the global problem. ... The canvas that was created at Kyoto is only partly painted in. It is a work in progress, and there is ample time to do the job right. I hope that the President will not sign his name to the protocol at this point."

—Senator Robert Byrd (D-WV)

"Any way you measure this, this is a very bad deal for America."

—Senator Chuck Hagel (R-NE)

"What we have here is not ratifiable in the Senate in my judgment."

—Senator John Kerry (D-MA)

"The accord is seriously flawed — so flawed, in fact, that it cannot be salvaged."

—Representative James Sensenbrenner (R-WI), Chairman, House Science Committee, and leader of the House congressional delegation in Kyoto

"The Kyoto Protocol would be a disaster even if global warming were a threat."

—Ronald Bailey, The Wall Street Journal, December 15, 1997

The Kyoto Protocol is not fair to the U.S.
It does not reflect the interests of the economy,
American business or consumers.

"If the U.S. negotiators are looking for a way to mess up the world's most productive and prosperous economy, this agreement will do it."

—Thomas Donohue, President, U.S. Chamber of Commerce

"NADA is heavily involved with legislative efforts to force the Administration to reject international treaty provisions that allow some nations to escape responsibility for reducing greenhouse gases, thereby placing a greater burden on the U.S."

—Frank McCarthy, Executive Vice President, National Automobile Dealers Association

“The Administration is giving away the farm and selling out the American family farmer. Our future is being handed over to our international competitors. We have no choice but to wage war against it.”

—Dennis Stolte, American Farm Bureau Federation

“Attaining the emission reductions that the administration agreed to in Kyoto — cutting emissions 7 percent below 1990 levels by about 2010 — would mean cutting U.S. energy use by as much as 37 percent. That would require much higher energy prices — gasoline prices, for example, would have to increase on the order of 75 cents a gallon. Those higher prices would do immense damage to the U.S. economy and severely lower Americans’ standards of living and drastically alter their lifestyles.”

—Leonard G. Bower, Director of Policy Analysis and Strategic Planning, American Petroleum Institute

“Policies disguised as ‘middle-of-the-road’ instead will be leading us down the road to national industrial policy and a planned economy. The losers will be American consumers, who will bear the brunt of restrictions on energy use in their everyday lives. They’ll have to pay the costs, not just in higher taxes and prices, but in a drastically lower standard of living.”

—Frances B. Smith, Executive Director, Consumer Alert

“Small businesses are America’s job creators. This proposal puts millions of American jobs at risk by unduly and unfairly burdening small businesses with vast new costs and stealth taxes.”

—Karen Kerrigan, President, Small Business Survival Committee

“American taxpayers must be assured that any new environmental programs actually provide benefits and are grounded in sound science. We must not enter into any agreement which puts us at a significant disadvantage in the global arena.”

—Senate Majority Leader Trent Lott (R-MS)

“(The treaty) is designed to give some nations a free ride, it is designed to raise energy prices in the United States, and it is designed to perpetuate a new U.N. bureaucracy to manage global resource allocation.”

—Senator Larry Craig (R-ID)

“Our negotiators have once again been outmaneuvered by the developing nations. If human-induced climate change is not a problem, then we will have agreed to unilateral measures that will harm our economy and competitiveness without positive benefits. But if human-induced climate change is eventually proven to be a problem, we will have exempted the developing nations, the future big emitters, from sharing in the burdens of greenhouse gas reductions. It is a win/win situation for the developing nations, and a lose/lose situation for the U.S. taxpayers and the economy.”

—Senator Frank Murkowski (R-AK), Chairman, Senate
Committee on Energy and Natural Resources

“Countries like Mexico, China, Brazil and India will be permitted to pollute the atmosphere unchecked while the U.S. and other developed countries tighten their belts and sacrifice jobs which will surely flow to nations exempt from the treaty. Encouraging pollution simply to move overseas won't solve the problem.”

—Representative James Sensenbrenner (R-WI), Chairman,
House Science Committee, and leader of the House
congressional delegation in Kyoto

“I have already voiced my very strong concerns with this treaty, which will require legally binding cutbacks in greenhouse gas emissions. By exempting all developing nations, the treaty will create a two-tiered environmental obligation, forcing the entire burden to reduce greenhouse emissions on industrialized nations while turning the developing world into a pollution ‘enterprise zone.’ This will have a devastating impact on American jobs.”

—Representative Joseph Knollenberg (R-MI)

“Any agreement must do more than exact a vague promise from the developing countries to participate at some point in the future. ... Voluntary measures and incentives are better than mandates.”

—Representative John Dingell (D-MI)

“The Southern Governors' Association believes that the proposals under negotiation, because of the disparity of treatment between developed and developing countries and the potential level of required emission reductions, could result in serious harm to the United States economy, including significant loss, trade disadvantages, [and] increased energy and consumer costs.”

—Southern Governors' Association

*"If the Kyoto Protocol were to be approved, America's standard of living would go into permanent
rest, and the end of the United States as industrial powerhouse of the world would be at hand."*

—Pat Buchanan, The Washington Times, December 15, 1997

*"The treaty's impact on America's workers and economy, meanwhile, could be severe. U.S.
industry would face increased production costs for virtually all goods. The net cost just to stabilize
U.S. emissions at 1990 levels could reach hundreds of billions of dollars annually, and many nations
are pushing to reduce emissions below 1990 levels, at an even more oppressive cost. The resulting
higher prices would make American products less competitive on the world market and less affordable
at home."*

—Jack Kemp, The Wall Street Journal, July 25, 1997

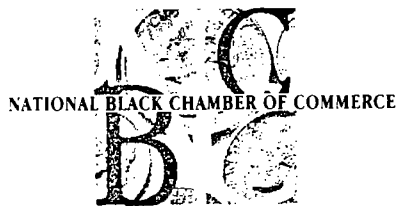
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May 1998



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GLOBAL CLIMATE CHANGE

CONGRESSIONAL TESTIMONY

By

**HARRY C. ALFORD
PRESIDENT/CEO**

Presented to:

**HOUSE COMMITTEE ON SMALL BUSINESS
HONORABLE JAMES M. TALENT, CHAIRMAN**

6/4/98

GLOBAL CLIMATE CHANGE

**CONGRESSIONAL TESTIMONY BY: HARRY C. ALFORD, PRESIDENT & CEO,
NATIONAL BLACK CHAMBER OF COMMERCE, INC.**

**PRESENTED TO: HOUSE COMMITTEE ON SMALL BUSINESS, HONORABLE
JAMES M. TALENT, CHAIRMAN**

PRESENTED ON: JUNE 4TH, 1998

My name is Harry C. Alford. I am the President and CEO of the National Black Chamber of Commerce, Inc. located at 2000 L St. NW, Suite 200, Washington, DC 20036, Tel. 202-416-1622, FAX 202-416-1722.

Mr. Chairman, honorable members of the Committee, thanks for inviting the NBCC to participate in this very important discussion on Global Climate Change. God has given us just one Earth and it is the responsibility and obligation of every official, organization and business to ensure that the future of our planet is safe and secure.

The NBCC, incorporated in May 1993, is a trade association with 180 affiliated chapters throughout the nation. Our chapters and direct members represent over 64,000 Black owned businesses, which are approximately 10% of the national total. Our mission is to enhance the economic empowerment of Black neighborhoods and communities through business development, the creation of a thorough understanding of entrepreneurship and the full utilization of the great American capitalistic system. This is no small task. Blacks only account for 1% of the total sales by small businesses in this nation while representing 14% of the population. Black Enterprise magazine just reported, June 1998, that the BE 100 companies experienced a 9% decrease in sales during 1997 despite it being one of the greatest economic growth periods ever experienced in this century by mainstream businesses.

The key to dramatically reducing crime, poverty, poor health, low education and unemployment in Black urban communities is jobs via business development and economic growth. There is no substitute and it is the charge of the NBCC to educate our masses to this American fact and to advocate good business regulations, laws and practices.

We have reviewed the Kyoto Protocol and what our Administration has pledged in terms of this nation's commitment. We have a serious concern about the effects this commitment is going to have on our urban communities. To say that we are targeting the reduction of "greenhouse gasses" by 7% below 1990 levels during a "commitment period" between the years 2008 and 2012 is tantamount to declaring current urban areas "economic deserts". Is this actually necessary?

A typical NBCC business did not operate in 1990. The particular growth patterns for Black owned business would show a doubling in population from the years 2000 versus 1990. The year 2010 will perhaps show an increase of 500% versus 1990. In essence, to achieve the proposed reductions we will have to require a forced suppression of Black owned business development and a continuation of the 20% + unemployment rates many of our urban areas experience today. It is not fair and why should the Black business community pay an inordinate cost for this initiative?

It is not uncommon for our urban, particularly Black communities, to pay for environmental initiatives at a disproportionate rate. There are 525,000 Brownfield sites in this nation and most are in urban communities. Please keep in mind that urban communities are the venue for 98 percent of all Black-owned businesses.

What is the scientific rationale behind the administration's commitment? A growing body of economic studies demonstrate that any U.S. effort to significantly limit energy use through taxes, caps or limits on "greenhouse gas" emissions, as proposed by the Administration, would slow economic growth, cost hundreds of thousands of American jobs, especially in urban areas seeking to revitalize, and would further reduce or delay investments in more energy-efficient technologies or facilities.

We see mandatory constraints on fossil fuel use would raise the cost of monthly electricity, heating and cooling bills; limit personal mobility; and could seriously disrupt urban economies and our lives, as did gasoline lines and high energy prices did in the 1970's and early 1980's. Constraints on energy use would be particularly harmful to those Black-owned businesses seeking to enter the marketplace, as well as individuals on fixed incomes, those living in rural areas and/or who are otherwise dependent on personal transportation for work and other worthwhile social activities, and those Black-owned businesses who depend on transportation to compete effectively against their foreign counterparts as a result of higher fuel costs.

Why should we exempt developing nations from participating in any commitment? It is ludicrous for the United States to offer itself as a heavy participant in the reduction of "greenhouse gases" while nations such as China, India, Pakistan, Brazil, etc. can continue with "business as usual". The effort to reduce the environmental dangers must be shared by all and in a fair manner.

Can we rely on the data and efforts made by developed nations? The Washington Post has reported (May 31, 1998) that our friendly neighbor, Canada, cannot be depended on actual reporting and living up to its commitment: "The reports also indicate that major development projects are not adequately reviewed for their effect on the environment and that federal departments are not doing enough to determine how Canada will meet its international commitments, such as the promise signed last year in Kyoto, Japan, to reduce emissions of greenhouse gases."

Can we rely on the accuracy and disclosure of the EPA? The NBCC is very disappointed in the EPA's track record on manipulating "race" as an issue to further its own objectives. We are engaged in redefining what "Environmental Justice" actually is. The EPA has been too quick, and sometimes deceitful, when it screams "Environmental Racism". Evidence of this was printed May 28, 1998, in the Detroit News: "The Environmental Protection Agency ignored some of its own ethnic population studies in pushing to link environmentalism and racial discrimination, internal documents show. The documents, obtained by The Detroit News, concluded that whites were more likely than blacks to live around highly polluted sites on the nation's "Superfund" priority cleanup list. That study never reached the highest levels of the agency as it developed its "environmental justice" policy, and has never been made public.... The next year, the agency completed an exhaustive survey of the racial demographics around every one of the 1,234 polluted "Superfund" sites in the country. Again, the study failed to find evidence that would bolster the agency's drive to meld civil rights laws into environmental regulations. Again, the agency shelved the report and never released the results."

The EPA has just released requirements for companies renewing permits to demonstrate that they are in compliance with Title VI of the Civil Rights Act of 1964. The NBCC applauds this but also wants to know: WHEN WILL THE EPA GET IN COMPLIANCE WITH TITLE VI? The US Commission on Civil Rights found the agency in noncompliance during recent audits of federal agencies.

The NBCC dedicates itself to educating its members, constituents and others that there is no scientific reason for limits on "greenhouse gas" emissions. The economic implications for urban areas and specifically Black-owned businesses would lead to an increase in costs and lost jobs, as well as higher living expenses in terms of such essential items as housing, food and clothing. We support climate policies that are balanced and cost effective, and that do not unfairly burden Black-owned businesses and the citizens of a particular urban area or community, state or country.

We urge the Administration to reconsider its commitment to the Protocol, which was set in Kyoto. The United States should not be a signatory to any protocol or other agreement regarding "greenhouse gas" emissions unless the protocol or other agreement also mandates new specific scheduled commitments to limit or reduce "greenhouse gas" emissions for developing countries within the same compliance period. At no time should this result in significant job loss or serious harm to the economy of the United States.

Thank you once again for this opportunity.



American Council for an Energy-Efficient Economy

WASHINGTON, DC

**TESTIMONY OF HOWARD GELLER, EXECUTIVE DIRECTOR
THE AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY**

**BEFORE THE COMMITTEE ON SMALL BUSINESS
U.S. HOUSE OF REPRESENTATIVES**

**ON THE KYOTO PROTOCOL TO THE UNITED NATIONS
FRAMEWORK CONVENTION ON CLIMATE CHANGE**

June 4, 1998

The American Council for an Energy-Efficient Economy (ACEEE) is a non-profit research organization dedicated to advancing energy efficiency as a means of promoting both economic prosperity and environmental protection. We conduct studies, advise policymakers, assist with energy efficiency program design and evaluation, work collaboratively with business, disseminate information, and inform consumers. I appreciate the opportunity to appear before the Committee.

In my testimony, I would like to make three main points:

- 1) Reducing greenhouse gas emissions and achieving the targets in the Kyoto Protocol can yield economic benefits for the United States as a whole.**
- 2) Reducing greenhouse gas emissions offers enormous growth opportunities for small businesses.**
- 3) Federal energy efficiency and renewable energy programs can help small businesses to profit and grow while cutting greenhouse gas emissions.**

Reducing Greenhouse Gas Emissions Can Benefit the Economy.

A strong commitment to cut U.S. emissions of carbon dioxide and other greenhouse gases (GHGs) does not need to be a drain on the U.S. economy, as some critics of the Kyoto Protocol have claimed. For example, over 2000 economists issued a statement last year which says in part, "Economic studies have found that there are many potential policies to reduce greenhouse gas emissions for which the total benefits outweigh the total costs."

Relying on better technologies such as more efficient appliances, lighting, vehicles, and industrial processes as well as renewable energy sources, rather than onerous taxes or heavy-handed regulations, is the key to cutting GHG emissions without harming the

economy. By taking a technology-oriented approach, the United States and other nations can create new industries and jobs, save consumers money, and greatly reduce GHG emissions. Many of these new technologies and jobs will come from small businesses since small businesses tend to be more innovative and entrepreneurial than large "Fortune 500" companies.

An innovation-led strategy for achieving the target adopted in Kyoto can produce a net increase in jobs by improving energy productivity, reducing expenditures on oil imports, and expanding sectors of the economy that result in the most employment per dollar of expenditure. A study conducted by ACEEE along with four other public interest organizations, called *Energy Innovations*, shows that the US can reduce its carbon dioxide emissions 10 percent below 1990 levels by the year 2010, while boosting economic performance. The *Energy Innovations* study found that by following an innovation path, the economy would support 800,000 additional jobs by 2010 compared to business-as-usual growth in the economy. Consumers would realize net savings of \$530 per household per year by 2010 due to energy bill savings exceeding the cost of energy efficiency and renewable energy measures.

Other studies, such as report prepared by five national laboratories for the U.S. Department of Energy titled *Scenarios of U.S. Carbon Reductions* reached a similar conclusion as *Energy Innovations* -- namely that it is possible to greatly reduce our GHG emissions without harming the economy if the emphasis is on a technological response rather than onerous taxes that depress economic growth.

It is important to keep these results (and competing claims of economic losses) in perspective. In an economy that creates 250,000 new jobs per month, the job gains forecast by *Energy Innovations* amount to a little less than one-half of one percent of baseline employment forecast for 2010. Also, it is important to recognize that there will be some shift in employment within the economy as a whole. Job gains in technology manufacturing, construction, and services will be partially offset by lower employment in the fossil fuel and utility industries. Steps should be taken to ensure that displaced workers are retrained and given employment opportunities in the growing energy efficiency and renewable energy industries.

Note that these results are based on achieving emission reductions entirely through domestic action in the energy sector. The U.S. can and should plan to achieve a substantial majority of the emission reductions called for in the Kyoto Protocol through domestic action. Nonetheless, the additional flexibility built into the Kyoto Protocol ensures that marginal emission control costs will remain low, even if some approaches are not as successful as we expect.

If it is possible to greatly reduce GHG emissions with net economic benefits, it is fair to ask why some studies claim that reducing GHG emissions will harm our economy. First it should be noted that many of these studies are funded by producers and major consumers

of the fossil fuels that cause global warming. Second, the studies use worst case assumptions that lead to loss of economic output, such as imposition of a carbon tax without recycling the revenue, no consideration of technological response or the cost savings from energy efficiency improvements, no economic benefits from pollution abatement, and no international joint implementation. The studies are thoroughly critiqued in a recent World Resources Institute report by Repetto and Austin titled *The Costs of Climate Protection: A Guide for the Perplexed*.

Putting economic modeling aside, history tells us that every time we have faced an environmental challenge--from getting the lead out of gasoline, to protecting the ozone layer, to controlling acid rain--there have been those in affected businesses that have said that it won't work and it will wreck the economy. They have never been right. In fact, once the decision was made, each time industry rose to the challenge and American ingenuity found ways to address these problems cheaper and faster than had been anticipated. To take one example, industry predicted that controlling acid rain would cost as much as \$1500 per ton of sulfur removed. Sulfur allowances are now trading at about \$100 per ton--less than one-tenth the prior estimate.

Reducing Greenhouse Gas Emissions Provides Economic Growth Opportunities for Small and Medium-Size Businesses.

A shift away from fossil fuels such as coal and petroleum and towards greater energy efficiency and renewable energy technologies presents enormous opportunities for small and medium-size businesses to grow and thrive. These businesses can manufacture, sell, and install energy-efficient appliances, lighting products, control systems, solar and wind power systems, advanced industrial processes, etc. Farmers can grow bioenergy crops and operate bioenergy facilities as well as produce food. Home builders can construct more efficient, higher value-added buildings, thereby increasing their revenues. And insulation and HVAC contractors can increase their business as they make our existing homes and commercial buildings more energy-efficient. All of this means more output and revenues for small and medium-size businesses, and less output and revenue for the Exxon's and Commonwealth Edison's of the world.

I would like to present some real world examples of small and medium-size businesses that are already profiting and growing by serving energy efficiency and renewable energy markets, or installing state-of-the-art industrial process equipment in their own operations.

AstraLite

AstraLite, based in Annandale, NJ, is a division of Computer Power, Inc. In the words of Les Listwa, one of its senior staff, Computer Power was a dying business five years ago since it was unable to compete with large manufacturers of inverters

and uninterruptible power supplies. In 1993, Computer Power formed the AstraLite division to manufacture and market light-emitting diode (LED) exit sign kits. An LED exit sign consumes just 2 Watts of power, compared to 12 Watts for a typical compact fluorescent exit sign or 40 Watts for an incandescent-based sign. The U.S. EPA Energy Star light fixtures program is promoting this technology, and the market is growing about 50 percent a year. AstraLite, which now employs about 80 workers, saved its parent company.

AstroPower Inc.

AstroPower, based in Newark, DE, is the second largest U.S.-owned manufacturer of photovoltaic cells and modules. AstroPower currently has about 185 employees and \$25 million in annual sales revenues. Sales revenue grew at a compound annual growth rate of 65% over the past five years. The company just went public.

Bergey Windpower Co.

Bergey Windpower Co. of Norman, OK was founded in 1977 and is currently the world's leading supplier of small wind turbines. BWC wind turbines have been installed in all 50 states and more than 80 countries. The company employs 25 workers and has annual revenues over \$4 million, compared to \$1.5 million five years ago. Earlier this year BWC established a Chinese joint venture to better serve this fast growing market for its products.

Broin and Associates, Inc.

Broin and Associates of Sioux Falls, SD builds medium-size fuel ethanol plants throughout the Midwest. These plants produce fuel ethanol and cattle feed using corn or milo as the feedstock. All of the plants are either cooperatively owned by farmers or co-owned by Broin and farmers. Broin and Associates currently employ and manage over 150 workers, up from about 50 workers four years ago. The company is profitable and growing.

Comfortex, Inc.

Comfortex, based in Cohoes and Watervliet, NY, manufactures energy-efficient insulating window treatments. Their window shades more than double the insulating value of a typical double pane window. Comfortex started out in 1990. They now have about 400 employees with plants in New York, Arizona, Florida, Nevada, and Pennsylvania. Sales of the insulating shades are increasing about 20-30 percent per year. The company got help in developing its window insulation technology from the New York State Energy Research and Development Authority (NYSERDA).

Decatur Foundry, Inc.

Decatur Foundry, located in Decatur, IL, produces iron castings for motor and pump components. Decatur has invested in new infrared heating equipment and computerized controls which enabled it to significantly cut energy use, reduce pollutant emissions, increase output and productivity, and create a safer workplace. Annual sales revenue grew from about \$6 million to \$10 million after these investments were made, with employment growing to 75 workers. Decatur received help from the Electric Power Research Institute and its local utility in implementing these innovations. It is participating in the U.S. EPA Climate Wise program.

A. Finkl and Sons Co.

A. Finkl and Sons, located in Chicago, is a large custom die steel forger. The company has \$80 million in revenues and 400 employees. Finkl was a thriving company in the 60s and 70s, but like many Midwestern iron and steel companies was hit hard by the recession of the early 1980s. Finkl responded by making capital improvements including installing state-of-the-art energy-efficient furnaces, computerized controls, and maximizing reuse of solid waste. As a result, Finkl has bounced back and is now one of the most efficient companies in its business. It is producing twice what it did in the early 70s, while consuming 60% less energy per pound of output.

Southwall Technologies

Southwall Technologies, based in Palo Alto, Ca, specializes in making low-emissivity coatings and films that are used in energy-efficient windows. Southwall developed its initial products with financial and technical support from the U.S. Department of Energy and Lawrence Berkeley National Laboratory. The company now has 250 employees and production facilities in California and Tempe, AZ. Sales revenue grew from \$18 million in 1993 to \$50 million in 1997.

Trigen Energy Corp.

Trigen, based in White Plains, New York, owns and operates cogeneration facilities and district heating and cooling systems in 22 locations throughout North America. For example, Trigen purchased the old district heating system in downtown St. Louis and is upgrading and expanding it. New customers served by the system include the Trans World Dome and the Morgan Street Brewery. By generating electricity and using the "waste heat" for supplying heating and cooling to buildings, Trigen greatly reduces fuel use and pollutant emissions while helping to revive urban core areas. The company has grown rapidly in the past decade, with 760 employees today compared to 200 in 1992.

These are not isolated examples -- there are thousands of small and medium-size businesses that are manufacturing, selling, or using energy efficiency and renewable energy technologies and, in doing so, are profiting from reducing GHG emissions and helping to slow global warming. The lesson from these examples is that by encouraging technological innovation, we can address the threat posed by global climate change while growing the economy and strengthening our nation's small businesses.

It is also important to note that international markets for energy efficiency and renewable energy technologies are expanding very rapidly. For example, worldwide windpower capacity tripled, solar photovoltaic cells shipments more than doubled, and compact fluorescent lamp sales increased by over a factor of 2.5 between 1992 and 1997. Some of the small businesses mentioned above, such as Bergey Windpower and Southwall Technologies, are thriving in large part because of exports. Promoting greater energy efficiency and renewable energy in the United States will help our companies prosper and better compete internationally.

Federal Programs Help Small Businesses Cut GHG Emissions Profitably.

Small businesses are usually not able carry out R&D on their own. They often lack technical expertise or dedicated energy and environmental managers. They often do not have information on or access to the latest energy efficiency and pollution prevention technologies. Nor are they well-equipped to compete in international markets.

A variety of federal programs are helping small businesses overcome these barriers and develop and implement state-of-the-art energy efficiency and renewable energy technologies. These programs are saving businesses and consumers money while cutting pollution of all types. And they are helping small businesses access international markets. These programs include:

EPA Energy Star and Green Lights programs

The Energy Star and Green Lights programs are assisting thousands of small businesses that are either manufacturing energy-efficient products or installing energy efficiency measures. These companies receive information, software, training, and recognition from the EPA. Nationwide, EPA estimates that program participants invested \$1.8 billion in efficiency measures and saved \$5.3 billion on their energy bills during 1991-97, and cut their carbon emissions by 25 million metric tons. Small businesses and institutions that are actively participating in the program in the St. Louis area include Venture Stores, Dazor Manufacturing Corp., Starbeam Supply Co., St. Louis Children's Hospital, and Washington University.

DOE Industrial Assessment Centers program

The Industrial Assessment Centers are located at 30 universities throughout the

country. The Centers provide free energy, waste, and productivity audits specifically for small and medium-size manufacturers. The Centers have conducted over 8,000 audits since the program was started and have generated about \$375 million in cost savings for the participating companies. About 300 assessments have been performed for manufacturers in Missouri by Centers located at the University of Missouri at Rolla and the University of Kansas.

DOE Building America and EPA Energy Star Homes programs

The Building America and Energy Star Homes programs are helping home builders upgrade the energy efficiency of new homes thereby improving housing quality, lowering energy bills, and making home ownership more affordable. Major builders like Pulte and Ryan Homes as well as smaller builders all over the country are participating in these programs. DOE and EPA are providing training and technical assistance to show these builders how they can significantly upgrade energy efficiency while minimizing any increase in construction costs.

CORECT and COEECT

The Department of Energy runs two programs, the Committee on Renewable Energy Commerce and Trade (CORECT) and the Committee on Energy Efficiency Export and Trade (COEECT) that are helping U.S. small businesses access and compete in rapidly growing worldwide markets. These programs are providing valuable support to American companies through market assessments, trade missions, facilitating export financing, etc.

The voluntary programs mentioned above are helping small businesses innovate, save money, increase sales, and cut pollutant emissions. They are justified even if the climate change problem didn't exist. They are not "premature implementation of the Kyoto treaty" as some have suggested.

President Clinton has proposed expanding existing Federal energy efficiency and renewable energy programs as part of his Climate Change Technology Initiative. While it's outside the purview of this Committee, I urge friends of small business in the Congress to approve this funding independent of opinions concerning the Kyoto Protocol. Put simply, these programs are good for business. If these technology-oriented programs are a success, we won't need to adopt onerous new taxes or burdensome regulations in order to meet our nation's environmental goals, whether it be goals of the Clean Air Act today or the Kyoto Protocol to the Framework Convention on Climate Change tomorrow.

Thank you for considering these views.



COMPETITIVE ENTERPRISE INSTITUTE

**Testimony of
Marlo Lewis, Jr.
Vice President for Policy and Coalitions,
The Competitive Enterprise Institute
Washington, D.C.**

**before the
Committee on Small Business
June 4, 1998**

Hearing on the Kyoto Protocol

Good morning, my name is Marlo Lewis. As Vice President for Policy and Coalitions of the Competitive Enterprise Institute, I welcome your invitation to discuss climate change policy. CEI is a public interest group established in 1984 with a current staff of 35 and an annual budget of about \$2.5 million. Located in Washington, D.C., CEI works to educate and inform policy makers, journalists, and other opinion leaders on market-based alternatives to government programs and regulations. CEI also engages in public interest litigation to protect property rights and economic liberty. CEI is supported by the voluntary contributions of foundations, corporations and individuals. We accept no grants from any government agency, nor do we accept grants from any other party that would compromise the principled positions we espouse.

Climate change policy is a major focus of the Competitive Enterprise Institute. Indeed, we have been active in the global warming debate ever since the issue first gained national prominence in the late 1980s. Former CEI environmental studies director Kent Jeffreys published a major monograph on the issue, titled "Why Worry About Global Warming," in February 1991. In 1992, along with the late Dixie Lee Ray, CEI President Fred Smith attended the 1992 Rio Conference as an observer and commentator. Our aim was to give intellectual aid and comfort to greenhouse skeptics in the U.S. and other delegations. Needless to say, CEI's efforts to dissuade the Bush Administration from signing the Framework Convention on Climate Change were less than spectacularly successful. But we remain hopeful that cooler heads will yet prevail in this round.

In July 1997, CEI held a full-day conference on the economic and political implications of climate change policy. Later that year we published *The Costs of Kyoto: Climate Change Policy and Its Implications*, a book based on the papers written for that conference. We also produced a conference highlights video with the same title. In addition, CEI conducted a congressional staff briefing, published nearly a score of op-eds and columns, and participated in numerous media interviews, press conferences, and educational symposia on global warming.

Since May 1997, CEI has chaired the Cooler Heads Coalition, the climate change working group of the National Consumers Coalition, an alliance of some 28 pro-market public policy groups, headed by Consumer Alert. On behalf of the Cooler Heads Coalition, CEI publishes *May Cooler Heads Prevail*, a biweekly newsletter on the science, economics, and politics of the climate treaty debate. Also on behalf of the Coalition, CEI organizes a monthly science briefing for congressional staff and media.

Finally, let me note that CEI attended all eleven days of the Kyoto conference as an officially registered non-governmental organization. Fred Smith wrote daily commentaries that enjoyed wide distribution in the U.S. via e-mail and fax.

Mr. Chairman, I commend you for holding this hearing. The Clinton Administration is making ambitious plans to restructure the energy economies of America and the world. Global warming may or may not be real, and if real, may or may not pose risks to human health and safety. In contrast, the risks of global warming policy are undeniably real and, I will argue, unacceptably high.

I. Risks of Precaution

What are the risks of global warming policy? They include the following: the risk that energy rationing will devastate employment in major U.S. industries; the risk that rising consumer energy prices will depress the living standards of American families; the risk that new regulatory policies and higher energy costs will handicap small business; the risk that U.S. job and export losses will fuel protectionism (carbon tariffs or quotas to offset carbon leakage); the risk that fossil fuel restrictions will impair the readiness and training of the U.S. armed forces; the risk that non-elected, unaccountable bureaucrats will gain greater control over our lives and resources; the risk that public attention and resources will be diverted from more serious threats to U.S. and global welfare; the risk that increased government control over energy production and consumption will strengthen repressive institutions, particularly in the Third World and the former Soviet Union; and the risk that Kyoto's anti-energy use policies will be extended to the developing world, condemning those nations to perpetual poverty.

The advocates of an international treaty ignore, deny, or downplay such risks. Invoking the "Precautionary Principle," they pretend that the only risks worth worrying about are those arising from economic activity. That the political regulation, suppression, or prohibition of economic activity might also carry serious and even lethal risks is a reality they seldom if ever address. Thus, in their view, the case for an international climate treaty is almost self-evident. The use of energy *might* be warming the earth. That warming *might* produce catastrophic results. The speed of this change *might* require immediate action. Governments *might* be able to prevent that warming by an aggressive global carbon withdrawal policy. Therefore, we *must* take action now to reduce emissions. We must not "gamble with the only planet we have." That they *are* gambling with the only economy we have never seems to trouble them.

This approach to policy making is both morally irresponsible and logically inconsistent. Precautionists demand assurances of no harm only with respect to actions that government might regulate, never with respect to government regulation itself. But government intervention frequently boomerangs, creating the very risks precautionists deem intolerable.

Examples abound. Federal fuel economy mandates force auto makers to produce smaller, lighter, less crash-resistant cars, causing thousands of highway deaths per year.¹ FDA regulations delay the availability of life-saving therapies, killing tens of thousands over the past two decades.² Banning DDT revived malaria epidemics in the developing world, afflicting 2.5 million people in Sri Lanka alone.³ Furthermore, a large body of literature documents that regulation can kill just by misdirecting resources and squandering wealth. Precautionists ignore the obvious connection between livelihoods, living standards, and lives – as if jobs and income were not the chief safety nets for most of the world's people. Even in a relatively wealthy country like the United States, every \$5 million to \$10 million drop in economic output is associated with an additional statistical death.⁴⁵

Making people poorer is seldom a good way to make the world safer, healthier, or cleaner. Yet the Kyoto Protocol would require America to reduce its emissions of greenhouse gases, chiefly carbon dioxide from fossil fuel combustion, 31% below the level projected for

¹ Robert W. Crandall & John D. Graham, "The Effect of Fuel Economy Standards on Automobile Safety," 32 *Journal of Law & Economics* 97, 109-10 (1989).

² Sam Kazman, "Deadly Overcaution," *Journal of Regulation and Social Costs*, August 1990.

³ Frank Cross, "Paradoxical Perils of the Precautionary Principle," 53 *Washington & Lee Law Review*, 851 (1996), p. 891.

⁴ Cross, "Paradoxical Perils," p. 919, "When Environmental Regulations Kill: The Role of Health/Health Analysis," 22 *Ecology Law Quarterly*, 729 (1995).

2010.⁶ There is no feasible way to accomplish such drastic emissions cutbacks without draconian cutbacks in energy use; and no way to put America on an energy austerity diet without depressing economic growth. WEFA, the respected economic forecasting firm, estimates that meeting the U.S. Kyoto target would reduce average family income in the year 2010 by \$2,700, reduce annual economic output by \$300 billion, and destroy more than 2.4 million jobs.⁷

II. Critique of the Global Warming Hypothesis

Mr. Chairman, Kyoto apologists would have us believe that the “consensus of scientists” has spoken, that global warming poses a “mortal threat” to human life,⁸ and that we must therefore waste no time making preparations and plans to de-carbonize the U.S. and other national economies. In reality, the case for an international climate treaty rests on an ensemble of hypotheses that are highly questionable.

Those hypotheses may be summarized as follows. First, man’s increased use of fossil energy is warming the earth significantly. Second, the impact of such warming will be catastrophic and rapid. Third, the scheme to coordinate global energy use reductions worldwide is feasible and effective. Fourth, if we do it smart, it won’t cost much. Finally, energy rationing will provide greater safety than concerted efforts to make societies freer, wealthier, and, thus, better able to ride out the shocks and surprises of an unknown future. Note that the mere fact that the Earth might be warming, or that mankind might be causing such warming, does not in itself clinch the case for an international climate treaty.

Let’s examine the case for a climate treaty through a series of questions.

First, are industrial emissions having (in practical, not just in statistical terms) a significant impact on global climate? Those arguing in the affirmative rely on computer models that simplify or ignore many key variables (water vapor, clouds, solar radiation), cannot “hindcast” the past century’s climate, and cannot replicate current climate without considerable tweaking or “fudge factors.”⁹ The modest 0.54° C warming observed during the past 110 years is within the historic natural range of climate variability, and may well be a recovery from the Little

⁶ U.S. Energy Information Administration, “World Energy Consumption,” *International Energy Outlook 1998*, p. 13.

⁷ Mary Novak, Testimony Before the Subcommittee on National Economic Growth, Natural Resources, and Regulatory Affairs, April 23, 1998.

⁸ Albert Gore, Jr., *Earth in the Balance: Ecology and the Human Spirit* (Boston, New York, London: Houghton Mifflin, 1992), p. 325.

⁹ Richard Kerr, “Greenhouse Forecasting Still Cloudy,” *Science* Vol. 276, 16 May 1997, pp. 1040-42.

Ice Age of 1550-1850.¹⁰ Approximately 70% of that warming had already occurred before 1945 – prior to the largest buildup of greenhouse gases.¹¹ Greenhouse theory predicts that most of the warming will occur in the higher latitudes, yet various weather stations record a cooling trend in the North Atlantic since the late 1950s.¹² Furthermore, U.S. Weather Satellites – the most accurate and comprehensive measuring system in the world – show no warming trend since 1979 when the satellite program began. Yet this was a period of rapidly increasing greenhouse gas concentrations.¹³ Fluctuations in solar activity correlate strongly with fluctuations in global temperature over the past 240 years, suggesting that the sun may be responsible for some or most of the warming observed over the past century.¹⁴ The real world evidence for human-induced global warming is dubious at best.

Next, suppose the data did suggest a “discernible” human influence on global climate – so what? There is no *a priori* reason to assume that global warming, on net, would be harmful rather than beneficial. Millions of America’s senior citizens adapt to climate change every decade – when they move from the Snow Belt to the Sun Belt. Thomas Gale Moore of the Hoover Institution shows through extensive historical data that mankind prospered in periods warmer than today, and suffered in colder. For example, in the Medieval Climate Optimum of 1000-1200 AD the world was 2-3°F warmer than today, yet this was a period marked by significant increases in agricultural output, commerce, trade, longevity, and population. Europe experienced milder weather and fewer outbreaks of epidemic diseases than in either the cold, dank “Dark Ages” or the subsequent Little Ice Age.¹⁵

Greenhouse theory itself predicts that most warming would occur at night, in winter, and in the higher latitudes. Such a warming pattern would likely lengthen growing seasons and, by reducing the temperature gradient between the tropics and the poles, possibly reduce extreme weather events. Furthermore, higher levels of carbon dioxide cause plants to grow faster, stronger, and more profusely, boosting agricultural yield and enhancing wildlife habitat.¹⁶ Thus, it is not clear that global warming is something that should be prevented, even if it were easy and

¹⁰ Roger Pocklington, “Oceanography and Inferences from Time Series,” in Laura Jones, ed., *Global Warming: the Science and the Politics* (Vancouver: The Fraiser Institute, 1997), pp. 49-51.

¹¹ Robert Balling, “Global Warming: Messy Models, Decent Data, and Pointless Policy,” in Ron Bailey, ed., *The True State of the Planet* (New York: The Free Press, 1995), p. 91.

¹² Pocklington, “Oceanography and Inferences.”

¹³ Roy Spencer and John Christy, “Precise Monitoring of Global Temperature Trends from Satellites,” *Science* 247 (1990): 1558-62, and updates.

¹⁴ Sallie Baliunas and Willie Soon, *Astrophysical Journal*, 450, 1995, pp. 896-901; “The earth’s climate: Solar rash and earthly fever,” *The Economist*, February 21st, 1998, pp. 81-82.

¹⁵ Thomas Gayle Moore, *Climate of Fear: Why We Shouldn’t Worry about Global Warming* (Washington, DC: Cato Institute, 1998), pp. 43-67.

¹⁶ Shirwood B. Idso, “The Biological Consequences of Increased Atmospheric Concentrations of CO₂,” in Laura Jones, ed., *Global Warming*, pp. 141-180.

cost little. Spending trillions to avoid better weather and a greener planet would make no sense at all.

Third, why rush? Kyoto apologists warn that we must take action now, lest the buildup of greenhouse gases wreak irreversible havoc on nature's delicate balances. Yet precisely because carbon dioxide emissions may linger in the atmosphere for a century or longer, it makes no practical difference in the long run whether carbon withdrawal policies are implemented now or a decade or more from now. Indeed, according to climate modeler Thomas Wigley, delaying action until 2020 would yield only 0.2°C additional warming in the year 2100.¹⁷ That's too small a difference to affect any discernible human or environmental interest.

Some greenhouse partisans urge immediate action on economic grounds. They argue that reducing emissions will be less expensive if we get started sooner rather than later to meet Kyoto's targets and timetables.¹⁸ But that begs the question of whether Kyoto's initial commitment period of 2008-2012 is not itself overly ambitious, or "too much, too soon," even if one were assume that some kind of climate treaty is a good idea. Former National Academy of Sciences officer Rob Coppock favors international controls on greenhouse gases but fears Kyoto will be counterproductive. Requiring nations to make significant reductions in a little more than a decade will force firms to invest in costly retrofits, delaying adoption of newer, cleaner, more energy-efficient technologies. Not only will premature turnover of capital equipment impair firms' ability to make deeper cuts over the long term, it will intensify resistance to the Protocol.¹⁹ Coppock finds this problem so serious that he thinks the Conference of the Parties should consider scrapping Kyoto and start over if they can't agree to stretch out the compliance period.

Fourth, if industrial civilization is dangerously altering global climate, can any treaty stop it? The Kyoto accord in itself would do nothing to mitigate climate change, since it exempts the developing countries, which will be the major emissions source in the next century. Patrick Michaels notes that even if all industrial countries faithfully meet their Kyoto targets, the amount of warming averted will be a miniscule 0.19°C by the year 2047 (if, that is, we assume the validity of the National Center for Atmospheric Research's newest climate model). Ground-based measurements probably could not verify that such a small change had actually occurred.²⁰

¹⁷ T.M.L. Wigley, R. Richels, & J.A. Edmonds, "Economic and environmental choices in the stabilization of atmospheric CO₂ concentrations," *Nature*, Vol. 379, January 18, 1996, pp. 241-43.

¹⁸ Rep. Henry Waxman, "Climate Change Facts: Five Myths about Developing Countries and Climate Change" (Dear Colleague, March 25, 1998).

¹⁹ Rob Coppock, "Implementing the Kyoto Protocol: The Kyoto Protocol will be a worthwhile agreement only if it adopts a long-term strategy in its implementation plan," *Issues in Science and Technology*, Spring 1998, p. 70; The Business Roundtable, *The Kyoto Protocol: A Gap Analysis*, May 1998, p. 8.

²⁰ This estimate is based on the newest model of the National Center for Atmospheric Research. Pat Michaels, "The Consequences of Kyoto," Cato Institute Policy Analysis, No. 307, May 7, 1998, p. 10.

Of course, we often hear that Kyoto is just a first step, a foundation for future agreements embracing more nations and requiring deeper cuts. But that makes the whole climate change prevention agenda seem all the more utopian, since no agreement in history approximates the complexity of the Kyoto Protocol. Kyoto does not propose to ban a specific substance manufactured by a few specialized companies but to regulate levels of the most pervasive byproduct of industrial civilization. Nations would have to control the energy budgets of their citizens, monitor all industrial and agricultural activities, and restrict mobility. They would continually have to increase scope and stringency of their regulatory efforts. And they would have to do so in a coordinated manner. Is there any reason to believe that this ambitious scheme would function more coherently, efficiently, or fairly than does its parent organization, the United Nations?

Conceivably, the U.S. could bully or bribe some developing countries to *sign* the Kyoto Protocol, but what is the likelihood that the agreement would be *enforced*? The benefits of emissions reduction are distant, diffuse, and speculative, whereas the costs are immediate, local, and real. Every party will thus have strong incentives to cheat. The UN can't enforce simpler agreements on arms control or human rights. Why would nations that routinely evade or flout other international commitments scrupulously deny themselves the benefits of affordable energy and economic growth?

Any global emissions reduction treaty would be akin to a super-OPEC, which in its own way for its own purposes has long sought to curb energy use. From time to time, largely when war or national policy has disrupted energy markets, OPEC succeeded somewhat in restricting global energy consumption. Mostly, however, OPEC has failed. Although OPEC members would all benefit from actual curtailment of energy output, their self-interest encourages each to produce more energy. Consequently, while all OPEC members express support for the energy curtailment program, most individually expand output. Non-OPEC countries have no clear and direct common interest in reducing energy use, or in coordinating energy reduction policies. Thus, one would expect even less success with a Kyoto style agreement.

Fifth, how much will it cost? Council of Economic Advisors Chairman Janet Yellen maintains that the net costs of Kyoto "are likely to be small" – *if* the Administration's diplomatic and domestic policy initiatives carry the day. Specifically, she claims that with developing country participation, robust emissions trading, federally-stimulated energy conservation improvements, joint implementation and the clean development mechanism, Kyoto should cost the United States only \$7 billion to \$12 billion per year in 2008 to 2012. For the average

household, energy costs would rise by no more than \$70 to \$110 per year.²¹ Commenting on Dr. Yellen's analysis, one witness at an earlier hearing could not help recalling the old Depression Era jest: "If we had some ham, we could make ham and eggs – if we had eggs." It is questionable whether any of the ingredients presupposed in the Administration's estimates will ever materialize.

To repeat, Kyoto will require the United States to reduce its emissions 31% below the level otherwise predicted for 2010. Kyoto would legally obligate the U.S. to cut 552 million metric tons of CO₂ per year by 2008-2012.²² As the Business Roundtable points out, that target is "the equivalent of having to eliminate all current emissions from either the U.S. transportation sector, or the utilities sector (residential and commercial sources), or industry."²³ What this suggests is not, as the Administration says, that if we "do it dumb," Kyoto will be "costly," but that unless fundamentally transformed by emissions trading, developing country participation, joint implementation, the Climate Change Technology Initiative, and the rest, Kyoto is a prescription for economic disaster. What then is the likelihood that this amazing transformation will occur?

Emission trading has the potential to bring down compliance costs, but by how much is unclear. The larger the market, the greater the number of countries participating, the greater the likelihood U.S. firms will be able to purchase relatively inexpensive emissions permits abroad rather than make expensive emissions reductions at home. But only nations that accept binding emission limits are eligible to participate in trading, and the Kyoto Protocol excludes developing countries – the richest potential source of inexpensive emissions credits – from binding commitments.

At the Kyoto conference, the developing country bloc known as the G-77 Plus China overwhelmingly rejected a provision (Article 10) that would have allowed individual developing nations voluntarily to accept binding targets. As the Business Roundtable observes, "It seems unlikely that these same countries that refused to permit the inclusion of a voluntary 'opt-in' provision in the Protocol would now reverse course and accept binding reductions."²⁴ Yet unless the developing country bloc does reverse course, the cost-reducing potential of trading will be greatly diminished.

²¹ Dr. Janet Yellen, Testimony before the House Subcommittee on National Economic Growth, Natural Resources, and Regulatory Affairs, May 19, 1998.

²² EIA, *International Energy Outlook 1998*, p. 13.

²³ BRT, *Gap Analysis*, p. 5.

²⁴ BRT, *Gap Analysis*, p. 16.

Emission trading may be severely constrained for other reasons as well. A trading system can be viable only if there are credible mechanisms to monitor trades, keep the books, and punish cheating. Why play by the rules if no one else does, if other countries are free to undercount emissions for domestic producers, or to issue permits exceeding their national quota? Kyoto, however, creates no monitoring and enforcement machinery for emissions trading. It leaves to future conferences the task of setting up the institutions required to audit emissions trades and punish emissions violators.

Article 17 of the Kyoto Protocol states that emissions trading “shall be supplemental to domestic actions for the purpose of meeting quantified emissions limitation and reduction commitments....” As the Business Roundtable notes, it is unclear at this stage how much of its target the U.S. would be able to meet through “supplemental” emissions trading and how much it would have to meet through “domestic actions.” The EU, for example, intends to push the position that no party should be allowed through trading to meet more than 10%-50% of its emission reduction target.²⁵ At its recent conference, the Group of Eight – the U.S., Japan, Germany, United Kingdom, Canada, France, Italy, and Russia – endorsed the use of emissions trading and other market mechanisms “to supplement domestic actions” – suggesting that only part of a nation’s target can be met through trading.²⁶

Similar difficulties surround other elements of the Administration’s scenario. Under Article 6 (joint implementation), U.S. firms may earn emissions credits by helping companies in other industrial countries reduce their emissions or enhance greenhouse gas-absorbing “sinks.” But here again, only projects “supplemental” to domestic actions would qualify – implying an upper limit to the credits attainable from joint implementation. Moreover, to earn credits, joint implementation projects must be “additional to any that would otherwise occur.” Yet those that would “otherwise occur” are apt to be the most profitable investments. If credits can only be earned through economically unattractive ventures, then “joint implementation will have very limited value.”²⁷

Under Article 12 (the clean development mechanism), the U.S. may earn credits by reducing emissions in developing countries. But such reductions may count only against “part” of our Kyoto obligation, and how large a part will not be determined until after the Protocol enters into force.²⁸ Also, a project may qualify for clean development credit only if the investment would be “additional” to any that would occur otherwise. In short, like emissions

²⁵ Ibid., p. 25.

²⁶ *BNA Daily Environment Report*, May 19, 1998.

²⁷ Ibid., p. 23.

²⁸ Ibid., p. 28.

trading and joint implementation, the CDM in practice may be far less “market-based” and “flexible” it is cracked up to be.

David Montgomery of Charles River Associates raises additional concerns about the Administration’s cost estimates. According to Montgomery, Dr. Yellen has looked only at the “direct” costs of compliance, ignoring the “ripple effects” of higher energy prices throughout the economy. Furthermore, Dr. Yellen apparently assumes that the \$6.3 billion Climate Change Technology Initiative would increase the annual rate of energy efficiency improvement from 1% to 1.25%, yielding an additional 40% boost in energy efficiency over the next 12 years *at no cost*.²⁹ Yet, as Montgomery notes, “Increasing the annual rate of efficiency improvement from 1% to 1.25% gives only a 4.5% improvement in energy efficiency over 12 years, not 40%. This is a simple compound interest calculation.”³⁰

III. Insurance Options – Prevention or Resiliency?

Confronted with such objections, greenhouse advocates emphasize precautionary considerations and compare the Kyoto Protocol to an insurance policy. Yes, my home will probably never be vandalized, consumed by fire, or destroyed by an earthquake or a flood. Nonetheless, I would be foolish not to purchase homeowners’ insurance. Similarly, Kyoto supporters argue, I am foolish if I am unwilling to invest in energy rationing policies that might possibly help avert a disaster of planetary proportions. There are two main flaws in this line of argument.

First, whether or not an insurance policy makes sense partly depends on the price of the premium. It is possible to spend too much on insurance. A homeowner’s policy so expensive that it effectively prevents the insured from purchasing health insurance, replacing the faulty brakes in his car, making safety improvements in his home, or saving for his retirement is probably a bad investment. The Administration assures us that the premium payments associated with the Kyoto Protocol will be relatively small, but, as noted, several respected private sector analysts disagree.

Second, an insurance policy worthy of the name should help make the insured whole after some unfortunate event has struck. Kyoto can do nothing of the kind. Quite the contrary, whatever resources we apply to prevent climate change are resources we cannot use to adapt to climate change if and when it occurs. Kyoto is all premium and no coverage.

²⁹ In her March 4, 1998 testimony before the House Commerce Committee, Dr. Yellen states that the CCTI “could lead to declines in the permit price of approximately 40 percent.”

³⁰ David Montgomery, Testimony before the Subcommittee on National Economic Growth, Natural Resources, and Regulatory Affairs, May 19, 1998.

This last point leads to a question that should be at the heart of the global warming debate. *Which type of societal insurance policy is likely to deliver the most protection?* Should we try to prevent global change by rationing energy and further politicizing economic and technological development? Or should we try to increase mankind's ability to adapt to change by reducing political barriers to enterprise, invention, and innovation?

Wealthier, more technologically advanced societies are better able to anticipate, withstand, and recover from climate change, extreme weather events, and other natural disasters. There is no evidence that extreme weather events are becoming more frequent or severe in this century.³¹ But let's assume for the sake of argument that rising levels of atmospheric carbon dioxide will warm the planet in ways that increase the number and intensity of severe storms. What type of insurance policy would offer the most protection under such circumstances?

Florida and Bangladesh both experience tropical storms. When a typhoon hits Bangladesh, tens of thousands of people may die. In contrast, when a hurricane strikes Florida, there may be tremendous property damage, but comparatively little loss of life. The reason is not that typhoons are worse than hurricanes but that Florida is wealthy, Bangladesh poor. In Florida, homes are built to withstand high-velocity winds. A developed infrastructure is in place to provide early warning, continuous communication, medical services, and emergency relief. Also, car ownership is widespread, allowing people to drive to safer locales before the storm hits. In short, richer is safer. This suggests that the proper goal of policy is to make more of the world like Florida and to shun political schemes that might damage our mobility, prosperity, or technological prowess. The best insurance policy against both man-made and natural disasters is greater wealth and technological sophistication.

A better approach to dealing with the potential hazards of climate change is a Resiliency Strategy. Policy makers would work to eliminate the fiscal and regulatory barriers that impede wealth creation, innovation, and intelligent adaptation. A Resiliency Strategy is clearly superior given the uncertainties surrounding the global warming hypothesis. Many catastrophes may await us in the next century: new viral plagues, increased earthquake activity, an errant meteor, nuclear terrorism, biological or chemical warfare, even global cooling. The resources of money, effort, and attention available to address such crises are limited. Mobilizing the nations of the world and spending vast sums to fend off one possible threat that may prove to be non-existent is

³¹ Chris W. Lansea et al., "(1996) *Geophys. Res. Let.* 23, 1693-1700. The IPCC states, "...overall, there is no evidence that extreme weather events, or climate variability, has increased, in a global sense, through the 20th century, although data and analyses are poor and not comprehensive. On regional scales, there is clear evidence of changes in some extremes and climate variability indicators. Some of these changes have been toward greater variability; some have been toward lower variability." IPCC, *Climate Change 1995, The Science of Climate Change*, Cambridge University Press, p. 173.

hardly a prudent insurance policy. In contrast, making societies wealthier and freer is inherently desirable, and would better prepare us to survive whatever various potential threats that might materialize in the 21st century.

Disingenuously, greenhouse lobbyists often argue that, at a minimum, we should pursue a “no regrets” policy – do things that should be done in any event. What they have in mind, however, are coercive conservation measures to reduce America’s allegedly “wasteful” use of energy. I say “allegedly” because such analysts typically confuse energy efficiency with economic efficiency. When energy is relatively abundant and inexpensive, as it is in the United States, forcing individuals and businesses to use less of it is likely to be a net waste of resources. The mere fact that a business may save money in the long run by investing in energy conservation proves nothing, unless that investment has a higher rate of return than other investments the business could have made with the same money.³² Profit-seeking firms continually search for ways to reduce costs, turn waste streams into assets, and do more with less. When investing in energy efficiency makes good business sense, firms will do so without being coerced or jawboned by political authorities. “To suppose otherwise is to assume that if free money were lying around on the sidewalk, businessmen would be too dumb (or lazy) to pick it up without a government planner twisting their arms or bending their ears.”³³

A true “no regrets” policy would involve government-cutting reforms like de-regulation, elimination of subsidy programs, and privatization of state-owned enterprises. We should eliminate the political preferences and subsidies that encourage certain fuels (coal, ethanol, solar) to be used rather than others that are more efficient. We should deregulate electricity generation and transmission to allow the most efficient (and typically least-polluting) firms to expand output. We should remove all regulatory barriers that now stifle innovation (for example, government restrictions on biotechnology pose major threats to our ability to produce more weather-robust crops and to fend off future insect infestations). We should encourage such free-market reforms throughout the world (by, for example, eliminating World Bank and other foreign aid programs that shore up oppressive regimes). Finally, we should encourage free trade to strengthen domestic pressures for sensible fiscal and regulatory policies. This would accelerate a shift away from wasteful material and energy policies, lightening mankind’s footprint on the planet.

Evidence for the superiority of the Resiliency Strategy is suggested by the fact that while in 1992 all the developed countries agreed to voluntary reductions of greenhouse gas emissions, only Germany and Great Britain were successful. It is ironic that these two countries, which

³² Jerry Taylor, “Energy Conservation and Efficiency: The Case Against Coercion,” *Cato Institute Policy Analysis* No. 189, March 9, 1993.

³³ Rep. John E. Peterson, “Rep. Waxman’s Mythical Facts” (Dear Colleague, May 19, 1998).

most avidly support stringent international political controls over the world's energy consumption, achieved their reductions by liberalizing and de-politicizing their energy markets. Germany ended support for the inefficient East German energy sector, and Great Britain stopped subsidizing her coal industry.

Whether the future will be warmer or colder, wetter or drier, stormier or more tranquil, some risks will increase and others will decline. Hampering the ability of private markets to respond to changing conditions serves no bona fide public interest. Indeed, it can be destructive. Stanford University's Stephen Schneider suggests that those who oppose precipitous action to avert global climate change are willing to run an uncontrolled experiment on the only planet we've got. Yet Schneider and those who join him in calling for dramatic emission reductions are willing to run an uncontrolled experiment on the only civilization we've got.

The proper question to ask is: Should we seek to eliminate change or should we improve our abilities to adapt to an ever-changing world? America and the world will certainly face severe risks in the future; whether these will be climatic, tectonic, biological, or political is unclear. Since we cannot be sure which risks will prove dominant, we ought to improve our generic ability to survive and recover from whatever dangers the future may hold. Rather than herd America's entrepreneurs, inventors, and workers into some elite's politically-correct industrial policy scheme, we should remove political impediments to production, market-driven innovation, and rapid adaptation.

The greatest risk of current carbon withdrawal policies is that they will fail to achieve any useful result while imposing major costs on the world's economy. The economic repercussions will fall most heavily on the poor at home and abroad. Starving the world of energy is all too likely to produce a world of more starving people. The risks of climate change are speculative; those of climate change policy are all too real. Once this is realized, it is likely that few policymakers here or abroad will rush to join the global warming bandwagon. The road to Hell, we all realize, is often paved with good intentions. The global warming debate illustrates that maxim very well; even a baby step on this destructive path should be avoided.



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June 4, 1998

U. S. House of Representatives
Committee on Small Business
Kyoto Protocol Hearing

FINANCIAL DISCLOSURE STATEMENT

Neither I, Marlo Lewis, Jr., nor The Competitive Enterprise Institute (CEI) has received any federal government funding which directly supports the subject matter on which I am appearing before the Committee. No money has been received in any amount from any Federal Grant (or subgrant thereof) or contract (or subcontract thereof) by me or CEI during the current and two preceding fiscal years from the Department of Energy, Environmental Protection Agency, or the National Oceanic and Atmospheric Administration relating to global change research, nor has any money been received from any other Federal agency.

A handwritten signature in black ink, appearing to read 'Marlo Lewis, Jr.', is written over a horizontal line.

Marlo Lewis, Jr.
Vice President for Policy and Coalitions



COMPETITIVE ENTERPRISE INSTITUTE

Marlo Lewis, Jr.

Marlo Lewis, Jr. is Vice President for Policy and Coalitions of the Competitive Enterprise Institute, a free market advocacy and research organization headquartered in Washington, D.C. CEI emphasizes the marketing and implementation of classical liberal ideals, believing limited government and competition best serve the public interest.

Before joining CEI in November 1993, Mr. Lewis served in various government and public policy organizations including: Citizens Against Government Waste (Research Director, 1990-93), the House Foreign Affairs Subcommittee on International Economic Policy and Trade (Staff Consultant, 1989), the U.S. State Department's Bureau of Inter-American Affairs (Special Assistant, 1988) and Bureau of International Organization Affairs (Special Assistant, 1987). He has also taught political theory and American government at Claremont McKenna College, Claremont Graduate School, and California State Polytechnic Institute, Pomona.

Lewis' articles on public policy have appeared in *The Washington Times*, *National Review*, and *Investors Business Daily*.

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**ORAL TESTIMONY OF DR. JANET YELLEN
CHAIR, COUNCIL OF ECONOMIC ADVISERS
BEFORE THE HOUSE SUBCOMMITTEE ON NATIONAL ECONOMIC GROWTH,
NATURAL RESOURCES AND REGULATORY AFFAIRS
ON THE ECONOMICS OF THE KYOTO PROTOCOL
MAY 19, 1998**

Thank you, Mr. Chairman. The President has said that we can work to avert the grave dangers of climate change, while at the same time maintaining the strength of our economy. I agree and am pleased to have this opportunity to appear before the Committee to elaborate on the Administration's views on these issues.

Effects of Climate Change

Before discussing the likely cost of U.S. efforts to avert climate change, it is important to recognize the costs and risks facing our nation should we fail to act. Current concentrations of greenhouse gases have reached levels well above those of preindustrial times. As a consequence, the Intergovernmental Panel on Climate Change estimates that global temperatures will increase by between 2 to 6 degrees Fahrenheit in the next 100 years, with a best guess of about 3.5 degrees Fahrenheit. The IPCC reports that a doubling of carbon dioxide levels would lead to approximately 10,000 additional deaths per year for the current U.S. population from higher summer temperatures, even after netting out the effects of warmer winters and acclimatization. The IPCC also predicts sea level increases of about 20 inches by 2100, with greater increases in subsequent years. Despite the difficulties of deriving quantitative assessments of the damages from climate change, researchers have nonetheless developed monetary estimates of damages that prompt substantial concern, and range in the tens of billions of dollars per year for temperature changes projected to occur in the next century. If left uncontrolled, disruption of the Earth's climate may thus pose substantial costs in terms of harm to commerce and the

environment alike. These costs--and they are significant--provide the primary motivation for actions to reduce greenhouse gas emissions. Moreover, these estimates do not, and cannot, accurately reflect the value of reducing the unknown risk of large-scale and potentially irreversible events with potentially catastrophic consequences. There is a strong argument for the Kyoto Protocol as a form of insurance against a serious environmental threat.

The Economic Costs

In taking action to reduce emissions, economic analysis suggests that two elements are absolutely essential: the effort must be flexible and market-based, to ensure that we reduce emissions in the most efficient way; and the effort must be global, for without global emissions reductions the effort would be ineffective. The nature of the climate change problem--that greenhouse gas emissions have the same effect on the climate regardless of how, where, and, within limits, when they occur--suggests three basic approaches to lower the cost of achieving given levels of environmental protection. We term these "when", "what", and "where" flexibility.

As a result of U.S. diplomatic efforts, all three forms of flexibility are broadly reflected in the Kyoto Protocol. The choice of a multi-year budget period, ending later than many countries proposed, with allowance for "banking" of emissions reductions, constitute key elements of "when flexibility." These provisions mitigate costs by permitting reductions at times when they are less rather than more costly. The inclusion of all six greenhouse gases and certain sink activities that promote removal of carbon from the atmosphere provide substantial "what flexibility". The U.S. succeeded in having the Kyoto Protocol stipulate that countries with binding targets are to reduce total greenhouse gas emissions by certain percentages, but the

Protocol does not require specific reductions for specific gases. Moreover, sinks can be used to offset emissions targets. The inclusion of international emissions trading among countries that take on binding targets, coupled with an agreement allowing industrial countries to receive emissions reduction credit for certified investments in “clean development” projects in the developing world, are the critical forms of “where” flexibility incorporated in the Kyoto Protocol. Although details of these provisions need to be finalized in negotiations in Buenos Aires later this year, we believe that these mechanisms can produce substantial reductions in the costs of attaining our environmental objectives.

Economic analysis also points to the need for a global solution to a problem which is global. Around 2015, under a continuation of business as usual, a majority of world emissions are projected to come from developing countries. Without developing country participation we cannot achieve adequate climate protection. In addition, developing country participation would permit relatively low-cost emissions reductions to be internationally recognized as a substitute for more expensive reductions in many industrial countries. The President has made clear that he will not submit the Kyoto Protocol to the Senate without meaningful participation from key developing countries (who are not included in Annex I).

Economic Effects

An economic analysis of climate change faces three broad categories of difficulties. First are the uncertainties that still remain over the terms of the ultimate treaty. Second are the inherent limitations of available models to analyze even short-term costs and benefits. And finally is the impossibility of putting a single monetary figure on the long-term benefits of climate change mitigation.

Mindful of the limitations of any single model as a tool for evaluating the economic impact of the Kyoto Protocol, we have employed a broad array of techniques to assess the various possible costs and non-climate benefits of the Administration's emissions reduction policy. Ignoring the benefits of mitigating climate change itself, our conclusion is that the net costs of our policies to reduce emissions are likely to be small if those reductions are undertaken in an efficient manner and we are successful in securing meaningful developing country participation as well as effective international trading and clean-development mechanisms in future negotiations. As I explain in my written testimony, this conclusion is not entirely dependent on, but is fully consistent with, formal model results. For example, given the factors, such as trading, just delineated, but excluding the benefits of acting and the impact of electricity restructuring, estimates derived using Battelle's Second Generation Model suggest that the resource costs of attaining the Kyoto targets for emission reductions might amount to just \$7 to \$12 billion per year in 2008 to 2012 -- or just 0.1 percent of projected GDP. That small net premium, in effect, purchases a partial insurance policy against a serious environmental threat.

A comprehensive economic evaluation of the Administration's climate change policies must also take into account the potential payoffs from the full package of proposed Administration climate change initiatives. As you know, the President's FY 1999 budget includes a \$6.3 billion package of tax cuts and R&D over the next 5 years; this package makes good sense in terms of energy policy even ignoring any payoff for climate change. A second responsible step entails industry-by-industry consultations to prepare emission reduction plans in key industrial sectors. A final component of the President's climate change policy is his support for electricity restructuring in a manner that will offer approximately \$20 billion in cost savings

to electricity consumers, while offering modest reductions in greenhouse gas emissions.

I look forward to continuing to work with members of this Committee, as well as other interested parties, in further analyzing the Kyoto Protocol and evaluating the effects of reducing greenhouse gas emissions.

I welcome your questions.

**TESTIMONY OF DR. JANET YELLEN
CHAIR, COUNCIL OF ECONOMIC ADVISERS
BEFORE THE
U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON GOVERNMENT REFORM AND OVERSIGHT
SUBCOMMITTEE ON NATIONAL ECONOMIC GROWTH,
NATURAL RESOURCES, AND REGULATORY AFFAIRS**

MAY 19, 1998

Thank you, Mr. Chairman. The President has said that we can work to avert the grave dangers of climate change, while at the same time maintaining the strength of our economy. I agree and am pleased to have this opportunity to appear before the Committee to elaborate on the Administration's views on these issues.

The international agreement that was reached in Kyoto this past December is a crucial step forward in addressing global climate change. But it is only one step in a journey. Since the international effort to reduce greenhouse gas emissions is still in some respects a work-in-progress, it is not yet possible to provide a full authoritative analysis of it. Many of the specifics in several crucial areas are not completely resolved in the diplomatic arena, forcing analysts to make a variety of assumptions about the ultimate form of the international regime. In my testimony today, I will attempt to identify key elements of the agreement and the Administration's policy, such as international emissions trading, meaningful developing country participation, inclusion of land-use activities that absorb carbon ("sinks") and six categories of gases, as well as domestic initiatives, that together can ensure that reductions in global greenhouse gas emissions are consistent with continued strong economic growth. I will explain the reasoning underlying our conclusion that, under these conditions, economic impacts are likely to be modest.

The Administration is strongly committed to ensuring that these key elements are reflected in our domestic and international climate change policies. We are firmly committed to meaningful developing country participation, the use of sinks to offset emissions requirements, and emissions trading both domestically and internationally. And as you know, the President's FY 1999 budget includes a \$6.3 billion package of tax cuts and R&D investments over the next 5 years; this package makes good sense in terms of energy policy and will jumpstart our efforts. A final component of the President's climate change policy is his support for electricity restructuring in a manner that will offer approximately \$20 billion in cost savings to electricity consumers, while reducing greenhouse gas emissions.

I. Basic Economic Rationale of the Kyoto Treaty

To begin our analysis, it may be worth stepping back and examining the larger question of the basic rationale, from an economist's perspective, for the Kyoto Protocol.

The earth's surface appears to be warming from the accumulation of greenhouse gases from myriad sources worldwide. None of these emitters presently pays the cost to others of warming's adverse effects -- a classic externality in the language of economists. As a result of these distorted incentives, disruption of the Earth's climate is likely to proceed at an excessive pace and if left uncontrolled may pose substantial costs in terms of harm to commerce and the environment alike. The fundamental economic logic of the Kyoto Protocol is thus that without such an international agreement, individual nations will not have the proper incentives to address the threats from global climate change.

II. Costs of Climate Change

In evaluating efforts to mitigate global warming, the first step is to consider the costs of inaction. These costs --and they are significant-- provide the primary motivation for actions to reduce greenhouse gas emissions.

The Intergovernmental Panel on Climate Change (IPCC) jointly established by the World Meteorological Organization and the United Nations Environment Programme, concluded in 1995 that "the balance of evidence suggests that there is a discernible human influence on global climate." Current concentrations of carbon dioxide, methane, nitrous oxide, and the other so-called greenhouse gases have reached levels well above those of preindustrial times. Of these, carbon dioxide (CO₂) is the most important: net cumulative CO₂ emissions resulting from the burning of fossil fuels and deforestation account for about two-thirds of potential warming from changes in greenhouse gas concentrations related to human activity.

Climatic Impact

If growth in global emissions continues unabated, the atmospheric concentration of CO₂ will likely double relative to its preindustrial level by midway through the next century and continue to rise thereafter. As a result of the increased concentration of CO₂, the IPCC estimates that global temperatures will increase by between 2 to 6 degrees Fahrenheit in the next 100 years, with a best guess of about 3.5 degrees Fahrenheit. While scientists believe that human activities are leading to a gradual warming of the *average* temperature of the earth, the change in temperature in a given region at a given time may differ substantially from this average. Indeed, models predict warming will be greater in high latitudes than in the tropics, and greater over land than ocean.

Potential consequences associated with this shift in climate include a rise in sea levels, greater frequency of severe weather events, shifts in agricultural growing conditions from changing weather patterns, threats to human health from increased range and incidence of diseases, changes in availability of freshwater supplies, and damage to ecosystems and biodiversity.

Economic and Monetary Damages

The derivation of quantitative or monetary estimates of the damages from such a change in the climate is extremely difficult given the capacity of today's models. Estimates of the economic damages from climate change fall into the following broad areas: agriculture, sea-level rise, air conditioning and heating, water supply, human life and health, air pollution, and other costs (hurricanes, relocation costs, human amenity, construction, leisure activities, urban infrastructure, and ecological damages such as forest loss and species loss). Although the quantification of these effects is quite demanding, researchers have developed estimates that prompt substantial concern. The IPCC reports that a doubling of carbon dioxide levels would lead to approximately 10,000 estimated additional deaths per year for the current U.S. population from higher summer temperatures, even after netting out the effects of warmer winters and assuming acclimatization. Other researchers have predicted sea level increases of about 20 inches by 2100, with greater increases in subsequent years.

Despite the difficulties, respected researchers have developed estimates of the monetary damages expected from an average worldwide temperature increase. For example, William Cline, then of the Institute for International Economics, estimated that a temperature change of 4.5 degrees Fahrenheit would impose annual damages of about 1.1 percent of GDP per year on the U.S. economy. That amounts to \$89 billion in today's terms. (Cline's original estimate is quoted in 1990 dollars. The figure given above translates this number into 1997 terms by scaling it to current GDP.) William Nordhaus of Yale University has likewise computed estimates of the dollar loss attributable to a doubling of greenhouse gas concentrations. Although he uses methods that differ from Cline's in several respects, Nordhaus estimates that a slightly larger temperature change of 5.4 degrees Fahrenheit would impose losses equal to about 1 percent of GDP. A third independent estimate reported by Nordhaus is close to Cline's. It must be noted, however, that this similarity among aggregated estimates masks the true uncertainty associated with forecasts of the damages from given increases in global warming -- the estimates are all fundamentally based on extrapolations from current and past experience, and may not fully incorporate effects that will unfortunately become apparent only with future experience.

One key difficulty in interpreting and monetizing these estimates of damages is uncertainty over the extent that they should be discounted because they occur in the distant future. Since the benefits of stemming future climate change accrue over not only decades but centuries, small changes in the discount rate can produce substantial changes in the results. But the precise discount rate that should be used to evaluate questions as important as the future climate of the planet remains a subject of intense debate. It is safe to say that there is, as yet, no professional consensus on the issue. Indeed there can be no technical answer to the ethical question how we should value the welfare of future generations.

A similar difficulty with such estimates is that they do not include potential non-linearities in the relationships between greenhouse gas concentrations and temperature, between temperature and economic damages, or in the various other complicated relationships governing interactions between greenhouse gas emissions, the climate, and the economy. Current estimates of damages do not, and cannot, accurately reflect the value of reducing the unknown risk of large-scale and potentially irreversible discrete events with potentially catastrophic consequences.

Two such possibilities serve as illustrations. Warming of Northern tundra may release huge amounts of methane from the permafrost, thereby leading to accelerated warming. We do not know at what point, if any, such potentially unstable activity would be triggered. Second, evidence from climate models suggests that some types of climate change may lead to changes in ocean currents, including weakening of the Gulf Stream that warms Western Europe. Scientific evidence suggests that abrupt seawater temperature shifts have occurred over periods as short as decades.

To what extent are we willing to take such chances with our planet? There is a strong argument for the Kyoto Protocol as a form of planet insurance. But what numerical weight should one assign to these catastrophic risks? In other words, what is the value of the insurance policy? Although it is difficult for an economist, or anyone, to know, reductions in the risk of such catastrophic outcomes must be considered in addition to the costs and benefits that can be reasonably quantified. Since human beings are typically averse to risk, such catastrophic risks are especially important in evaluating whether the benefits of a particular climate control policy justify the costs. One must have at least some sympathy with those who criticize economists on the grounds that the effects of climate change are extremely difficult to quantify in a single monetary number.

III. Addressing Global Climate Change in an Efficient Manner

The costs of unabated climate change may thus be difficult to quantify, but they are nonetheless real and provide the motivation for reducing greenhouse gas emissions. In taking action to reduce those emissions, economic analysis suggests that two elements are absolutely essential:

- The effort must be global, to address the global externality inherent in the nature of the problem.
- The effort must be flexible and market-based, to ensure that we achieve our objectives in the most efficient manner possible.

Need for Global Action

Climate change is a global problem requiring a global solution. As I mentioned earlier, no single country has an incentive to reduce emissions sufficiently to protect the global environment against climate change. Each has an economic incentive to “free ride” on the efforts of others. Even if the United States sharply reduced its emissions unilaterally without an international agreement limiting emissions abroad, greenhouse gas emissions from all other countries would continue to grow, and the risks posed by climate change would not be significantly reduced. It is important to emphasize that emissions of different gases anywhere in the world have very similar effects on global climate.

The threat of disruptive climate change has led to coordinated international efforts to reduce the risks of global warming by reducing emissions of greenhouse gases. A landmark international agreement to address global warming was the Framework Convention on Climate Change signed during the Earth Summit in Rio de Janeiro in 1992. This convention established an objective of limiting greenhouse gas concentrations and called upon industrial countries to return their emissions to 1990 levels by 2000. Since then, it has become clear that the United States and many other participating countries will not meet this voluntary goal; quite the contrary, emission levels have continued to rise not fall among both developed and developing countries.

To address the lack of progress among many industrialized countries toward meeting the Rio objective, the United States and approximately 160 other nations agreed in negotiations held in Kyoto, Japan, last December, to reduce emissions of greenhouse gases. The Kyoto Protocol, which requires the advice and consent of the Senate, would place binding limits on each industrial country's combined emissions of the six principal categories of greenhouse gases: carbon dioxide (CO₂), nitrous oxide (N₂O), methane, sulfur hexafluoride, perfluorocarbons, and hydrofluorocarbons. These limits apply to the 38 so-called Annex I countries, which are the industrialized countries, defined to include Russia, Ukraine, and most Eastern European countries.

Under the Kyoto Protocol, each industrial country's baseline is its 1990 emissions of CO₂, methane, and N₂O and its choice of 1990 or 1995 levels of the other three categories of gases. The United States agreed to a target of 7 percent below this baseline by the period between 2008 and 2012. Given the changes in the definition of the baseline for the three long-lived chemical compounds (HFCs, PFCs and SF₆) from 1990 to 1995 combined with a change in the way sinks are accounted for in the baseline, the actual reduction required in the U.S. is no more than 2-3% more than the President originally proposed as the U.S. negotiating position. The targets for the European Union and Japan are 8 percent and 6 percent below 1990 levels, respectively. Australia, New Zealand, Norway, Russia, and Ukraine all have limits somewhat less ambitious when phrased as cuts relative to their 1990 levels. In sum, over the period from 2008 to 2012, the industrial countries are expected to reduce their average emissions of greenhouse gases to about 5 percent below their 1990 levels.

The President has made clear that he will not submit the Kyoto Protocol to the Senate without meaningful participation from key developing countries (who are not included in Annex I).

There are several reasons why meaningful participation from developing countries is essential. First, developing countries are projected to contribute a majority of world emissions around 2030 under a continuation of business-as-usual. Without the participation of developing economies, efforts by the industrialized countries to limit emissions will therefore not provide adequate protection from climate change.

Second, developing country participation is crucial because it would permit relatively low-cost emissions reductions to be internationally recognized as a substitute for more expensive emissions reductions that might otherwise be achieved domestically by U.S. companies and those in other industrialized countries. Since greenhouse gas emissions have the same basic impact on the climate regardless of where they occur, emission reductions in developing countries have the same environmental benefit as reductions in the U.S. But these reductions are much less costly than reductions in the U.S. or in other developed nations, because of the very inefficient and carbon-intensive uses of energy in these countries today. It thus makes sense, from both an environmental and an economic perspective, to incorporate emissions reductions in developing countries into the international system.

Third, principles of basic fairness suggest all countries should do their part, depending, in part, on their ability to contribute to the solution. Thus even poor countries should participate, although the lack of resources in such countries may limit the extent of their participation.

Some have expressed fears that the Kyoto Protocol might adversely affect the competitive position of American industry. Evaluating how the Kyoto Protocol could affect competitiveness of a few specific manufacturing industries -- especially those that are especially energy-intensive, such as aluminum and chemicals -- is complex. The answer depends, in part, on the impact of the agreement on energy prices, which we will shortly address. In general it is difficult to undergo a structural change in the economy without having the effect of expanding some sectors and contracting others. But to provide some perspective on this issue, consider the following facts. First, on average, energy constitutes only 2.2 percent of total costs to U.S. industry. Second, energy prices already vary significantly across countries. According to the *1997 Statistical Abstract*, for example, in 1996 premium gasoline cost \$1.28 per gallon in the United States -- but only 8 cents per gallon in Venezuela. Similarly, gas prices were \$3.71 per gallon in Switzerland and \$4.41 per gallon in France. Electricity prices also vary significantly: in the U.S., for industry, they were 5 cents per kilowatt hour in 1995, a fraction of prices in Switzerland of 13 cents per kilowatt hour. Yet U.S. industry is not moving en masse to Venezuela, nor is Swiss industry moving to the United States. Third, roughly two-thirds of all emissions are not in manufacturing at all, but in transportation and buildings, sectors which, by their very nature, are severely limited in their ability to relocate to other countries. We therefore believe we need developing country participation because the problem is global and cost-effective solutions are essential, than to avoid adverse effects on competitiveness.

Flexibility and Market Mechanisms

A global solution is thus critical to the global problem of climate change. Globalizing the solution is not, however, enough by itself. We must also ensure that our reductions in global greenhouse gas emissions are attained in the most efficient manner possible. The nature of the climate change problem suggests three basic methods to lower costs of achieving given levels of environmental protection. They can be characterized in terms of three categories of flexibility: (1) “when” flexibility; (2) “what” flexibility; and (3) “where” flexibility, which may be the most important of all. Such methods have long been championed by economists interested in increasing the efficiency of protection. Indeed, over 2,500 economists from academia, industry, and government alike urged such approaches in a letter they signed last year advocating action on climate change:

“Economic studies have found that there are many potential policies to reduce greenhouse gas emissions for which the total benefits outweigh the total costs...The most efficient approach to slowing climate change is through market-based policies.”

1. “When flexibility” (timing)

First is “when flexibility” or timing. Since climate change is a long-term problem, the exact timing of emissions reductions is, within some range, not of primary importance. Thus the freedom to delay or accelerate reductions within an agreed upon time frame -- while ensuring credibility of emissions reductions -- lowers costs.

As a result of U.S. leadership, the Kyoto Protocol incorporates this principle of “when flexibility” in four ways:

- First, the initial emissions reductions are less severe, and the period over which they occur ends much later than what had been proposed by many other countries. By adopting a gradual and credible path of reductions in the early years, we can greatly reduce costs such as those from prematurely scrapping coal-fired electricity plants, while attaining the same ultimate environmental goals.
- Second, under the Kyoto Protocol, the emissions target is not specified in terms of a specific year, but rather in terms of an average over a five-year period (2008-2012). Averaging over five years, instead of requiring countries to meet a specific target each year, can lower costs, especially given an uncertain future. The averaging can smooth out the effects of short-term events such as fluctuations in the business cycle and energy demand, or hard winters and hot summers that would increase energy use and emissions.

- Third, there is allowance for “banking” emission reductions within the 2008-2012 commitment period, for use in a subsequent commitment period [although the emission targets of the subsequent periods have not yet been specified].
- Fourth, CDM credits achieved between 2000 and 2008 may be banked until 2008 to 2012.

2. “What flexibility” (gases and sinks)

The second type of flexibility is “what flexibility”, along two dimensions. The first is the inclusion in the agreement of all six greenhouse gases. Emissions of different kinds of gases, not just carbon dioxide, contribute to the greenhouse effect. Since the IPCC has developed conversion factors for all greenhouse gases by estimating their global warming potentials, reductions in emissions of one gas can be used to substitute for increases in emissions of another by an amount that has equivalent environmental effects. Again at U.S. urging, all six gases are included, while Japan and the EU had insisted until the end on covering only three. Thus the U.S. succeeded in having the Kyoto Protocol stipulate that countries with binding targets are to reduce their *total* greenhouse gas emissions by certain percentages, but does not require specific reductions for specific gases. Since a molecule of sulfur hexafluoride is 23,900 times more potent over 100 years than a molecule of CO₂, it may be cheaper to achieve the same environmental benefit by eliminating one molecular unit of SF₆ than nearly 24,000 units of CO₂.

Some initial analysis indicates that a strategy of reducing non-CO₂ greenhouse gas emissions by a greater percent than CO₂ emissions could lower emissions permit prices by as much as 10 percent. Thus allowing countries flexibility in what gases they reduce -- essentially trading emissions reductions across gases -- can help lower significantly the costs of meeting their targets.

The second source of “what flexibility” is the treatment of sinks, i.e., land use activities that promote the removal of carbon from the atmosphere through the growth of plants. At the urging of the U.S. delegation, sinks can be used to offset emissions targets. Promoting such sinks through afforestation and reforestation may reduce atmospheric concentrations of CO₂ at much lower costs than reducing emissions of greenhouse gases.

3. “Where flexibility” (international)

The third type of flexibility, and perhaps the most important, is “where flexibility” (international). As I have already emphasized, emissions have the same environmental consequences regardless of where in the world they occur. Therefore, the least-cost approach to controlling climate change is to reduce emissions wherever such reductions are cheapest. The Kyoto Protocol, because of U.S. insistence and persistence, includes three important cost-saving provisions of this nature.

- First, it provides the opportunity for countries that take on binding targets to trade rights to emit greenhouse gases with each other. This market in emissions permits could ensure that emissions reductions occur where they are least expensive within the industrial countries. In particular, U.S. companies could purchase emissions reductions in other participating countries when doing so would reduce their costs -- thus lowering costs without affecting the level of environmental protection. While currently only industrialized countries have emissions caps, this mechanism also offers an incentive for developing countries to take on emissions targets.
- Second, the agreement provides for Joint Implementation by Annex I countries. Thus if some countries do not develop programs to trade permits internationally, U.S. firms could nonetheless implement projects in those countries for which they could receive emissions reductions credits in the U.S.
- Third, the agreement allows industrial countries to invest in "clean development" projects in the developing world and use these projects' certified emissions reductions toward meeting their targets. Many such clean development projects may be quite cheap in terms of the cost per ton of emissions avoided, as has been illustrated by the Joint Implementation pilot program that is already in place in the U.S.

Details of how these provisions will operate will be discussed in future negotiations such as the one in Buenos Aires later this year. Nonetheless, effective international trading of emission credits, Joint Implementation, and the Clean Development Mechanism can lead to substantial reductions in costs relative to alternative policies that do not exploit the power of market incentives. To illustrate briefly the ability of U.S. industry to perform beyond expectations when given appropriate economic incentives, consider further EPA's highly acclaimed sulfur dioxide (SO₂) program, which relies, among other things, on a system of tradeable permits to reduce emissions of SO₂ from electric utilities. The SO₂ program has been successful in several ways: a large number of utilities participate, SO₂ emissions and ambient concentrations have fallen and the costs of reducing emissions are considerably lower than originally forecast.

As has been frequently noted, the average cost of SO₂ emissions reductions has recently been significantly lower than was originally forecast, in part due to the role of incentives in fostering innovation. Emission permit prices, currently at approximately \$100 per ton of SO₂, are well below earlier estimates of around \$250 to \$400 per ton.

Trading programs may not always bring cost savings as large as those achieved by the SO₂ program; trading programs will not always be accompanied by the discovery of much cheaper control strategies. However, the SO₂ experience demonstrates clearly how programs like international permit trading, Joint Implementation, and the Clean Development Mechanism will lead firms to find cheaper ways of reducing emissions that can lead to unexpectedly low costs.

IV. Difficulties of Economic Analysis of the Kyoto Protocol

Now that we have a Protocol -- even if it is not yet fully complete nor ready for the President's submission to the Senate -- it is possible to examine it in somewhat more detail from an economic perspective. But, once again the inherent limitations of any such estimates deserve emphasis. Such limitations should not be surprising to you: economists have a difficult enough time projecting the behavior of the economy over the next quarter or year, let alone over the next two decades. The scale of the forecasting exercise is therefore daunting, and any specific results should be treated with substantial caution.

The difficulties associated with economic analysis of climate change fall into three broad categories. First are the uncertainties that still remain over the terms of the ultimate treaty, necessitating assumptions on which the analysis is predicated. Second are the inherent limitations of available models to analyze even short-term costs and benefits. And finally is a topic discussed earlier: the impossibility of putting a single monetary number on the long-term benefits of climate change mitigation, although there will clearly be economic benefits of emission reductions.

Uncertainties in the International Effort to Combat Climate Change

The Kyoto Protocol was an historic accomplishment, delineating the broad terms of the international effort to address climate change. But although we know a lot more than we did before Kyoto about how that international system can work, and that informs our analysis, there is still much that we do not know.

First, some provisions raise complex implementation issues. At issue here is the treatment of so-called sinks -- activities that affect the rate at which carbon is removed from the atmosphere and "sequestered," e.g., by the planting of trees.

Second, the details of a number of items -- primarily concerning international trading, the Clean Development Mechanism, and developing countries -- are the subject of further discussions including future negotiations in Buenos Aires next fall, because they had not been definitively settled by the end of the Kyoto talks.

Finally, and most importantly, we have not yet negotiated international agreements to limit emissions beyond the 2012 window. The emission cuts agreed upon at Kyoto are only a first step on a long journey. The first step that we propose to take over the next 15 years is critical. But the reason it is critical is *not* that, by itself, it will solve the climate change problem -- emissions during any given decade are small compared to the cumulative concentrations in the atmosphere. Rather, the first step is critical because we can not take the second and third steps until we have taken the first. At the same time, any analysis is complicated by the lack of knowledge over what the subsequent steps will be.

Inherent Limitations of Models

In addition to these uncertainties about the details of the international effort to address climate change, are the inherent limitations of the models used to evaluate that effort. Even within a given model, answers depend critically on the precise nature of the question asked. For example, the costs of emissions reductions depend critically on the extent of global participation and international trading that a treaty is assumed to feature. But in addition to the dependence of the results from a given model on the precise assumptions, different models can give different answers even when all the assumptions are specified to be the same -- a concrete illustration of the range of uncertainty to which we must assign the predictions of any one individual model.

One area in which the uncertainty is particularly large is the pace of technological progress --especially the diffusion of existing energy-efficient technologies, but also the development of new technologies -- and the extent to which the pace will accelerate in response to government programs. Models and experts on climate change policy tend to have a wider range of disagreement on the scope for speeding the diffusion of existing energy-efficient technologies than on any other single issue.

Furthermore, each model has strengths and weaknesses; each has questions to which it is better or worse suited to answer. Some, for example, model the energy sector in detail. Some allow for the fact that a coal-fired power plant cannot costlessly be converted to one that runs on natural gas. Some show the effects of hypothetical tax cuts made possible by the new revenues earned through the auction of emissions permits. Some are capable of showing recessions and booms. Others include a long-term "carbon cycle" model that can keep track of the accumulation of greenhouse gas concentrations in the atmosphere and their climatological effects. Some break down the rest of the world into regions and so can model international trade. No one model does everything, and therefore we must not rely blindly on the results of any one model or set of models. Professional judgement and economic intuition, along with diplomatic assessments, are also crucial.

Benefits of Averting Climate Change

As discussed above, it is evident that the benefits of averting climate change are potentially immense. But we have chosen not to try to quantify them in monetary terms, in light of the difficulties we have enumerated. These include the uncertainty of these benefits, their timing and therefore the extreme sensitivity of the results to the chosen discount rate, and the dependence of benefits on emissions paths after the 2008 to 2012 budget period specified in Kyoto.

V. Assessing the Kyoto Protocol

In order to evaluate the likely net economic impact of the Kyoto Protocol, *excluding the benefits of mitigating climate change itself*, we have drawn upon a variety of tools to assess the various possible costs and non-climate benefits of the Administration's emissions reduction policy. To give away the punch line, our conclusion is as follows: the net costs of our policies to reduce emissions are likely to be small, assuming those reductions are undertaken in an efficient manner and we are successful in securing meaningful developing country participation as well as effective international trading, and the Clean Development Mechanism in future negotiations. That potential small net premium, even excluding the benefits of mitigating climate change, in effect, purchases a partial insurance policy against a serious environmental threat.

Because the results from any model must be treated with caution, the Administration has employed a broad set of economic tools to assess the Kyoto Protocol. We have drawn on the insights of a wide range of models of the energy sector and economy over the next 25 years, including but not limited to the results of the Stanford Energy Modeling Forum exercises, the IPCC's review of the economic and social dimensions of climate change, the work of the OECD on Economic Dimensions and Policy Responses to Global Warming, and the staff-level Interagency Analytical Team analysis produced last year. Other tools include simple relevant statistics, "meta-analyses" such as work by the World Resources Institute, models, and basic economic reasoning. Drawing on this broad array of analytical tools is crucial to an intelligent evaluation of the policy alternatives.

To our knowledge, no model -- whether used inside the government or not -- has yet been set up to analyze the implications of the Kyoto Protocol, since this agreement is only a few months old and remains unfinished. In particular, no model is currently designed to assess Kyoto's treatment of sinks, or all six greenhouse gases. Some model-builders outside the government tend to take as long as several years to incorporate changes in policy parameters into their models.

Our thinking has been informed, however, by simulations conducted with the Second Generation Model of Battelle Laboratories, one of the leading models in the field. The SGM is one of the models best positioned to analyze the role of international trade in emission permits, which we consider to be a critical element of the Kyoto Treaty. However, the SGM does not cover all six gases included in the Kyoto Protocol or include a role for sinks. We have used the SGM model as one input into our overall assessment of the Kyoto treaty, but have attempted to supplement its results with additional analysis to account for such special features of the agreement as the inclusion of six gases, a possible trading arrangement that could include a subset of the Annex I countries and the Clean Development Mechanism. We will share with you today some preliminary results of this analysis. To the extent possible, we have compared results obtained with the SGM model with those of other modelling efforts.

Mindful of the limitations of any single model, we are eager to see features of the Kyoto Protocol assessed by other models to obtain a better feel for the range of possible effects. This work is just beginning and much of it will continue to go on outside the government. For example, the Energy Modeling Forum, based at Stanford University, is a long-running model comparison exercise involving many of the leading climate models. EMF is currently studying how features of the Kyoto legal language can be translated into terms recognizable to economic modelers. We expect that the group will conduct a full scale analysis of the Kyoto Protocol. The Energy Modeling Forum believes that its members will need at least until mid-year to update their results.

VI. Assessing the Potential Costs of Emissions Reductions

I said in Congressional testimony last July that we can do this smart or we can do this dumb. I was referring to the point that the costs of cutting emissions can be much reduced if flexible, market-based mechanisms are used. Our economic analysis highlighted the importance of such flexible, market-based mechanisms -- which are therefore reflected, at the President's insistence, in the Kyoto Protocol and our ongoing diplomatic strategy.

Within the Kyoto Protocol, this means an insistence on international trading, Joint Implementation, the Clean Development Mechanism, and, ultimately, on meaningful developing country participation. Domestically, this means that we implement any emissions reductions through a market-based system of *tradeable* emissions permits, which ensures that we achieve reductions wherever they are least expensive. But this also means taking serious and responsible steps in the short run to prepare us to meet our obligations in the longer term.

The first such step is the inclusion in this year's budget of an aggressive, \$6.3 billion program of tax cuts and R&D investments -- \$1.3 billion more than the \$5 billion package the President promised in his October 22 speech on this issue. The goal is both to stimulate the development of new energy-saving and carbon-saving technologies and to encourage the dissemination of those that exist already. The proposed package contains \$3.6 billion over the next 5 years in tax cuts for energy efficient purchases and renewable energy, including tax credits of \$3,000 to \$4,000 for consumers who purchase highly fuel efficient vehicles, a 15 percent credit (up to \$2,000) for purchases of rooftop solar equipment, a 20 percent credit (subject to a cap) for purchasing energy-efficient building equipment, a credit up to \$2,000 for purchasing energy-efficient new homes, an extension of the wind and biomass tax credit, and a 10 percent investment credit for the purchase of combined heat and power systems. The package also contains \$2.7 billion over the next 5 years in additional research and development investments -- covering the four major carbon-emitting sectors of the economy (buildings, industry, transportation, and electricity), plus carbon removal and sequestration, Federal facilities, and cross-cutting analyses and research. One example of the R&D effort is the Partnership for a New Generation of Vehicles (PNGV). PNGV is a government-industry effort to develop attractive, affordable cars that meet all applicable safety and environmental standards and get up to three times the fuel efficiency of today's cars. In FY99, the combined proposal for PNGV is \$277 million, up from \$227 million appropriated in FY98. Similar government-industry efforts are proposed to develop more efficient diesel engines for both light trucks and heavy trucks.

A second responsible step entails industry-by-industry consultations to prepare emission reduction plans in key industrial sectors. The Administration will work in partnership with industry to identify ways in which the Federal government might remove regulatory hurdles that discourage energy efficiency. In addition, DOE will spearhead a comprehensive effort to improve the energy efficiency of the Federal government's own operations and purchases.

The third step is the promotion of an environmentally-responsible electricity restructuring bill, which the President identified as part of his domestic climate change package in his address to the National Geographic Society on October 22. An electricity sector freed from government regulation would be a more efficient energy sector. Costs to consumers would fall. In addition, stronger incentives for improved generation efficiency in conjunction with appropriate market based provisions could achieve modest reductions in emissions. A reasonable overall estimate of the contribution of federal electricity restructuring to the rest of the President's program to address climate change is that it would make further progress to the same emission reduction goals at a cost saving of roughly \$20 billion per year. These steps should be taken regardless of Kyoto, because they make sense in terms of energy efficiency. But they have the added benefit of preparing us for Kyoto.

Estimated Reduction in Costs from Annex I Trading

In the language of the treaty, "Annex I," is the set of countries that have agreed to take on binding limitations in emissions of greenhouse gases. Even without meaningful developing country participation -- which, again, the President has emphasized is essential before the treaty would be submitted for ratification -- costs could be reduced substantially by emission trading among the Annex I countries. To provide some indication of the possible efficiency improvements, Russia and Ukraine consume six times as much energy per dollar of output as does the United States. Such large international differences in energy efficiency suggest that adoption of existing U.S. technology would yield very large emissions reductions in these countries.

Estimates derived from the SGM model confirm that emissions trading among Annex I countries can reduce the cost to the United States of achieving its targets for 2008-2012 emissions by about half relative to a situation in which such trading was not available. This concept of costs is meant to capture aggregate resource costs to the US economy, including the cost to domestic firms of purchasing emission permits from other countries where emission reductions may be cheaper than in the United States. Although these estimates reflect idealized international trading in efficient markets, the overall conclusion is clear. The dramatic reduction in costs potentially available from Annex I trading within the SGM model -- cutting the costs involved by half -- highlights why the President insisted that international trading be part of the Kyoto Protocol; and why its achievement by our negotiators in Kyoto was such an important accomplishment.

Estimated reduction in costs from umbrella trading

One possibility that emerged in Kyoto, which none of us foresaw, was the idea developed there by the U.S. delegation, that the United States might undertake trading with a subset of Annex I countries, dubbed the "umbrella". Countries that have expressed interest in the umbrella include the United States, Australia, Canada, New Zealand and Russia, with strong indications of interest from some others. This subset of Annex I countries shares a common interest in promoting market-based mechanisms, most specifically, fully flexible rules for international trading of emissions permits.

It is too early to state the precise form the umbrella will take. But we can envision a number of potential benefits. The umbrella could, for example greatly reduce costs to the U.S. Results that we have derived from various SGM simulations of efficient international trading suggest that, relative to the situation in which there is no trading at all, the umbrella can reduce costs by an estimated 60-75 percent, depending on whether the former Warsaw Pact countries fall within the umbrella. The Kyoto Protocol classifies these countries outside of the EU bubble for the first budget period 2008-2012.

Estimated reduction in costs from developing country participation

The next consideration is participation by developing countries. The President has said that he will not submit the treaty for ratification without meaningful participation by key developing countries. Such participation would further reduce the costs involved.

The substantial potential gains from meaningful developing country participation are highlighted by the significant benefits that will likely accrue from the limited role that the developing countries have already agreed to: the Clean Development Mechanism (CDM), modeled after the U.S. joint implementation concept. The CDM cannot realistically be expected to yield all the gains of binding targets for developing countries, but it might shave costs by roughly another 20 to 25 percent from the reduced costs that result from trading among Annex I countries.

Another possibility is that we persuade some of the key developing countries that are the largest emitters to commit to targets, and allow us to buy emission reductions from those paths. Simulations with the SGM model suggest that full participation by non Annex I countries could cut roughly 55 percent off the reduced costs that result from Annex I trading. The actual cost reduction would depend on the extent of developing country participation that is ultimately obtained, as well as the effectiveness of international trading arrangements. The more developing countries that take on modest binding targets and trade in international permit markets, the lower will be costs.

These cost-saving opportunities are fundamental tenets of the U.S. position. The promise of Kyoto cannot be achieved without effective emissions trading. Moreover, if we do not get meaningful participation by key developing countries, we won't submit the treaty for ratification to the Senate. So, while our analysis may be predicated on some ambitious conditions concerning trading and developing country participation, it is exactly those conditions that form the foundation of the U.S. position in international negotiations including those at Buenos Aires.

Accounting for Carbon Sinks

The preceding discussion has emphasized the importance of trading arrangements and the CDM. In reaching an overall economic assessment, it is also important to factor in the potential role of carbon sinks. Again, the U.S. delegation obtained a novel concept, that carbon absorbing activities called sinks could be used to offset emissions. The arrangements concerning carbon sinks in the Kyoto Protocol have received less attention than they merit. The Kyoto Protocol specifies that removals of CO₂ by sinks count toward meeting the target. The Kyoto Protocol counts the net emissions effects of three sink activities --afforestation, reforestation, and deforestation. Very preliminary estimates of the implications for the United States of the Kyoto provision on sinks indicate that carbon sinks could comprise a significant portion of the total required emissions reductions. Moreover, decreasing the required emissions reduction by, for example, 10% would likely result in cost-savings greater than 10%.

Even this estimate of the effect of sinks is conservative in one respect: it is based on an assumption for sink activity in the U.S. over the 2008-2012 period, and no assumed benefits from sinks elsewhere in the world. Very preliminary estimates suggest that incorporating the gains from sinks *throughout the world* can substantially reduce the costs of meeting the Kyoto target, on top of the gains from trading among Annex I countries. (Furthermore, no model has yet even tried to take into account that government policies can help increase the activities qualifying as allowable sinks, like some tree-planting.) Because the quantitative uncertainty is so large, we do not yet have an estimate with which we are comfortable. But we expect that complete modelling of the Kyoto provision pertaining to sinks will likely have favorable and potentially large effects on projected costs.

Accounting for the role of improvements in energy efficiency

Another issue in analyzing the Kyoto protocol concerns future improvements in energy efficiency due to innovation and diffusion of existing technology. The parameter that figures most prominently in analysis of energy efficiency is the rate of improvement in the so-called Autonomous Energy Efficiency Index (AEEI), that is the rate at which the total use of energy falls relative to GDP. A plausible assumption on the AEEI is an improvement of 1.0 percent per year. Reflecting a conservative interpretation of the 15-year impact of various climate change initiatives, this is only a small increase above the 0.9 percent number in the Energy Information Administration's Annual Energy Outlook. That assumption is not the most

optimistic outcome that might occur. Some authorities in the field of energy policy forecast more rapid technological progress. Experts at five national laboratories managed by the Department of Energy, using an engineering approach rather than an economic paradigm, found that a third of the emissions reductions necessary to return to 1990 levels by 2010 could be achieved through the adoption of existing energy-efficient technologies at no net resource cost, or even some savings. The National Academy of Sciences reached qualitatively similar conclusions in a 1992 report.

The President's FY 1999 budget, as I have noted, includes a \$6.3 billion package of tax cuts and R&D investments intended to spur the discovery and adoption of new technologies. If the Administration is successful in this effort, the rate of improvement in energy efficiency could rise and such improvements would lower the cost of meeting our Kyoto target. For example, published results based on SGM model simulations with different assumed rates of AEEI suggest that an increase in the AEEI of 25 percent could lead to declines in the permit price of approximately 40 percent.

Our justification for incorporating into our assessment a small assumed impact of Administration technology policies is somewhat analogous to the Administration's rationale for employing mainstream economic assumptions in our budget forecasts: in the presence of uncertainty, we are conservative in our estimates of the speed with which the economy will grow, tax receipts will rise, and the budget will improve. That way, any revisions or surprises that occur are likely to be in the pleasant direction. In this instance, we prudently and conservatively assume that there will be substantial delays between investments in new technology or the diffusion of existing technology, and the returns to such investments.

Moreover, at the recent automobile show in Detroit, General Motors announced that it has developed a hybrid-based vehicle that can achieve fuel efficiency of 80 miles per gallon, and that this car could be in commercial production within a few years. Ford also exhibited a prototype of a light-weight highly fuel efficient sedan that could be in commercial production by the middle of the next decade. These announcements followed an earlier breakthrough announced by DOE and its partners of a fuel cell that could run on gasoline and double current fuel economy while reducing conventional air pollution emissions by 90 percent. These technological advances have been made possible through the efforts of the Partnership for a New Generation of Vehicles between the Administration and the U.S. auto companies and their suppliers.

Such progress may be replicated in other sectors. VCRs and TVs, while switched off, consume about \$1 billion worth of electricity annually. EPA has established a partnership with major manufacturers that has a goal of achieving up to a 70 percent reduction in energy use by VCRs and TVs while they are switched off, without sacrificing product quality, usefulness, or increasing costs. This partnership offers promise of substantial improvements in energy efficiency.

Non-Climate Benefits

A final factor that should be included in any comprehensive assessment of the economic implications of the Kyoto protocol are the benefits of the agreement. The literature has emphasized that any relative price shifts that prove necessary to reduce emissions should produce non-climate benefits in three areas: traffic congestion, highway accidents, and air pollution unrelated to climate change. These benefits are hard to quantify precisely but are potentially significant: our rough estimates suggest that these three benefits could offset approximately a quarter of the resource cost of the climate change policy.

Synthesis

A comprehensive evaluation of the economic impact of the Kyoto Protocol must integrate all of the factors described above: reliance on flexible market-based mechanisms domestically; international trading and Joint Implementation among Annex I countries; the Clean Development Mechanism; meaningful developing country participation; the potential cost-mitigating role of including six gases and carbon sinks; the benefits of electricity restructuring; and emissions reductions achieved as a consequence of other proposed Administration climate change initiatives. Assuming that effective mechanisms for international trading, Joint Implementation and the Clean Development Mechanism are established, and assuming also that the U.S. achieves meaningful developing country participation, our overall assessment is that the economic cost to the United States in aggregate and to typical households of attaining the targets and timetables specified in the Kyoto Protocol, will be modest.

This conclusion that the impact will be modest is not entirely dependent upon, but is fully consistent with, formal model results. I have previously emphasized the limitations of relying on any single model in assessing the economic impact of the Kyoto Protocol, and continue to view any such results as just one input into an overall analysis. But it is worth emphasizing that model results reflecting the details of the Kyoto Protocol are consistent with our conclusion. For example, under the assumptions of either trading under the umbrella or within Annex I, the CDM and permit trading with developing countries, estimates derived using the SGM model, which adjust for the inclusion of six gases and assume little banking of credits beyond 2012, suggest that the resource costs of attaining the Kyoto targets for emission reductions might amount to \$7 to \$12 billion per year in 2008 to 2012. This implies that overall costs, excluding not only climate and non-climate benefits, but also such cost mitigating factors as sinks and payoffs from the President's electricity restructuring and climate change initiatives, would reach roughly one tenth of one percent of projected GDP in 2010.

A more tangible measure of costs is the estimated effects on energy prices. Excluding the impact of electricity restructuring and the ancillary benefits of mitigation and better forest management, the SGM-based estimate, corresponding to the gross resource cost estimate cited above, is an emissions price in the range of \$14 to \$23 per ton of carbon equivalent. This translates into an increase in energy prices between 2008 and 2012 at the household level of

between 3 and 5 percent, an increase in fuel oil prices of about 5 to 9 percent, natural gas prices of 3 to 5 percent, gasoline prices of 3 to 4 percent (or around 4 to 6 cents per gallon), and electricity prices of 3 to 4 percent. This increase in energy prices at the household level would raise the average household's energy bill in ten years by between \$70 and \$110 per year, although such predictions may not be observable because they would be small relative to typical energy price changes, and nearly fully offset by electricity price declines from Federal electricity restructuring. In particular, this increase in energy prices is small relative to the average of *year to year* real energy price changes experienced by U.S. consumers since 1960: such *annual* changes have averaged 3.8 percent. In addition, by 2008-2012, the anticipated 10 percent decline in electricity prices from the restructuring that is part of our climate change agenda is projected to lead to expenditure reductions of about \$90 per year for the average household.

As highlighted earlier, there are substantial but unavoidable uncertainties surrounding estimates like these. For example, the estimate just discussed is predicated, among other things, on the developing country participation that we are insisting upon as a condition for our ratifying the Kyoto Protocol, but which is not yet part of that Protocol, and on effective international trading. Moreover, other models will yield other answers and much work remains to be done by the modeling community to test the robustness of these results. Preliminary comparisons of the SGM model to the few other models that have attempted to evaluate the Kyoto accord, suggest that its predictions concerning the impact of the Kyoto Protocol on carbon permit prices are neither the most conservative nor the most optimistic of the models that have been developed. The predictions of the SGM model are robust in the sense that virtually all energy models reveal the potency of effective, flexible, domestic and international trading mechanisms to reduce substantially the cost and energy price impact of meeting the Kyoto targets.

Of course, the most important factor that has been left out of the above assessment is the benefit of mitigating climate change itself. A full cost-benefit analysis would include mitigation in the benefits column. The only reason we have not done so, explained repeatedly above, is the difficulty in coming up with a number to capture the monetary benefits. But nobody should lose sight of our ultimate objective -- keeping our planet the hospitable home that we enjoy today.

Effects on employment and aggregate output

So far we have said nothing about job losses resulting from climate change policy. Although there may be job gains in some sectors and job losses in others, we do not anticipate any significant aggregate employment effect if we achieve the conditions we have discussed. The effects on energy prices described above will occur only 10 to 14 years in the future. Not only are these effects small relative to historical variations in energy prices, and offset by other policies like electricity restructuring, they would occur sufficiently far in the future to enable monetary policy to keep the economy operating at its potential. In energy-intensive sectors some employment reduction could occur, although given the very small predicted change in energy prices, impacts in most such sectors are apt to be minimal. Furthermore, a large number of jobs will be created in other sectors -- many of them high-tech jobs paying high wages. The President is firmly committed to assisting any workers who are adversely affected during the transition to a climate-friendly economy.

VII. Conclusion

In conclusion, the Kyoto Protocol and the President's general approach to climate change reflect the insight of economic analysis. The Kyoto Protocol includes key provisions on international trading and Clean Development projects. The President's approach relies on market incentives -- first, with a system of tax cuts and R&D investments, and then later with a market-based system of tradeable permits -- to ensure that our objectives are achieved as efficiently as possible.

Our overall conclusion is that the economic impact of the Protocol will be modest under the conditions we have identified. The purpose of this testimony has been to explain the reasoning underlying this conclusion, which draws insights from not only the forecasts of individual models, any one of which has its own strengths and limitations, but also a broad variety of additional analyses.

I look forward to continuing to work with members of this Committee, as well as other interested parties, in further analyzing the Kyoto Protocol and evaluating the net effects of reducing greenhouse gas emissions. It is my hope that economic analysis will continue to play a key role in designing policies in this area.

I welcome your questions.

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**TESTIMONY OF DR. JANET YELLEN
CHAIR, COUNCIL OF ECONOMIC ADVISERS
BEFORE THE
U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON INTERNATIONAL RELATIONS**

MAY 13, 1998

Thank you, Mr. Chairman. The President has said that we can work to avert the grave dangers of climate change, while at the same time maintaining the strength of our economy. I agree and am pleased to have this opportunity to appear before the Committee to elaborate on the Administration's views on these issues.

The international agreement that was reached in Kyoto this past December is a crucial step forward in addressing global climate change. But it is only one step in a journey. Since the international effort to reduce greenhouse gas emissions is still in some respects a work-in-progress, it is not yet possible to provide a full authoritative analysis of it. Many of the specifics in several crucial areas are not completely resolved in the diplomatic arena, forcing analysts to make a variety of assumptions about the ultimate form of the international regime. In my testimony today, I will attempt to identify key elements of the agreement and the Administration's policy, such as international emissions trading, meaningful developing country participation, inclusion of land-use activities that absorb carbon ("sinks") and six categories of gases, as well as domestic initiatives, that together can ensure that reductions in global greenhouse gas emissions are consistent with continued strong economic growth. I will explain the reasoning underlying our conclusion that, under these conditions, economic impacts are likely to be modest.

The Administration is strongly committed to ensuring that these key elements are reflected in our domestic and international climate change policies. We are firmly committed to meaningful developing country participation, the use of sinks to offset emissions requirements, and emissions trading both domestically and internationally. And as you know, the President's FY 1999 budget includes a \$6.3 billion package of tax cuts and R&D investments over the next 5 years; this package makes good sense in terms of energy policy and will jumpstart our efforts. A final component of the President's climate change policy is his support for electricity restructuring in a manner that will offer approximately \$20 billion in cost savings to electricity consumers, while reducing greenhouse gas emissions.

I. Basic Economic Rationale of the Kyoto Treaty

To begin our analysis, it may be worth stepping back and examining the larger question of the basic rationale, from an economist's perspective, for the Kyoto Protocol.

The earth's surface appears to be warming from the accumulation of greenhouse gases from myriad sources worldwide. None of these emitters presently pays the cost to others of warming's adverse effects -- a classic externality in the language of economists. As a result of these distorted incentives, disruption of the Earth's climate is likely to proceed at an excessive pace and if left uncontrolled may pose substantial costs in terms of harm to commerce and the environment alike. The fundamental economic logic of the Kyoto Protocol is thus that without such an international agreement, individual nations will not have the proper incentives to address the threats from global climate change.

II. Costs of Climate Change

In evaluating efforts to mitigate global warming, the first step is to consider the costs of inaction. These costs --and they are significant-- provide the primary motivation for actions to reduce greenhouse gas emissions.

The Intergovernmental Panel on Climate Change (IPCC) jointly established by the World Meteorological Organization and the United Nations Environment Programme, concluded in 1995 that "the balance of evidence suggests that there is a discernible human influence on global climate." Current concentrations of carbon dioxide, methane, nitrous oxide, and the other so-called greenhouse gases have reached levels well above those of preindustrial times. Of these, carbon dioxide (CO₂) is the most important: net cumulative CO₂ emissions resulting from the burning of fossil fuels and deforestation account for about two-thirds of potential warming from changes in greenhouse gas concentrations related to human activity.

Climatic Impact

If growth in global emissions continues unabated, the atmospheric concentration of CO₂ will likely double relative to its preindustrial level by midway through the next century and continue to rise thereafter. As a result of the increased concentration of CO₂, the IPCC estimates that global temperatures will increase by between 2 to 6 degrees Fahrenheit in the next 100 years, with a best guess of about 3.5 degrees Fahrenheit. While scientists believe that human activities are leading to a gradual warming of the *average* temperature of the earth, the change in temperature in a given region at a given time may differ substantially from this average. Indeed, models predict warming will be greater in high latitudes than in the tropics, and greater over land than ocean.

Potential consequences associated with this shift in climate include a rise in sea levels, greater frequency of severe weather events, shifts in agricultural growing conditions from changing weather patterns, threats to human health from increased range and incidence of diseases, changes in availability of freshwater supplies, and damage to ecosystems and biodiversity.

Economic and Monetary Damages

The derivation of quantitative or monetary estimates of the damages from such a change in the climate is extremely difficult given the capacity of today's models. Estimates of the economic damages from climate change fall into the following broad areas: agriculture, sea-level rise, air conditioning and heating, water supply, human life and health, air pollution, and other costs (hurricanes, relocation costs, human amenity, construction, leisure activities, urban infrastructure, and ecological damages such as forest loss and species loss). Although the quantification of these effects is quite demanding, researchers have developed estimates that prompt substantial concern. The IPCC reports that a doubling of carbon dioxide levels would lead to approximately 10,000 estimated additional deaths per year for the current U.S. population from higher summer temperatures, even after netting out the effects of warmer winters and assuming acclimatization. Other researchers have predicted sea level increases of about 20 inches by 2100, with greater increases in subsequent years.

Despite the difficulties, respected researchers have developed estimates of the monetary damages expected from an average worldwide temperature increase. For example, William Cline, then of the Institute for International Economics, estimated that a temperature change of 4.5 degrees Fahrenheit would impose annual damages of about 1.1 percent of GDP per year on the U.S. economy. That amounts to \$89 billion in today's terms. (Cline's original estimate is quoted in 1990 dollars. The figure given above translates this number into 1997 terms by scaling it to current GDP.) William Nordhaus of Yale University has likewise computed estimates of the dollar loss attributable to a doubling of greenhouse gas concentrations. Although he uses methods that differ from Cline's in several respects, Nordhaus estimates that a slightly larger temperature change of 5.4 degrees Fahrenheit would impose losses equal to about 1 percent of GDP. A third independent estimate reported by Nordhaus is close to Cline's. It must be noted, however, that this similarity among aggregated estimates masks the true uncertainty associated with forecasts of the damages from given increases in global warming -- the estimates are all fundamentally based on extrapolations from current and past experience, and may not fully incorporate effects that will unfortunately become apparent only with future experience.

One key difficulty in interpreting and monetizing these estimates of damages is uncertainty over the extent that they should be discounted because they occur in the distant future. Since the benefits of stemming future climate change accrue over not only decades but centuries, small changes in the discount rate can produce substantial changes in the results. But the precise discount rate that should be used to evaluate questions as important as the future climate of the planet remains a subject of intense debate. It is safe to say that there is, as yet, no professional consensus on the issue. Indeed there can be no technical answer to the ethical question how we should value the welfare of future generations.

A similar difficulty with such estimates is that they do not include potential non-linearities in the relationships between greenhouse gas concentrations and temperature, between temperature and economic damages, or in the various other complicated relationships governing interactions between greenhouse gas emissions, the climate, and the economy. Current estimates of damages do not, and cannot, accurately reflect the value of reducing the unknown risk of large-scale and potentially irreversible discrete events with potentially catastrophic consequences.

Two such possibilities serve as illustrations. Warming of Northern tundra may release huge amounts of methane from the permafrost, thereby leading to accelerated warming. We do not know at what point, if any, such potentially unstable activity would be triggered. Second, evidence from climate models suggests that some types of climate change may lead to changes in ocean currents, including weakening of the Gulf Stream that warms Western Europe. Scientific evidence suggests that abrupt seawater temperature shifts have occurred over periods as short as decades.

To what extent are we willing to take such chances with our planet? There is a strong argument for the Kyoto Protocol as a form of planet insurance. But what numerical weight should one assign to these catastrophic risks? In other words, what is the value of the insurance policy? Although it is difficult for an economist, or anyone, to know, reductions in the risk of such catastrophic outcomes must be considered in addition to the costs and benefits that can be reasonably quantified. Since human beings are typically averse to risk, such catastrophic risks are especially important in evaluating whether the benefits of a particular climate control policy justify the costs. One must have at least some sympathy with those who criticize economists on the grounds that the effects of climate change are extremely difficult to quantify in a single monetary number.

III. Addressing Global Climate Change in an Efficient Manner

The costs of unabated climate change may thus be difficult to quantify, but they are nonetheless real and provide the motivation for reducing greenhouse gas emissions. In taking action to reduce those emissions, economic analysis suggests that two elements are absolutely essential:

- The effort must be global, to address the global externality inherent in the nature of the problem.
- The effort must be flexible and market-based, to ensure that we achieve our objectives in the most efficient manner possible.

Need for Global Action

Climate change is a global problem requiring a global solution. As I mentioned earlier, no single country has an incentive to reduce emissions sufficiently to protect the global environment against climate change. Each has an economic incentive to “free ride” on the efforts of others. Even if the United States sharply reduced its emissions unilaterally without an international agreement limiting emissions abroad, greenhouse gas emissions from all other countries would continue to grow, and the risks posed by climate change would not be significantly reduced. It is important to emphasize that emissions of different gases anywhere in the world have very similar effects on global climate.

The threat of disruptive climate change has led to coordinated international efforts to reduce the risks of global warming by reducing emissions of greenhouse gases. A landmark international agreement to address global warming was the Framework Convention on Climate Change signed during the Earth Summit in Rio de Janeiro in 1992. This convention established an objective of limiting greenhouse gas concentrations and called upon industrial countries to return their emissions to 1990 levels by 2000. Since then, it has become clear that the United States and many other participating countries will not meet this voluntary goal; quite the contrary, emission levels have continued to rise not fall among both developed and developing countries.

To address the lack of progress among many industrialized countries toward meeting the Rio objective, the United States and approximately 160 other nations agreed in negotiations held in Kyoto, Japan, last December, to reduce emissions of greenhouse gases. The Kyoto Protocol, which requires the advice and consent of the Senate, would place binding limits on each industrial country's combined emissions of the six principal categories of greenhouse gases: carbon dioxide (CO₂), nitrous oxide (N₂O), methane, sulfur hexafluoride, perfluorocarbons, and hydrofluorocarbons. These limits apply to the 38 so-called Annex I countries, which are the industrialized countries, defined to include Russia, Ukraine, and most Eastern European countries.

Under the Kyoto Protocol, each industrial country's baseline is its 1990 emissions of CO₂, methane, and N₂O and its choice of 1990 or 1995 levels of the other three categories of gases. The United States agreed to a target of 7 percent below this baseline by the period between 2008 and 2012. Given the changes in the definition of the baseline for the three long-lived chemical compounds (HFCs, PFCs and SF₆) from 1990 to 1995 combined with a change in the way sinks are accounted for in the baseline, the actual reduction required in the U.S. is no more than 2-3% more than the President originally proposed as the U.S. negotiating position. The targets for the European Union and Japan are 8 percent and 6 percent below 1990 levels, respectively. Australia, New Zealand, Norway, Russia, and Ukraine all have limits somewhat less ambitious when phrased as cuts relative to their 1990 levels. In sum, over the period from 2008 to 2012, the industrial countries are expected to reduce their average emissions of greenhouse gases to about 5 percent below their 1990 levels.

The President has made clear that he will not submit the Kyoto Protocol to the Senate without meaningful participation from key developing countries (who are not included in Annex I).

There are several reasons why meaningful participation from developing countries is essential. First, developing countries are projected to contribute a majority of world emissions around 2030 under a continuation of business-as-usual. Without the participation of developing economies, efforts by the industrialized countries to limit emissions will therefore not provide adequate protection from climate change.

Second, developing country participation is crucial because it would permit relatively low-cost emissions reductions to be internationally recognized as a substitute for more expensive emissions reductions that might otherwise be achieved domestically by U.S. companies and those in other industrialized countries. Since greenhouse gas emissions have the same basic impact on the climate regardless of where they occur, emission reductions in developing countries have the same environmental benefit as reductions in the U.S. But these reductions are much less costly than reductions in the U.S. or in other developed nations, because of the very inefficient and carbon-intensive uses of energy in these countries today. It thus makes sense, from both an environmental and an economic perspective, to incorporate emissions reductions in developing countries into the international system.

Third, principles of basic fairness suggest all countries should do their part, depending, in part, on their ability to contribute to the solution. Thus even poor countries should participate, although the lack of resources in such countries may limit the extent of their participation.

Some have expressed fears that the Kyoto Protocol might adversely affect the competitive position of American industry. Evaluating how the Kyoto Protocol could affect competitiveness of a few specific manufacturing industries -- especially those that are especially energy-intensive, such as aluminum and chemicals -- is complex. The answer depends, in part, on the impact of the agreement on energy prices, which we will shortly address. In general it is difficult to undergo a structural change in the economy without having the effect of expanding some sectors and contracting others. But to provide some perspective on this issue, consider the following facts. First, on average, energy constitutes only 2.2 percent of total costs to U.S. industry. Second, energy prices already vary significantly across countries. According to the *1997 Statistical Abstract*, for example, in 1996 premium gasoline cost \$1.28 per gallon in the United States -- but only 8 cents per gallon in Venezuela. Similarly, gas prices were \$3.71 per gallon in Switzerland and \$4.41 per gallon in France. Electricity prices also vary significantly: in the U.S., for industry, they were 5 cents per kilowatt hour in 1995, a fraction of prices in Switzerland of 13 cents per kilowatt hour. Yet U.S. industry is not moving en masse to Venezuela, nor is Swiss industry moving to the United States. Third, roughly two-thirds of all emissions are not in manufacturing at all, but in transportation and buildings, sectors which, by their very nature, are severely limited in their ability to relocate to other countries. We therefore believe we need developing country participation because the problem is global and cost-effective solutions are essential, than to avoid adverse effects on competitiveness.

Flexibility and Market Mechanisms

A global solution is thus critical to the global problem of climate change. Globalizing the solution is not, however, enough by itself. We must also ensure that our reductions in global greenhouse gas emissions are attained in the most efficient manner possible. The nature of the climate change problem suggests three basic methods to lower costs of achieving given levels of environmental protection. They can be characterized in terms of three categories of flexibility: (1) “when” flexibility; (2) “what” flexibility; and (3) “where” flexibility, which may be the most important of all. Such methods have long been championed by economists interested in increasing the efficiency of protection. Indeed, over 2,500 economists from academia, industry, and government alike urged such approaches in a letter they signed last year advocating action on climate change:

“Economic studies have found that there are many potential policies to reduce greenhouse gas emissions for which the total benefits outweigh the total costs...The most efficient approach to slowing climate change is through market-based policies.”

1. “When flexibility” (timing)

First is “when flexibility” or timing. Since climate change is a long-term problem, the exact timing of emissions reductions is, within some range, not of primary importance. Thus the freedom to delay or accelerate reductions within an agreed upon time frame -- while ensuring credibility of emissions reductions -- lowers costs.

As a result of U.S. leadership, the Kyoto Protocol incorporates this principle of “when flexibility” in four ways:

- First, the initial emissions reductions are less severe, and the period over which they occur ends much later than what had been proposed by many other countries. By adopting a gradual and credible path of reductions in the early years, we can greatly reduce costs such as those from prematurely scrapping coal-fired electricity plants, while attaining the same ultimate environmental goals.
- Second, under the Kyoto Protocol, the emissions target is not specified in terms of a specific year, but rather in terms of an average over a five-year period (2008-2012). Averaging over five years, instead of requiring countries to meet a specific target each year, can lower costs, especially given an uncertain future. The averaging can smooth out the effects of short-term events such as fluctuations in the business cycle and energy demand, or hard winters and hot summers that would increase energy use and emissions.

- Third, there is allowance for “banking” emission reductions within the 2008-2012 commitment period, for use in a subsequent commitment period [although the emission targets of the subsequent periods have not yet been specified].
- Fourth, CDM credits achieved between 2000 and 2008 may be banked until 2008 to 2012.

2. “What flexibility” (gases and sinks)

The second type of flexibility is “what flexibility”, along two dimensions. The first is the inclusion in the agreement of all six greenhouse gases. Emissions of different kinds of gases, not just carbon dioxide, contribute to the greenhouse effect. Since the IPCC has developed conversion factors for all greenhouse gases by estimating their global warming potentials, reductions in emissions of one gas can be used to substitute for increases in emissions of another by an amount that has equivalent environmental effects. Again at U.S. urging, all six gases are included, while Japan and the EU had insisted until the end on covering only three. Thus the U.S. succeeded in having the Kyoto Protocol stipulate that countries with binding targets are to reduce their *total* greenhouse gas emissions by certain percentages, but does not require specific reductions for specific gases. Since a molecule of sulfur hexafluoride is 23,900 times more potent over 100 years than a molecule of CO₂, it may be cheaper to achieve the same environmental benefit by eliminating one molecular unit of SF₆ than nearly 24,000 units of CO₂.

Some initial analysis indicates that a strategy of reducing non-CO₂ greenhouse gas emissions by a greater percent than CO₂ emissions could lower emissions permit prices by as much as 10 percent. Thus allowing countries flexibility in what gases they reduce -- essentially trading emissions reductions across gases -- can help lower significantly the costs of meeting their targets.

The second source of “what flexibility” is the treatment of sinks, i.e., land use activities that promote the removal of carbon from the atmosphere through the growth of plants. At the urging of the U.S. delegation, sinks can be used to offset emissions targets. Promoting such sinks through afforestation and reforestation may reduce atmospheric concentrations of CO₂ at much lower costs than reducing emissions of greenhouse gases.

3. “Where flexibility” (international)

The third type of flexibility, and perhaps the most important, is “where flexibility” (international). As I have already emphasized, emissions have the same environmental consequences regardless of where in the world they occur. Therefore, the least-cost approach to controlling climate change is to reduce emissions wherever such reductions are cheapest. The Kyoto Protocol, because of U.S. insistence and persistence, includes three important cost-saving provisions of this nature.

- First, it provides the opportunity for countries that take on binding targets to trade rights to emit greenhouse gases with each other. This market in emissions permits could ensure that emissions reductions occur where they are least expensive within the industrial countries. In particular, U.S. companies could purchase emissions reductions in other participating countries when doing so would reduce their costs -- thus lowering costs without affecting the level of environmental protection. While currently only industrialized countries have emissions caps, this mechanism also offers an incentive for developing countries to take on emissions targets.
- Second, the agreement provides for Joint Implementation by Annex I countries. Thus if some countries do not develop programs to trade permits internationally, U.S. firms could nonetheless implement projects in those countries for which they could receive emissions reductions credits in the U.S.
- Third, the agreement allows industrial countries to invest in "clean development" projects in the developing world and use these projects' certified emissions reductions toward meeting their targets. Many such clean development projects may be quite cheap in terms of the cost per ton of emissions avoided, as has been illustrated by the Joint Implementation pilot program that is already in place in the U.S.

Details of how these provisions will operate will be discussed in future negotiations such as the one in Buenos Aires later this year. Nonetheless, effective international trading of emission credits, Joint Implementation, and the Clean Development Mechanism can lead to substantial reductions in costs relative to alternative policies that do not exploit the power of market incentives. To illustrate briefly the ability of U.S. industry to perform beyond expectations when given appropriate economic incentives, consider further EPA's highly acclaimed sulfur dioxide (SO₂) program, which relies, among other things, on a system of tradeable permits to reduce emissions of SO₂ from electric utilities. The SO₂ program has been successful in several ways: a large number of utilities participate, SO₂ emissions and ambient concentrations have fallen and the costs of reducing emissions are considerably lower than originally forecast.

As has been frequently noted, the average cost of SO₂ emissions reductions has recently been significantly lower than was originally forecast, in part due to the role of incentives in fostering innovation. Emission permit prices, currently at approximately \$100 per ton of SO₂, are well below earlier estimates of around \$250 to \$400 per ton.

Trading programs may not always bring cost savings as large as those achieved by the SO₂ program; trading programs will not always be accompanied by the discovery of much cheaper control strategies. However, the SO₂ experience demonstrates clearly how programs like international permit trading, Joint Implementation, and the Clean Development Mechanism will lead firms to find cheaper ways of reducing emissions that can lead to unexpectedly low costs.

IV. Difficulties of Economic Analysis of the Kyoto Protocol

Now that we have a Protocol -- even if it is not yet fully complete nor ready for the President's submission to the Senate -- it is possible to examine it in somewhat more detail from an economic perspective. But, once again the inherent limitations of any such estimates deserve emphasis. Such limitations should not be surprising to you: economists have a difficult enough time projecting the behavior of the economy over the next quarter or year, let alone over the next two decades. The scale of the forecasting exercise is therefore daunting, and any specific results should be treated with substantial caution.

The difficulties associated with economic analysis of climate change fall into three broad categories. First are the uncertainties that still remain over the terms of the ultimate treaty, necessitating assumptions on which the analysis is predicated. Second are the inherent limitations of available models to analyze even short-term costs and benefits. And finally is a topic discussed earlier: the impossibility of putting a single monetary number on the long-term benefits of climate change mitigation, although there will clearly be economic benefits of emission reductions.

Uncertainties in the International Effort to Combat Climate Change

The Kyoto Protocol was an historic accomplishment, delineating the broad terms of the international effort to address climate change. But although we know a lot more than we did before Kyoto about how that international system can work, and that informs our analysis, there is still much that we do not know.

First, some provisions raise complex implementation issues. At issue here is the treatment of so-called sinks -- activities that affect the rate at which carbon is removed from the atmosphere and "sequestered," e.g., by the planting of trees.

Second, the details of a number of items -- primarily concerning international trading, the Clean Development Mechanism, and developing countries -- are the subject of further discussions including future negotiations in Buenos Aires next fall, because they had not been definitively settled by the end of the Kyoto talks.

Finally, and most importantly, we have not yet negotiated international agreements to limit emissions beyond the 2012 window. The emission cuts agreed upon at Kyoto are only a first step on a long journey. The first step that we propose to take over the next 15 years is critical. But the reason it is critical is *not* that, by itself, it will solve the climate change problem -- emissions during any given decade are small compared to the cumulative concentrations in the atmosphere. Rather, the first step is critical because we can not take the second and third steps until we have taken the first. At the same time, any analysis is complicated by the lack of knowledge over what the subsequent steps will be.

Inherent Limitations of Models

In addition to these uncertainties about the details of the international effort to address climate change, are the inherent limitations of the models used to evaluate that effort. Even within a given model, answers depend critically on the precise nature of the question asked. For example, the costs of emissions reductions depend critically on the extent of global participation and international trading that a treaty is assumed to feature. But in addition to the dependence of the results from a given model on the precise assumptions, different models can give different answers even when all the assumptions are specified to be the same -- a concrete illustration of the range of uncertainty to which we must assign the predictions of any one individual model.

One area in which the uncertainty is particularly large is the pace of technological progress --especially the diffusion of existing energy-efficient technologies, but also the development of new technologies -- and the extent to which the pace will accelerate in response to government programs. Models and experts on climate change policy tend to have a wider range of disagreement on the scope for speeding the diffusion of existing energy-efficient technologies than on any other single issue.

Furthermore, each model has strengths and weaknesses; each has questions to which it is better or worse suited to answer. Some, for example, model the energy sector in detail. Some allow for the fact that a coal-fired power plant cannot costlessly be converted to one that runs on natural gas. Some show the effects of hypothetical tax cuts made possible by the new revenues earned through the auction of emissions permits. Some are capable of showing recessions and booms. Others include a long-term "carbon cycle" model that can keep track of the accumulation of greenhouse gas concentrations in the atmosphere and their climatological effects. Some break down the rest of the world into regions and so can model international trade. No one model does everything, and therefore we must not rely blindly on the results of any one model or set of models. Professional judgement and economic intuition, along with diplomatic assessments, are also crucial.

Benefits of Averting Climate Change

As discussed above, it is evident that the benefits of averting climate change are potentially immense. But we have chosen not to try to quantify them in monetary terms, in light of the difficulties we have enumerated. These include the uncertainty of these benefits, their timing and therefore the extreme sensitivity of the results to the chosen discount rate, and the dependence of benefits on emissions paths after the 2008 to 2012 budget period specified in Kyoto.

V. Assessing the Kyoto Protocol

In order to evaluate the likely net economic impact of the Kyoto Protocol, *excluding the benefits of mitigating climate change itself*, we have drawn upon a variety of tools to assess the various possible costs and non-climate benefits of the Administration's emissions reduction policy. To give away the punch line, our conclusion is as follows: the net costs of our policies to reduce emissions are likely to be small, assuming those reductions are undertaken in an efficient manner and we are successful in securing meaningful developing country participation as well as effective international trading, and the Clean Development Mechanism in future negotiations. That potential small net premium, even excluding the benefits of mitigating climate change, in effect, purchases a partial insurance policy against a serious environmental threat.

Because the results from any model must be treated with caution, the Administration has employed a broad set of economic tools to assess the Kyoto Protocol. We have drawn on the insights of a wide range of models of the energy sector and economy over the next 25 years, including but not limited to the results of the Stanford Energy Modeling Forum exercises, the IPCC's review of the economic and social dimensions of climate change, the work of the OECD on Economic Dimensions and Policy Responses to Global Warming, and the staff-level Interagency Analytical Team analysis produced last year. Other tools include simple relevant statistics, "meta-analyses" such as work by the World Resources Institute, models, and basic economic reasoning. Drawing on this broad array of analytical tools is crucial to an intelligent evaluation of the policy alternatives.

To our knowledge, no model -- whether used inside the government or not -- has yet been set up to analyze the implications of the Kyoto Protocol, since this agreement is only a few months old and remains unfinished. In particular, no model is currently designed to assess Kyoto's treatment of sinks, or all six greenhouse gases. Some model-builders outside the government tend to take as long as several years to incorporate changes in policy parameters into their models.

Our thinking has been informed, however, by simulations conducted with the Second Generation Model of Battelle Laboratories, one of the leading models in the field. The SGM is one of the models best positioned to analyze the role of international trade in emission permits, which we consider to be a critical element of the Kyoto Treaty. However, the SGM does not cover all six gases included in the Kyoto Protocol or include a role for sinks. We have used the SGM model as one input into our overall assessment of the Kyoto treaty, but have attempted to supplement its results with additional analysis to account for such special features of the agreement as the inclusion of six gases, a possible trading arrangement that could include a subset of the Annex I countries and the Clean Development Mechanism. We will share with you today some preliminary results of this analysis. To the extent possible, we have compared results obtained with the SGM model with those of other modelling efforts.

Mindful of the limitations of any single model, we are eager to see features of the Kyoto Protocol assessed by other models to obtain a better feel for the range of possible effects. This work is just beginning and much of it will continue to go on outside the government. For example, the Energy Modeling Forum, based at Stanford University, is a long-running model comparison exercise involving many of the leading climate models. EMF is currently studying how features of the Kyoto legal language can be translated into terms recognizable to economic modelers. We expect that the group will conduct a full scale analysis of the Kyoto Protocol. The Energy Modeling Forum believes that its members will need at least until mid-year to update their results.

VI. Assessing the Potential Costs of Emissions Reductions

I said in Congressional testimony last July that we can do this smart or we can do this dumb. I was referring to the point that the costs of cutting emissions can be much reduced if flexible, market-based mechanisms are used. Our economic analysis highlighted the importance of such flexible, market-based mechanisms -- which are therefore reflected, at the President's insistence, in the Kyoto Protocol and our ongoing diplomatic strategy.

Within the Kyoto Protocol, this means an insistence on international trading, Joint Implementation, the Clean Development Mechanism, and, ultimately, on meaningful developing country participation. Domestically, this means that we implement any emissions reductions through a market-based system of *tradeable* emissions permits, which ensures that we achieve reductions wherever they are least expensive. But this also means taking serious and responsible steps in the short run to prepare us to meet our obligations in the longer term.

The first such step is the inclusion in this year's budget of an aggressive, \$6.3 billion program of tax cuts and R&D investments -- \$1.3 billion more than the \$5 billion package the President promised in his October 22 speech on this issue. The goal is both to stimulate the development of new energy-saving and carbon-saving technologies and to encourage the dissemination of those that exist already. The proposed package contains \$3.6 billion over the next 5 years in tax cuts for energy efficient purchases and renewable energy, including tax credits of \$3,000 to \$4,000 for consumers who purchase highly fuel efficient vehicles, a 15 percent credit (up to \$2,000) for purchases of rooftop solar equipment, a 20 percent credit (subject to a cap) for purchasing energy-efficient building equipment, a credit up to \$2,000 for purchasing energy-efficient new homes, an extension of the wind and biomass tax credit, and a 10 percent investment credit for the purchase of combined heat and power systems. The package also contains \$2.7 billion over the next 5 years in additional research and development investments -- covering the four major carbon-emitting sectors of the economy (buildings, industry, transportation, and electricity), plus carbon removal and sequestration, Federal facilities, and cross-cutting analyses and research. One example of the R&D effort is the Partnership for a New Generation of Vehicles (PNGV). PNGV is a government-industry effort to develop attractive, affordable cars that meet all applicable safety and environmental standards and get up to three times the fuel efficiency of today's cars. In FY99, the combined proposal for PNGV is \$277 million, up from \$227 million appropriated in FY98. Similar government-industry efforts are proposed to develop more efficient diesel engines for both light trucks and heavy trucks.

A second responsible step entails industry-by-industry consultations to prepare emission reduction plans in key industrial sectors. The Administration will work in partnership with industry to identify ways in which the Federal government might remove regulatory hurdles that discourage energy efficiency. In addition, DOE will spearhead a comprehensive effort to improve the energy efficiency of the Federal government's own operations and purchases.

The third step is the promotion of an environmentally-responsible electricity restructuring bill, which the President identified as part of his domestic climate change package in his address to the National Geographic Society on October 22. An electricity sector freed from government regulation would be a more efficient energy sector. Costs to consumers would fall. In addition, stronger incentives for improved generation efficiency in conjunction with appropriate market based provisions could achieve modest reductions in emissions. A reasonable overall estimate of the contribution of federal electricity restructuring to the rest of the President's program to address climate change is that it would make further progress to the same emission reduction goals at a cost saving of roughly \$20 billion per year. These steps should be taken regardless of Kyoto, because they make sense in terms of energy efficiency. But they have the added benefit of preparing us for Kyoto.

Estimated Reduction in Costs from Annex I Trading

In the language of the treaty, "Annex I," is the set of countries that have agreed to take on binding limitations in emissions of greenhouse gases. Even without meaningful developing country participation -- which, again, the President has emphasized is essential before the treaty would be submitted for ratification -- costs could be reduced substantially by emission trading among the Annex I countries. To provide some indication of the possible efficiency improvements, Russia and Ukraine consume six times as much energy per dollar of output as does the United States. Such large international differences in energy efficiency suggest that adoption of existing U.S. technology would yield very large emissions reductions in these countries.

Estimates derived from the SGM model confirm that emissions trading among Annex I countries can reduce the cost to the United States of achieving its targets for 2008-2012 emissions by about half relative to a situation in which such trading was not available. This concept of costs is meant to capture aggregate resource costs to the US economy, including the cost to domestic firms of purchasing emission permits from other countries where emission reductions may be cheaper than in the United States. Although these estimates reflect idealized international trading in efficient markets, the overall conclusion is clear. The dramatic reduction in costs potentially available from Annex I trading within the SGM model -- cutting the costs involved by half -- highlights why the President insisted that international trading be part of the Kyoto Protocol; and why its achievement by our negotiators in Kyoto was such an important accomplishment.

Estimated reduction in costs from umbrella trading

One possibility that emerged in Kyoto, which none of us foresaw, was the idea developed there by the U.S. delegation, that the United States might undertake trading with a subset of Annex I countries, dubbed the “umbrella”. Countries that have expressed interest in the umbrella include the United States, Australia, Canada, New Zealand and Russia, with strong indications of interest from some others. This subset of Annex I countries shares a common interest in promoting market-based mechanisms, most specifically, fully flexible rules for international trading of emissions permits.

It is too early to state the precise form the umbrella will take. But we can envision a number of potential benefits. The umbrella could, for example greatly reduce costs to the U.S. Results that we have derived from various SGM simulations of efficient international trading suggest that, relative to the situation in which there is no trading at all, the umbrella can reduce costs by an estimated 60-75 percent, depending on whether the former Warsaw Pact countries fall within the umbrella. The Kyoto Protocol classifies these countries outside of the EU bubble for the first budget period 2008-2012.

Estimated reduction in costs from developing country participation

The next consideration is participation by developing countries. The President has said that he will not submit the treaty for ratification without meaningful participation by key developing countries. Such participation would further reduce the costs involved.

The substantial potential gains from meaningful developing country participation are highlighted by the significant benefits that will likely accrue from the limited role that the developing countries have already agreed to: the Clean Development Mechanism (CDM), modeled after the U.S. joint implementation concept. The CDM cannot realistically be expected to yield all the gains of binding targets for developing countries, but it might shave costs by roughly another 20 to 25 percent from the reduced costs that result from trading among Annex I countries.

Another possibility is that we persuade some of the key developing countries that are the largest emitters to commit to targets, and allow us to buy emission reductions from those paths. Simulations with the SGM model suggest that full participation by non Annex I countries could cut roughly 55 percent off the reduced costs that result from Annex I trading. The actual cost reduction would depend on the extent of developing country participation that is ultimately obtained, as well as the effectiveness of international trading arrangements. The more developing countries that take on modest binding targets and trade in international permit markets, the lower will be costs.

These cost-saving opportunities are fundamental tenets of the U.S. position. The promise of Kyoto cannot be achieved without effective emissions trading. Moreover, if we do not get meaningful participation by key developing countries, we won't submit the treaty for ratification to the Senate. So, while our analysis may be predicated on some ambitious conditions concerning trading and developing country participation, it is exactly those conditions that form the foundation of the U.S. position in international negotiations including those at Buenos Aires.

Accounting for Carbon Sinks

The preceding discussion has emphasized the importance of trading arrangements and the CDM. In reaching an overall economic assessment, it is also important to factor in the potential role of carbon sinks. Again, the U.S. delegation obtained a novel concept, that carbon absorbing activities called sinks could be used to offset emissions. The arrangements concerning carbon sinks in the Kyoto Protocol have received less attention than they merit. The Kyoto Protocol specifies that removals of CO₂ by sinks count toward meeting the target. The Kyoto Protocol counts the net emissions effects of three sink activities --afforestation, reforestation, and deforestation. Very preliminary estimates of the implications for the United States of the Kyoto provision on sinks indicate that carbon sinks could comprise a significant portion of the total required emissions reductions. Moreover, decreasing the required emissions reduction by, for example, 10% would likely result in cost-savings greater than 10%.

Even this estimate of the effect of sinks is conservative in one respect: it is based on an assumption for sink activity in the U.S. over the 2008-2012 period, and no assumed benefits from sinks elsewhere in the world. Very preliminary estimates suggest that incorporating the gains from sinks *throughout the world* can substantially reduce the costs of meeting the Kyoto target, on top of the gains from trading among Annex I countries. (Furthermore, no model has yet even tried to take into account that government policies can help increase the activities qualifying as allowable sinks, like some tree-planting.) Because the quantitative uncertainty is so large, we do not yet have an estimate with which we are comfortable. But we expect that complete modelling of the Kyoto provision pertaining to sinks will likely have favorable and potentially large effects on projected costs.

Accounting for the role of improvements in energy efficiency

Another issue in analyzing the Kyoto protocol concerns future improvements in energy efficiency due to innovation and diffusion of existing technology. The parameter that figures most prominently in analysis of energy efficiency is the rate of improvement in the so-called Autonomous Energy Efficiency Index (AEEI), that is the rate at which the total use of energy falls relative to GDP. A plausible assumption on the AEEI is an improvement of 1.0 percent per year. Reflecting a conservative interpretation of the 15-year impact of various climate change initiatives, this is only a small increase above the 0.9 percent number in the Energy Information Administration's Annual Energy Outlook. That assumption is not the most

optimistic outcome that might occur. Some authorities in the field of energy policy forecast more rapid technological progress. Experts at five national laboratories managed by the Department of Energy, using an engineering approach rather than an economic paradigm, found that a third of the emissions reductions necessary to return to 1990 levels by 2010 could be achieved through the adoption of existing energy-efficient technologies at no net resource cost, or even some savings. The National Academy of Sciences reached qualitatively similar conclusions in a 1992 report.

The President's FY 1999 budget, as I have noted, includes a \$6.3 billion package of tax cuts and R&D investments intended to spur the discovery and adoption of new technologies. If the Administration is successful in this effort, the rate of improvement in energy efficiency could rise and such improvements would lower the cost of meeting our Kyoto target. For example, published results based on SGM model simulations with different assumed rates of AEEI suggest that an increase in the AEEI of 25 percent could lead to declines in the permit price of approximately 40 percent.

Our justification for incorporating into our assessment a small assumed impact of Administration technology policies is somewhat analogous to the Administration's rationale for employing mainstream economic assumptions in our budget forecasts: in the presence of uncertainty, we are conservative in our estimates of the speed with which the economy will grow, tax receipts will rise, and the budget will improve. That way, any revisions or surprises that occur are likely to be in the pleasant direction. In this instance, we prudently and conservatively assume that there will be substantial delays between investments in new technology or the diffusion of existing technology, and the returns to such investments.

Moreover, at the recent automobile show in Detroit, General Motors announced that it has developed a hybrid-based vehicle that can achieve fuel efficiency of 80 miles per gallon, and that this car could be in commercial production within a few years. Ford also exhibited a prototype of a light-weight highly fuel efficient sedan that could be in commercial production by the middle of the next decade. These announcements followed an earlier breakthrough announced by DOE and its partners of a fuel cell that could run on gasoline and double current fuel economy while reducing conventional air pollution emissions by 90 percent. These technological advances have been made possible through the efforts of the Partnership for a New Generation of Vehicles between the Administration and the U.S. auto companies and their suppliers.

Such progress may be replicated in other sectors. VCRs and TVs, while switched off, consume about \$1 billion worth of electricity annually. EPA has established a partnership with major manufacturers that has a goal of achieving up to a 70 percent reduction in energy use by VCRs and TVs while they are switched off, without sacrificing product quality, usefulness, or increasing costs. This partnership offers promise of substantial improvements in energy efficiency.

Non-Climate Benefits

A final factor that should be included in any comprehensive assessment of the economic implications of the Kyoto protocol are the benefits of the agreement. The literature has emphasized that any relative price shifts that prove necessary to reduce emissions should produce non-climate benefits in three areas: traffic congestion, highway accidents, and air pollution unrelated to climate change. These benefits are hard to quantify precisely but are potentially significant: our rough estimates suggest that these three benefits could offset approximately a quarter of the resource cost of the climate change policy.

Synthesis

A comprehensive evaluation of the economic impact of the Kyoto Protocol must integrate all of the factors described above: reliance on flexible market-based mechanisms domestically; international trading and Joint Implementation among Annex I countries; the Clean Development Mechanism; meaningful developing country participation; the potential cost-mitigating role of including six gases and carbon sinks; the benefits of electricity restructuring; and emissions reductions achieved as a consequence of other proposed Administration climate change initiatives. Assuming that effective mechanisms for international trading, Joint Implementation and the Clean Development Mechanism are established, and assuming also that the U.S. achieves meaningful developing country participation, our overall assessment is that the economic cost to the United States in aggregate and to typical households of attaining the targets and timetables specified in the Kyoto Protocol, will be modest.

This conclusion that the impact will be modest is not entirely dependent upon, but is fully consistent with, formal model results. I have previously emphasized the limitations of relying on any single model in assessing the economic impact of the Kyoto Protocol, and continue to view any such results as just one input into an overall analysis. But it is worth emphasizing that model results reflecting the details of the Kyoto Protocol are consistent with our conclusion. For example, under the assumptions of either trading under the umbrella or within Annex I, the CDM and permit trading with developing countries, estimates derived using the SGM model, which adjust for the inclusion of six gases and assume little banking of credits beyond 2012, suggest that the resource costs of attaining the Kyoto targets for emission reductions might amount to \$7 to \$12 billion per year in 2008 to 2012. This implies that overall costs, excluding not only climate and non-climate benefits, but also such cost mitigating factors as sinks and payoffs from the President's electricity restructuring and climate change initiatives, would reach roughly one tenth of one percent of projected GDP in 2010.

A more tangible measure of costs is the estimated effects on energy prices. Excluding the impact of electricity restructuring and the ancillary benefits of mitigation and better forest management, the SGM-based estimate, corresponding to the gross resource cost estimate cited above, is an emissions price in the range of \$14 to \$23 per ton of carbon equivalent. This translates into an increase in energy prices between 2008 and 2012 at the household level of

between 3 and 5 percent, an increase in fuel oil prices of about 5 to 9 percent, natural gas prices of 3 to 5 percent, gasoline prices of 3 to 4 percent (or around 4 to 6 cents per gallon), and electricity prices of 3 to 4 percent. This increase in energy prices at the household level would raise the average household's energy bill in ten years by between \$70 and \$110 per year, although such predictions may not be observable because they would be small relative to typical energy price changes, and nearly fully offset by electricity price declines from Federal electricity restructuring. In particular, this increase in energy prices is small relative to the average of *year to year* real energy price changes experienced by U.S. consumers since 1960: such *annual* changes have averaged 3.8 percent. In addition, by 2008-2012, the anticipated 10 percent decline in electricity prices from the restructuring that is part of our climate change agenda is projected to lead to expenditure reductions of about \$90 per year for the average household.

As highlighted earlier, there are substantial but unavoidable uncertainties surrounding estimates like these. For example, the estimate just discussed is predicated, among other things, on the developing country participation that we are insisting upon as a condition for our ratifying the Kyoto Protocol, but which is not yet part of that Protocol, and on effective international trading. Moreover, other models will yield other answers and much work remains to be done by the modeling community to test the robustness of these results. Preliminary comparisons of the SGM model to the few other models that have attempted to evaluate the Kyoto accord, suggest that its predictions concerning the impact of the Kyoto Protocol on carbon permit prices are neither the most conservative nor the most optimistic of the models that have been developed. The predictions of the SGM model are robust in the sense that virtually all energy models reveal the potency of effective, flexible, domestic and international trading mechanisms to reduce substantially the cost and energy price impact of meeting the Kyoto targets.

Of course, the most important factor that has been left out of the above assessment is the benefit of mitigating climate change itself. A full cost-benefit analysis would include mitigation in the benefits column. The only reason we have not done so, explained repeatedly above, is the difficulty in coming up with a number to capture the monetary benefits. But nobody should lose sight of our ultimate objective -- keeping our planet the hospitable home that we enjoy today.

Effects on employment and aggregate output

So far we have said nothing about job losses resulting from climate change policy. Although there may be job gains in some sectors and job losses in others, we do not anticipate any significant aggregate employment effect if we achieve the conditions we have discussed. The effects on energy prices described above will occur only 10 to 14 years in the future. Not only are these effects small relative to historical variations in energy prices, and offset by other policies like electricity restructuring, they would occur sufficiently far in the future to enable monetary policy to keep the economy operating at its potential. In energy-intensive sectors some employment reduction could occur, although given the very small predicted change in energy prices, impacts in most such sectors are apt to be minimal. Furthermore, a large number of jobs will be created in other sectors -- many of them high-tech jobs paying high wages. The President is firmly committed to assisting any workers who are adversely affected during the transition to a climate-friendly economy.

VII. Conclusion

In conclusion, the Kyoto Protocol and the President's general approach to climate change reflect the insight of economic analysis. The Kyoto Protocol includes key provisions on international trading and Clean Development projects. The President's approach relies on market incentives -- first, with a system of tax cuts and R&D investments, and then later with a market-based system of tradeable permits -- to ensure that our objectives are achieved as efficiently as possible.

Our overall conclusion is that the economic impact of the Protocol will be modest under the conditions we have identified. The purpose of this testimony has been to explain the reasoning underlying this conclusion, which draws insights from not only the forecasts of individual models, any one of which has its own strengths and limitations, but also a broad variety of additional analyses.

I look forward to continuing to work with members of this Committee, as well as other interested parties, in further analyzing the Kyoto Protocol and evaluating the net effects of reducing greenhouse gas emissions. It is my hope that economic analysis will continue to play a key role in designing policies in this area.

I welcome your questions.

**ORAL TESTIMONY OF DR. JANET YELLEN
CHAIR, COUNCIL OF ECONOMIC ADVISERS
BEFORE THE HOUSE INTERNATIONAL RELATIONS COMMITTEE
ON THE ECONOMICS OF THE KYOTO PROTOCOL
MAY 13, 1998**

Thank you, Mr. Chairman. The President has said that we can work to avert the grave dangers of climate change, while at the same time maintaining the strength of our economy. I agree and am pleased to have this opportunity to appear before the Committee to elaborate on the Administration's views on these issues.

The international agreement that was reached in Kyoto this past December is a crucial step forward in addressing global climate change. But it is only one step in a long journey. Since the international effort to reduce greenhouse gas emissions is still in some respects a work-in-progress, it is not yet possible to provide a full authoritative analysis of it. In my testimony today, I will attempt to identify key elements of the agreement and the Administration's policy, such as international emissions permit trading, meaningful developing country participation, the inclusion of land-use activities that absorb carbon ("sinks") and six categories of gases, as well as domestic initiatives, that can ensure that reductions in global greenhouse gas emissions are consistent with continued strong economic growth.

Effects of Climate Change

The Intergovernmental Panel on Climate Change (IPCC), jointly established by the World Meteorological Organization and the United Nations Environment Programme, concluded in 1995 that "the balance of evidence suggests that there is a discernible human influence on global climate." Current concentrations of carbon dioxide, methane, nitrous oxide, and the other so-called greenhouse gases have reached levels well above those of preindustrial times. As a

result of the increased concentration of greenhouse gases, the IPCC estimates that global temperatures will increase by between 2 to 6 degrees Fahrenheit in the next 100 years, with a best guess of about 3.5 degrees Fahrenheit. The IPCC reports that a doubling of carbon dioxide levels would lead to approximately 10,000 additional deaths per year for the current U.S. population from higher summer temperatures, even after netting out the effects of warmer winters and acclimatization. The IPCC also predicts sea level increases of about 20 inches by 2100, with greater increases in subsequent years. Despite the difficulties of deriving quantitative assessments of the damages from climate change, researchers have nonetheless developed monetary estimates of damages that prompt substantial concern, and range in the tens of billions of dollars per year for temperature changes projected to occur in the next century. If left uncontrolled, disruption of the Earth's climate may thus pose substantial costs in terms of harm to commerce and the environment alike. These costs--and they are significant--provide the primary motivation for actions to reduce greenhouse gas emissions.

These estimates do not, and cannot, accurately reflect the value of reducing the unknown risk of large-scale and potentially irreversible events with potentially catastrophic consequences, such as warming of the Northern tundra sufficient to release very large amounts of methane from the permafrost and thereby leading to accelerated warming. There is thus a strong argument for the Kyoto Protocol as a form of insurance against a serious environmental threat.

Kyoto Protocol

To address climate change, the United States and approximately 160 other nations agreed in negotiations held in Kyoto, Japan, last December, to reduce emissions of greenhouse gases. The Kyoto Protocol, which requires the advice and consent of the Senate, would place binding

limits on each industrial country's combined emissions of the six principal categories of greenhouse gases. These limits apply to the 38 so-called Annex I countries, which are the industrialized countries, defined to include Russia, Ukraine, and most Eastern European countries.

In taking action to reduce emissions, economic analysis suggests that two elements are absolutely essential: the effort must be flexible and market-based, to ensure that we reduce emissions in the most efficient way; and the effort must be global, for without global emissions reductions the effort would be ineffective. The nature of the climate change problem--that greenhouse gas emissions have the same effect on the climate regardless of how, where, and, within limits, when they occur--suggests three basic approaches to lower the cost of achieving given levels of environmental protection. We term these “when”, “what”, and “where” flexibility.

As a result of U.S. diplomatic efforts, all three forms of flexibility are broadly reflected in the Kyoto Protocol. The choice of a multi-year budget period, ending later than many countries proposed, with allowance for “banking” of emissions reductions, constitute key elements of “when flexibility.” These provisions mitigate costs by permitting reductions at times when they are less rather than more costly. The inclusion of all six greenhouse gases and certain sink activities that promote removal of carbon from the atmosphere provide substantial “what flexibility”. The U.S. succeeded in having the Kyoto Protocol stipulate that countries with binding targets are to reduce total greenhouse gas emissions by certain percentages, but the Protocol does not require specific reductions for specific gases. Moreover, sinks can be used to offset emissions targets. The inclusion of international emissions trading among countries that

take on binding targets, coupled with an agreement allowing industrial countries to receive emissions reduction credit for certified investments in "clean development" projects in the developing world, are the critical forms of "where" flexibility incorporated in the Kyoto Protocol. Although details of these provisions need to be finalized in negotiations in Buenos Aires later this year, we believe that these mechanisms can produce substantial reductions in the costs of attaining our environmental objectives.

The problem of climate change is global and so requires a global solution. Around 2030, under a continuation of business as usual, a majority of world emissions are projected to come from developing countries. Without developing country participation we cannot achieve adequate climate protection. In addition, developing country participation would permit relatively low-cost emissions reductions to be internationally recognized as a substitute for more expensive reductions in many industrial countries. The President has made clear that he will not submit the Kyoto Protocol to the Senate without meaningful participation from key developing countries (who are not included in Annex I).

Economic Effects

An economic analysis of climate change faces three broad categories of difficulties. First are the uncertainties that still remain over the terms of the ultimate treaty. Second are the inherent limitations of available models to analyze even short-term costs and benefits. And finally is the impossibility of putting a single monetary figure on the long-term benefits of climate change mitigation.

Mindful of the limitations of any single model as a tool for evaluating the economic impact of the Kyoto Protocol, we have employed a broad array of techniques to assess the

various possible costs and non-climate benefits of the Administration's emissions reduction policy. Ignoring the benefits of mitigating climate change itself, our conclusion is that the net costs of our policies to reduce emissions are likely to be small if those reductions are undertaken in an efficient manner and we are successful in securing meaningful developing country participation as well as effective international trading and clean-development mechanisms in future negotiations. As I explain in my written testimony, this conclusion is not entirely dependent on, but is fully consistent with, formal model results. For example, given the factors, such as trading, just delineated, but excluding the benefits of acting and the impact of electricity restructuring, estimates derived using Battelle's Second Generation Model suggest that the resource costs of attaining the Kyoto targets for emission reductions might amount to just \$7 to \$12 billion per year in 2008 to 2012 -- or just 0.1 percent of projected GDP. That small net premium, in effect, purchases a partial insurance policy against a serious environmental threat.

A comprehensive economic evaluation of the Administration's climate change policies must also take into account the potential payoffs from the full package of proposed Administration climate change initiatives. As you know, the President's FY 1999 budget includes a \$6.3 billion package of tax cuts and R&D over the next 5 years; this package makes good sense in terms of energy policy and will jumpstart our efforts. A second responsible step entails industry-by-industry consultations to prepare emission reduction plans in key industrial sectors. A final component of the President's climate change policy is his support for electricity restructuring in a manner that will offer approximately \$20 billion in cost savings to electricity consumers, while offering modest reductions in greenhouse gas emissions.

I look forward to continuing to work with members of this Committee, as well as other

interested parties, in further analyzing the Kyoto Protocol and evaluating the effects of reducing greenhouse gas emissions.

I welcome your questions.

**Statement of
Stuart E. Elzenstat
Under Secretary of State
for Economic, Business and Agricultural Affairs
before the
House International Relations Committee
May 13, 1998**

Thank you, Mr. Chairman.

At the outset, let me thank those members of Congress, in this chamber and in the Senate, who participated with us in the Kyoto Conference last December and who lent their advice and support to our efforts there. Rarely has there been an environmental issue more important or complex than global warming, and rarely has there been a greater need for the Executive Branch and the Congress to work closely together.

It is with great pleasure that I appear here today to explain the Administration's position on global warming. To this end, I will divide my testimony into four parts: (1) a short discussion of the science -- the driving force for all the efforts we have taken to date to mitigate a significant and growing global environmental problem; (2) a discussion of the results of the Kyoto Conference and key features of the Kyoto Protocol; (3) an effort to correct misperceptions; and (4) a brief review of the President's Climate Change Technology Initiative. I hope to leave you with a clear understanding of why we believe that it is necessary to act, of how we intend to proceed internationally, and of what the President plans to do here at home.

The Science

Human beings are changing the climate by increasing the global concentrations of greenhouse gases such as carbon dioxide, methane and nitrous oxide. Burning coal, oil and natural gas to heat our homes, power our cars and illuminate our cities produces carbon dioxide and other

greenhouse gases as by-products -- more than 6 billion metric tons worth of carbon in the form of carbon dioxide annually. Similarly, deforestation and land clearing also release significant quantities of such gases -- another 1 to 2 billion tons a year. Over the last century, greenhouse gases have been released to the atmosphere faster than natural processes can remove them. There is no ambiguity in the data; since 1860, concentrations of carbon dioxide have risen 30 percent, from 280 parts per million (ppm) to 365 ppm.

In December 1995, the authoritative Intergovernmental Panel on Climate Change (IPCC), representing the work of more than 2,000 of the world's leading climate change scientists from more than 50 countries, concluded that "the balance of evidence suggests that there is a discernible human influence on global climate."

The IPCC Assessment represents the best synthesis of the science of climate change. It concludes:

Concentrations of greenhouse gases could exceed 700 ppm by 2100 under "business as usual" -- levels not seen on the planet for 50 million years. The projected temperature increase of 2 to 6.5 degrees Fahrenheit over the next 100 years, could exceed rates of change for the last 10,000 years. For perspective, while there is some uncertainty, tropical sea surface temperatures in the last ice age were anywhere from 2 to 9 degrees Fahrenheit cooler than today.

Increased temperatures are expected to speed up the global water cycle. Faster evaporation will lead to a drying of soils and in some areas increased drought. Overall, however, due to the faster global cycling of water, there will be an increase in precipitation.

Sea levels are expected to rise between 6 and 37 inches over the next century. A 20 inch sea level rise could double the global population at risk from storm surges -- from roughly 45 million to over 90 million, even if coastal populations do not increase. Low-lying areas are particularly vulnerable (e.g., much of coastal Louisiana and the Florida Everglades).

Human health is likely to be affected. Warmer temperatures will increase the chances of heat waves (like the Chicago event in 1995 that

killed over 400 people) and can exacerbate air quality problems such as smog, and lead to an increase in allergic disorders. Diseases that thrive in warmer climates, such as dengue fever, malaria, yellow fever, encephalitis, and cholera are likely to spread due to the expansion of the range of disease carrying organisms. By 2100, there could be an additional 50-80 million cases of malaria each year.

Agriculture, forests, and natural ecosystems are also likely to be affected. The poorest countries, already subject to food production and distribution problems, will likely suffer the greatest agricultural impacts. Doubling current carbon dioxide concentrations could lead to a dramatic change in the geographic distribution of one-third of the Earth's forests. (For example, the ideal range of some North American forest species would shift by as much as 300 miles to the north in the next 100 years -- far faster than their ability to migrate on their own.) Such changes could have profound effects on parks and wildlife refuges, and lead to a reduction in species diversity.

What Changes Have We Seen to Date?

The earth's temperature is increasing: Scientists from our National Oceanic and Atmospheric Administration (NOAA), the U.K. Meteorological Office and the National Aeronautics and Space Administration (NASA) all recently announced that 1997 was the warmest year on record. In fact, nine of the last 11 years are among the warmest ever recorded.

In recent weeks, satellite images confirmed that a section of an Antarctic ice shelf as big as the District of Columbia has broken away from the Larsen Ice Shelf. A segment the size of Rhode Island broke off from this same area a few years ago. While these events do not appear to threaten a collapse of the west Antarctic ice sheet, they do appear to be related to a several degree warming of the ocean in this region.

In addition, the water cycle of the planet may be speeding up: Since the beginning of the century, NOAA estimates that precipitation in the United States has increased by about 5 - 10 percent, while the frequency of heavy downpours (where more than 2 inches fall in a day) has increased by about 20 percent. The United States has had many recent reminders of how

costly extreme events can be: the Mississippi flooding of 1993 led to damages of between \$10 and \$20 billion; the Southern Plains drought of 1996 was estimated to cost \$4 billion; and the Northwest floods of 1996-97 about \$3 billion. We have yet to determine the total costs of the 1997-98 El Nino. While no single event can be attributed to global warming, increases in floods and droughts are expected as global warming occurs.

Action Needed Now

Some have argued that we can wait to act until all the details of the climate system have been fully understood. The science tells us that this is a recipe for disaster. We will only fully confirm predictions when we experience them. At that point it will be too late. The concentrations of greenhouse gases in the atmosphere continue to rise each year, and because these gases will persist for many decades to centuries, this problem is only slowly reversed. The earth will continue to warm and the seas continue to rise as long as we continue to load the entire atmosphere of the earth with greenhouse gases. The problem has developed over the course of a century and it will take many decades to solve. Already, we have another 1.0 degree Fahrenheit of warming in the pipeline from emissions that have previously occurred, and there will be more warming ahead as emissions continue to occur into the future. So some impacts will happen no matter what actions we take. Nevertheless, we can still forestall many others if we begin taking cost-effective actions now.

We should look at the Kyoto Protocol as an insurance policy against the potentially devastating and irreversible impacts of global warming. This insurance policy is fully justified today, based solely on our current understanding of the science. If we act now the premium will be far more reasonable than if we delay and hope the problem created by greenhouse gases will go away. It is like a life insurance policy whose costs grow significantly if we delay year after year insuring ourselves.

But there is a critical difference in the case of the climate system. In most insurance policies, the loser can be made whole -- restitution is possible; the building can be rebuilt, the stolen car replaced, the fire or flood damage repaired. In the case of global warming, we will not have a second chance -- failure to act will lead to irreversible consequences. We will be

committing ourselves, our children and our grandchildren to a very different planet, and they will never forgive us.

But the premium for this insurance policy must be reasonable. For this reason we rejected unrealistic targets in Kyoto; we insisted on the use of market-mechanisms; and we opposed mandatory policies and measures – like carbon taxes.

The totality of our scientific information, including that on vulnerability and impacts of global warming, provides a compelling reason to act.

Let me now turn to the recent Kyoto Conference.

Kyoto Protocol

Last December in Kyoto, Japan, the nations of the world reached agreement on an historic step to control greenhouse gas emissions which cause global warming. No sooner had the negotiating session ended, however, than some critics on both ends of the political spectrum, without a full examination of the results achieved, denounced the agreement as either too little too late or too much too soon. In fact, the Kyoto Protocol, reached only through the exercise of vigorous American leadership, represents an important achievement in the best interests of the United States. But it is a framework for action, a work in progress, not a finished product ready for Senate consideration.

U.S. Negotiating Objectives

In order to secure an effective agreement that is environmentally strong and economically sound, while protecting the unique worldwide interests of the U.S. military, President Clinton and Vice President Gore established three major objectives. As a result of the Kyoto negotiations, we achieved the first two – realistic targets and timetables for reducing greenhouse gas emissions among the world's major industrial nations, which fully protect the unique role of our military in its global reach; and flexible market-based mechanisms for achieving those targets. The third, meaningful participation of developing countries, will be the focus of our work in the

coming months and years, but with the Kyoto Protocol we have made an important down payment.

Elements of the Kyoto Protocol and Related Decisions

Our first objective – realistic targets and timetables among developed countries – had to be a credible step in reducing the dangerous buildup of greenhouse gases, yet measured enough to safeguard U.S. prosperity at home and competitiveness abroad. In the end, we secured the key elements of the President's proposal on targets and timetables, often over the initial objections of the European Union and other developed countries. The agreement and related decisions include:

The U.S. concept of a multi-year time frame for emissions reductions rather than a fixed, single-year target. The multi-year time frame will allow the United States, other nations and our industries greater flexibility in meeting our targets. Averaging over five years, instead of requiring countries to meet a specific target each year, can lower costs, especially given an uncertain future. The averaging can smooth out the effects of short-term events such as fluctuations in the business cycle and energy demand, or hard winters and hot summers that would increase energy use and emissions.

The U.S. specific time frame of 2008-2012, rather than earlier periods preferred by the European Union and others, giving us more time to phase in change gradually and deploy new technologies cost-effectively, and thereby to cushion the effects on our businesses and workers.

Differentiated targets for the key industrial powers ranging from 6% to 8% below baseline levels (1990 and 1995) of greenhouse gas emissions, with the United States agreeing to a 7% reduction. When changes in the accounting rules for certain gases and offsets for activities that absorb carbon dioxide are factored in, the level of effort required of the United States is quite close to the President's original proposal to return emissions to 1990 levels by 2008-2012, representing at most a 3 percent real reduction below that proposal, and perhaps less.

An innovative proposal shaped in part by the United States, allowing certain activities, such as planting trees, that absorb carbon dioxide – called

“sinks” – to be offset against emissions targets. This will both promote cost-effective solutions to climate change and encourage good forestry practices. As a major forestry nation this will be of special benefit to the United States.

As proposed by the United States, the Kyoto Protocol covers all six significant greenhouse gases even though the E.U. and Japan proposed and fought until the last moment to cover only three. This was an important environmental victory – also supported by many in our own industry – because gases that other countries wanted to omit and leave uncovered (including substitutes for the now banned chlorofluorocarbons that endanger the ozone layer) are among the fastest growing and longest lasting greenhouse gases.

Flexible Market Mechanisms

Our second broad Presidential objective was to make sure that countries can use flexible market mechanisms to reach their targets rather than the mandatory “policies and measures,” such as carbon taxes, favored by the E.U. and many other developed countries.

The Kyoto Protocol enshrines a centerpiece of this U.S. market-based approach – the opportunity for companies and countries to trade emissions permits. In this way, companies or countries can purchase less expensive emissions permits from companies or countries that have more permits than they need (because they have met their targets with room to spare). This is not only economically sensible, but environmentally sound. By finding the least expensive way to reduce emissions, we will be providing a strong incentive for achieving the maximum level of emissions reductions at the least cost. The United States has had a very positive experience with permit trading in the acid rain program, reducing costs by 50 percent from what was expected, yet fully serving our environmental goals.

This was a new concept for developed and developing countries alike – some of whom fought it vigorously. But we have it firmly enshrined in the Kyoto Protocol and it is a critical way of ensuring cost-effective solutions. Its inclusion was a major victory for us.

We went even further by achieving a conceptual understanding with several countries, including Australia, Canada, Japan, New Zealand, Russia and Ukraine, to trade emissions rights with each other. This 'umbrella group' could further reduce compliance costs. Since Kyoto, further discussions have taken place and will continue.

Ensuring that we can meet our target reductions cost-effectively will depend significantly on access to the flexibility mechanisms we fought hard to include in the Kyoto Protocol. Let me be very clear: The commitment we made in Kyoto would not have been made -- could not have been made -- were it not for the flexibility mechanisms that were also agreed there. Until we are satisfied with the rules and procedures yet to be established, the promise of Kyoto will never be realized.

Meaningful Participation of Developing Countries

Our third objective was to secure meaningful participation of key developing countries, a concern that the Senate obviously shares, as evidenced by last summer's Byrd-Hagel Resolution. Global warming is, after all, a global problem which requires a global solution -- not only from the developed world but also from key developing countries.

Per capita emission rates are low in the developing world and will remain so for some time. At the same time, it is also true that by around 2015 China will likely be the largest overall emitter of greenhouse gases, and by 2025 the developing world will emit more greenhouse gases in total than the developed world. So from an environmental perspective, this problem cannot be solved unless developing countries get on board.

We encountered significant resistance in Kyoto by some developing countries to meaningful participation in solving the global warming problem. For example, we had sought to include a specific process through which advanced developing or newly developed countries could take on quantified emission limitation commitments and thereby take part in the international emissions trading regime. While a number of developing countries expressed interest in our proposal and supported it in Kyoto, others rejected it, and it was not possible to include such a specific process in the Protocol. Still, developing countries may nevertheless, as a prerequisite for engaging

in emissions trading, voluntarily assume binding emissions targets through amendment to the annex of the Protocol that lists countries with targets.

Some developing countries believe – wrongly -- that the developed world is asking them to limit their capacity to industrialize, reduce poverty and raise their standard of living. We have made clear that we support an approach under which developing countries would continue to grow – but in a more environmentally sound and economically sustainable way, by taking advantage of technologies not available to countries that industrialized at an earlier time.

The Kyoto agreement does not meet our requirements for developing country participation. Nevertheless, a significant down payment was made in the form of a provision advanced by Brazil and backed by the United States and the Alliance of Small Island States. This provision defines a "Clean Development Mechanism," which embraces the U.S.-backed concept of "joint implementation with credit." The goal is to build a bridge – with incentives – between developed, industrialized countries, and developing nations. This new mechanism will allow companies in the developed world to invest in projects in countries in the developing world – such as the construction of high-tech, environmentally sound power plants – for the benefit of the parties in both worlds. The companies in the developed world will get emissions credits at lower costs than they could achieve at home, while countries in the developing world will share in those credits, and receive the kind of technology that can allow them to grow with lower greenhouse gas emissions.

The Clean Development Mechanism has great potential, but developing countries will need to do more in order to participate meaningfully in the effort to combat global warming. In determining what developing countries ought to do, we should be aware that the circumstances of developing countries vary widely, along a kind of continuum. Some today are very poor; their greenhouse gas emissions are negligible and are likely to remain so for the foreseeable future. Others, whose greenhouse gas emissions are not substantial, are relatively well off. Some are poor on a per capita basis, but their greenhouse gas emissions today rival or surpass those of the most advanced industrialized nations. Still others have already joined ranks with the industrialized world in the OECD but have not yet fully

accepted the added responsibility for protection of the global environment that comes with their new status.

Any 'one-size-fits-all' approach to the 'meaningful participation of developing countries' and to satisfy the Byrd-Hagel Resolution is thus unlikely to prevail. We found in Kyoto that even among the industrialized countries it was necessary to recognize the individual national circumstances faced by those differently situated in order to reach agreement, notwithstanding our common purpose. Similarly, any uniform, inflexible approach to the 'meaningful participation of developing countries' is unlikely to prevail.

Recognizing our "common but differentiated responsibilities and respective capabilities" it will be necessary to develop an approach that provides for a meaningful global response to the threat of global warming, while acknowledging the legitimate aspirations of developing countries to achieve a better life for their peoples. To succeed, we will need to ensure that those responsible for a significant share of global emissions accept their responsibility to protect the global environment. We will also need to ensure that those who are able to do so contribute according to their capacities and stage of development.

The Global Environment Facility (GEF) plays a unique role in moving developing countries toward integrating climate change mitigation into their overall development processes. The GEF has committed \$732 million to projects in developing countries and the economies in transition for energy efficiency and cleaner energy supply, and it has leveraged over \$3 billion from other sources. Every project includes measures tailored to the conditions in recipient countries to promote stronger environmental policies and domestic investment in clean energy. This is a positive, constructive role for the GEF in the climate issue -- fully consistent with the Byrd-Hagel Resolution and numerous U.S. objectives related to energy, environment, and economic development.

Some Misperceptions

Before moving on, Mr. Chairman, let me address a few specific points on which I believe there may be some misperceptions. The first of these is

that the Kyoto Protocol will damage our national security or imperil the ability of our military to meet its worldwide responsibilities – this is not true.

We took special pains working with the Defense Department and the uniformed military before and in Kyoto to protect the unique position of the United States as the world's only superpower with global military responsibilities. We achieved everything they outlined as necessary to protect military operations and our national security.

At the Kyoto Conference, the Parties took a decision to exempt key overseas military activities from emissions targets, including exemptions for "bunker fuels" (those used in international aviation and maritime transport) and for emissions resulting from a wide range of multilateral operations, such as peacekeeping and humanitarian relief. This exempts from our national targets not only multilateral operations expressly authorized by the U.N. Security Council (such as Desert Storm or Bosnia), but also multilateral operations that the United States initiates pursuant to the U.N. Charter without express authorization (such as Grenada). Countries may also decide among themselves how to account for emissions relating to multilateral operations (e.g., U.S. training in another NATO country) without going through emissions trading.

Furthermore, in terms of domestic implementation of the Kyoto Protocol, the President recently determined that, to ensure defense readiness, he will propose that military operations and training be held harmless from any national emissions limits that might be adopted. Measures intended to promote reductions in emission of greenhouse gases will not impair or adversely affect operations and training or the ability to reallocate emissions resulting from overseas activities and bases. In summary, the Department of Defense is satisfied with the agreement reached in Kyoto.

Second, it has been suggested that the Protocol will create a super U.N. Secretariat that will threaten U.S. sovereignty and national decision-making through alleged intrusive verification procedures and prior approval of individual emissions trades. That is not so. The review process contained in the Protocol largely codifies the existing practice under the 1992 Framework Convention, to which the United States is a Party. Under the Protocol, small expert review teams will continue to visit Annex I countries

for brief periods to review implementation of the Convention and of the Protocol. The review process is intergovernmental, in that experts are nominated by governments. The review teams meet with government officials, and with others by invitation. In reviews under the Convention, including the review of our second national communication which took place here in Washington from April 20-24, 1998, the teams have met with Congressional staff, representatives of the private sector and representatives of environmental organizations – but only with their concurrence. Any other visits, such as site visits, would take place only if approved by the host country and, if the private sector is involved, the relevant interested persons. To date under the Convention, no site visits have taken place.

In addition, let me be unmistakably clear – while trading rules must be established internationally to have emissions trading work – as our SEC must set rules for equity trading – we will not accept nor do we anticipate an approach that would require prior approval of individual emissions trades by an international body. Trading will be done between interested nations and their companies, based on market principles.

Concerns have also been raised that the Protocol is flawed, on the one hand because it will threaten U.S. sovereignty by dictating national decisions on implementation and, on the other hand, because it lacks mechanisms to verify compliance. In fact we believe that the Protocol strikes an appropriate balance between these two extremes.

The United States firmly opposed mandatory, harmonized policies and measures that would be imposed upon us in order to reach our target. We prevailed. The Protocol leaves Parties entirely free to decide how best to meet their targets based on national circumstances.

At the same time, we could not tolerate a free-for-all where Parties might or might not meet their commitments, particularly given the conscientious way the United States meets its international obligations. As a result, the Protocol calls for national measurement of emissions, detailed reporting, and in-depth reviews – on an intergovernmental basis.

The one area where we believe more work needs to be done is in identifying appropriate consequences for non-compliance; the Protocol

provides for elaborating such consequences, with any binding consequences to be done in amendment form, so that the Senate would have the opportunity to approve them.

Finally, some have suggested that the Protocol will result in a huge government transfer of foreign aid to Russia in which we will give away taxpayer money with no leverage on Russian policies with these funds. This also is not true. Under the Protocol's emissions trading provisions, we envision that U.S. private sector firms may choose to purchase international emissions credits in order to meet their emissions obligations. Indeed, the private purchase of emissions credits is one of the crucial ways to achieve cost-effective emissions reductions for U.S. firms.

As with any market transaction, purchases of these credits will have to comply with all U.S. legal and regulatory requirements. In addition, U.S. firms interested in international investment will have an incentive to ensure that other countries meet the international standards for adequate monitoring and reporting of their emissions of greenhouse gases. At the same time, Russia will have significant incentives to use the revenue generated to invest in the most modern, climate-friendly plants and equipment so that, as its economy recovers, it continues to produce emissions credits that it can sell on international markets. But of course, Russia will decide how best to meet its own commitments.

Framework for Action

Where do we go from here? While historic, the Kyoto Protocol is only one step in a long process. It is, in essence, a framework for action, a work in progress, and a number of challenges still lie ahead.

Rules and procedures must be adopted to ensure that emissions trading rights, joint implementation and the Clean Development Mechanism operate efficiently and smoothly. The Kyoto Protocol establishes emissions trading, but leaves open the specifics of operations. We will work hard to ensure that the rules and procedures adopted enable emissions trading, joint implementation and the Clean Development Mechanism to work smoothly and efficiently, thereby encouraging the private sector to engage.

We will also work closely with our industries to be sure they are satisfied that the emissions trading system which is developed is as efficient and effective as possible to meet their needs.

Most significant, we must work to secure the meaningful participation of key developing countries. We must be creative in initiating bilateral agreements. We have made a promising start with an agreement we reached with China during last fall's Summit and in our continuing discussions since then.

Another example is the Joint Statement of President Clinton and President Frei of Chile, issued in conjunction with the recent Summit of the Americas in Santiago. There, the two presidents:

- Expressed their firm support for the principles and objectives of the Kyoto Protocol and their conviction that its market mechanisms will be a great help in mobilizing private sector resources to reduce greenhouse gas emissions;
- recognized the potential of the Clean Development Mechanism to become an important resource for attracting private sector initiatives and investment in clean energy technologies, energy efficiency, forests and other activities that reduce, absorb or eliminate greenhouse gas emissions;
- agreed that all countries should be involved in global efforts to address climate change, taking into account their common but differentiated responsibilities;
- noted that developed countries must set the example in reducing greenhouse gas emissions as a matter of priority, while developing countries should participate meaningfully in efforts to address climate change, for example, by taking on emissions targets whenever possible; and
- committed their governments to work together on these issues in preparation for the next conference of the parties to

the Framework Convention on Climate Change this November in Buenos Aires.

We are also using regional and multilateral fora to achieve our objectives -- such as the recent Summit of the Americas in Santiago, Chile, in the Asian Partnership for Economic Cooperation (APEC) process, the President's recent trip to Africa, and the upcoming G-8 Summit in the United Kingdom.

As Secretary Albright said in her Earth Day speech, we are mounting a full court diplomatic press to bring developing nations into a meaningful role in helping solve the global climate challenge. We will accept nothing less, nor would we expect the United States Senate to do so. As the President has indicated, the United States should not assume binding obligations under the Protocol until key developing countries meaningfully participate in meeting the challenge of climate change. Although the Kyoto Protocol was an historic step forward, more progress is necessary with respect to participation of key developing countries. It would be premature to submit the treaty to the Senate for its advice and consent to ratification at this time.

The Administration also plans to continue to work with the international financial institutions to promote market-based energy sector policies in developing countries that will help reduce developing country greenhouse gas emissions. Multilateral development bank policies, including those of the Global Environment Facility, strongly influence international lending and private capital flows for energy, industrial and transportation investments. Policies that favor market pricing, privatization, clean technologies and environmentally-friendly approaches will make implementing the Kyoto Protocol easier and will speed the growth of markets for new technologies that help reduce emissions in developing countries. We will work with the international financial institutions themselves -- from the World Bank to the regional development banks -- and with other countries, especially developed countries, to achieve these goals in the coming years.

The Kyoto agreement does not solve the problem of global warming, but it represents an important step in dealing with a problem that we cannot

wish away. If we fail to take reasoned action now, our children and grandchildren will pay the price.

Mr. Chairman, before turning briefly to our domestic efforts, let me note two other key elements in this equation – the contributions that the United States provides to carry out work under the U.N. Framework Convention on Climate Change and in the Intergovernmental Panel on Climate Change (IPCC), as well as the contributions that we make to the Global Environment Facility (GEF). For FY 1999, the President has requested \$314 million for the International Organizations and Programs Account, a level that represents a 6.6 percent increase over FY 1998. This amount includes \$8 million for the Climate Stabilization Fund which supports the Framework Convention and the IPCC. Parties to the Convention have much work ahead of them, as I have already noted. In addition, the IPCC has now embarked on its Third Assessment Report of Climate Change, scheduled for completion in late 2000 or early 2001. These funds are vital to ensuring U.S. leadership in both of these organizations and to ensuring that our views and the work of our scientists are taken fully into account.

In addition, the President has requested \$300 million to meet our past and current pledges to help fund the Global Environment Facility (GEF). The GEF helps developing countries act to protect the global environment in several key focal areas including international waters, biodiversity, climate change and depletion of the stratospheric ozone layer. As I noted earlier, if we want to bring developing countries on board with real commitments to limit greenhouse gas emissions, we need to demonstrate that we are a reliable partner by supporting their concrete efforts with reliable resources. At this point, our GEF shortfall damages U.S. credibility in promising to help developing countries meet the climate change obligations we are urging that they undertake. I would therefore urge the Congress to fund fully our \$300 million request, to meet our current pledge and also clear our substantial shortfall of nearly \$200 million.

President's Climate Change Technology Initiative

In his State of the Union address, President Clinton said that global warming is "the gathering crisis that requires worldwide action." We need to

begin now to launch the sensible, cost-effective efforts that will help us avoid the high future cost of inaction.

The President last October outlined a three-stage approach to addressing climate change at home. The first stage consists of immediate actions to stimulate development and use of technologies that can minimize the cost of meeting U.S. goals in reducing greenhouse gas emissions. Stage two will review options created through ongoing technology development and lead to detailed plans for a domestic, market-based permit trading system for carbon emissions. Stage three will begin to implement a market-based emissions-trading system.

As a first installment on this plan, President Clinton announced in his State of the Union message his proposal for a \$6.3 billion Climate Change Technology Initiative over five years to cut U.S. greenhouse gas emissions -- \$1.3 billion higher than the President announced in his initial plan in October. This vigorous initiative calls for tax cuts coupled with research and development (R&D) to take cost-effective, practical steps that will position us well to meet the challenge we face early in the next century.

This initiative consists of two parts -- \$3.6 billion in tax credits for energy-efficient purchases and renewable energy, and \$2.7 billion in new R&D spending over five years.

The tax package includes tax credits of \$3,000 to \$4,000 for consumers who purchase advanced technology, highly fuel efficient vehicles. It provides a 15 percent credit (up to \$2,000) for purchases of rooftop solar electricity and hot water systems to provide incentives for meeting the Million Solar Roofs goal. It also includes a 20 percent credit (subject to a cap) for purchasing energy-efficient building equipment, a \$2,000 credit for purchasing energy efficient new homes, extension of the wind and biomass tax credit, and a 10 percent investment credit for the purchase of combined heat and power systems.

The R&D component covers the four major carbon-emitting sectors of the economy (buildings, industry, transportation and electricity), plus carbon removal and sequestration, Federal facilities, and cross cutting analysis and research. Examples of this R&D effort include the Partnership for a New

Generation of Vehicles (PNGV), a government-industry effort to develop affordable cars that meet all applicable safety and environmental standards and get up to three times the fuel efficiency of today's cars. In 1999, the President's budget for PNGV is \$277 million, up from \$227 million appropriated for 1998. Our PNGV effort is clearly paying off – the developments about higher mileage cars announced by the Big Three last month were assisted by research supported under PNGV. It is exciting to see our U.S. automakers already planning for the cars of the future, not as pipe dreams but as achievable greenhouse gas friendly products.

As General Motors Chair and CEO John F. Smith said recently in announcing GM's plans to step up research spending and focus on bringing new products to market, "No car company will be able to thrive in the 21st century if it relies solely on internal combustion engines."

Similar government-industry efforts are proposed to develop cleaner, more efficient diesel engines for both light trucks and heavy trucks. The R&D effort also includes expanded research partnerships for key renewable technologies such as wind, photovoltaics, geothermal, biomass, and hydropower to accelerate price reductions and improve performance. The President's 1999 budget proposes a \$100 million increase in appropriations for solar and renewable energy R&D – a 37 percent increase over 1998.

We hope that the Congress will view the President's initiative favorably and appropriate the funds and enact the tax incentives that he has requested. We look forward to working with you to put the President's proposals into action.

The President and his Administration are committed to working with you in the Congress, both to realize the potential of the Climate Change Technology Initiative and to craft the ongoing U.S. approach to climate change. The United States has the power to lead the global effort, and Congress holds the key. What is done or not done today will determine the kind of world we will leave to future generations and the conditions of life they will face.

Before concluding, let me also briefly address a concern that some have raised in recent weeks – namely that the Administration is somehow

seeking to implement the Kyoto Protocol before submitting that treaty to the Senate for its advice and consent. This is not so.

We are pursuing a host of actions as a matter of good environmental and good energy policy -- including efforts to promote energy efficiency, to increase the use of renewable forms of energy, to improve air quality, and to develop new technologies. Our efforts in these areas predate the Kyoto Conference last December and the Kyoto Protocol adopted there. They represent a prudent effort to do things today that make sense, that will be good for business and good for our environment.

Last October, the President announced his intention to proceed with the Climate Change Technology Initiative -- whether or not there was a successful outcome in Kyoto -- because the development of sound energy policies is in our national interest. The President mentioned this initiative in his State of the Union message and included it in the Administration's budget proposals to the Congress. We have acted openly, transparently and in a spirit of full cooperation with the Congress.

Let me also note that United States has existing obligations under the United Nations Framework Convention on Climate Change to adopt policies and measures to mitigate climate change. The Framework Convention was negotiated during the Bush Administration, and the United States Senate overwhelmingly gave its advice and consent to the Framework Convention in 1992. To meet our commitments under the Framework Convention, President Clinton launched the Climate Change Action Plan in October 1993 which contained nearly 50 specific measures and programs. And we continue to search for cost-effective ways to act responsibly in the face of this most significant threat to our global environment.

What we have not done -- what we will not do -- is take steps that would require mandatory action at the macro-economic level or with respect to specific sectors of our economy in order to reach the Kyoto target before the President has obtained the advice and consent of the Senate.

Sustained Effort Required

Mr. Chairman, I have mentioned that Kyoto produced a framework for future action, and I have listed a number of the steps that await us. If we delay responding to climate change, the cost of responding in the future will rise. It is crucial now to develop new technologies to avoid future costs.

Coming to grips with the threat of global warming is no small task. We must tackle it in a vigorous, sober and determined manner, understanding that it represents a challenge but also an opportunity. And as we have always done in the face of global challenge, we must assume the responsibilities of American leadership.

Thank you.

**Oral Statement by
Stuart E. Eizenstat
Under Secretary of State for
Economic, Business and Agricultural Affairs
before the
Committee on International Relations
House of Representatives
May 13, 1998**

Thank you, Mr. Chairman. Rarely has there been an environmental issue more complex and important, and rarely has there been a greater need for the Executive Branch and Congress to work closely together. I'll divide the summary of my testimony, the full version of which I assume can be submitted for the record, into four parts: First, a short discussion of the science; second, the key features of the protocol; third, efforts to correct misperceptions; and, fourth, a brief review of the President's own Climate Change Technology Initiative.

But first on the science. Human beings are changing the climate by increasing the global concentrations of greenhouse gases. Over the last century, greenhouse gases have been released to the atmosphere far faster than natural processes can remove them. There is no ambiguity in the data. In this first chart, the actual data is shown in blue from ice cores taken from scientists, and the orange indicates also actual data taken from the atmosphere in Hawaii.

What this dramatizes quite clearly is that the concentrations of greenhouse gases have grown by some 30 percent, and especially since 1960. You can see the increasing slope of these concentrations in the orange from 1960 to the present date. That slope will increase and continue to increase dramatically.

The authoritative Intergovernmental Panel on Climate Change, representing the work of more than 2,000 of the world's leading climate change scientists from more than 50 countries, and representing the best synthesis of the science on climate change, made a number of important conclusions. Under a business-as-usual environment, concentrations of greenhouse gases could exceed levels not seen on the planet for 50 million years. The projected temperature increases of two to six and a half degrees over the next hundred years could exceed rates of change not seen for the last 10,000 years. The chart which we have over here indicates both

the increase in the concentration levels and in temperature, and it indicates the dramatic connection between concentrations of CO₂ and other greenhouse gases and the dramatic increase in temperatures which would occur if those are left unabated.

Increased temperatures are expected to speed up the global water cycle. It will lead to a drying of soils, and in some areas increased drought. Sea levels are expected to rise between six and 37 inches over the next century. A 20-inch sea-level rise could double the global population at risk from storm surges -- and low-lying areas are particularly vulnerable -- much for example of coastal Louisiana and the Florida Everglades, as well as other parts of the world.

This would also affect human health. It would exacerbate air quality problems, and diseases that thrive in warmer climates, including malaria and yellow fever would increase. It is estimated that by the end of the next century there would be an additional 50 to 80 million cases of malaria each year if this climate change continues unabated.

We should look, Mr. Chairman and members of the committee, at Kyoto as an insurance policy against the potentially devastating and irreversible impacts of global warming. If we act now, the premium on this insurance policy will be far more reasonable and less costly than if we delay in hope that the problem created by greenhouse gases will somehow go away. Indeed, it's like a life insurance policy whose costs grow significantly if we delay year after year in insuring ourselves.

In the case of global warming, we will not have a second chance. Failure to act could lead to irreversible consequences, and we'll be committing ourselves, our children and our grandchildren to a very different planet and they will never forgive us.

Second is the actual conference and protocol itself. It represents an important achievement, but it is a framework for action, not a finished product yet ready for Senate consideration. President Clinton and Vice President Gore established three major objectives for us to negotiate. And as a result of the negotiations, we achieved the first two and have made some progress, though not enough, on the third.

Our first objective was developing realistic targets and timetables among the developed countries. These had to be credible in terms of beginning to reduce the dangerous buildup of greenhouse gases and yet measured enough to safeguard prosperity at home and competitiveness abroad.

In the end, we secured the key elements of the President's proposal. The U.S. concept of multi-year timeframes for emission reductions was selected, rather than a fixed single-year target. This will allow our industries greater flexibility to meet those targets. In addition, the timeframe, 2008 to 2012, was the U.S. time frame, not the earlier periods preferred by the European Union, Japan and others. This will help cushion the transition and the effect on businesses and workers.

We also got the concept of differentiated targets for key industrial powers, ranging from 6 to 8 percent below baseline levels, so that our competitors are taking on similar, and in some cases with respect to the European Union, deeper obligations than we are.

When changes in the accounting rules for certain gases and offsets for so-called sinks that absorb carbon dioxide are factored in, the level of effort required of the United States is very close to the President's original proposal to return emissions to 1990 levels by 2008-2012, representing at most a 3 percent real reduction below that proposal and perhaps less.

An innovative proposal shaped in part by the United States allows certain activities like planting trees, called sinks, and good forest practices that absorb carbon dioxide to be used to offset emission requirements that industry will have. This will be a significant way of reducing costs and burdens and will be of particular benefit to the United States.

Also, as proposed by the U.S., the Kyoto Protocol covers all six significant greenhouse gases, even though the European Union and Japan fought until the last moment to cover only three.

Our second Presidential objective was to make sure that countries could meet their obligations by flexible market mechanisms, rather than mandatory policies and measures, like carbon taxes favored by the European Union and many other developed countries. The Kyoto Protocol enshrines a centerpiece of this U.S. market-based approach — the opportunity for companies and countries to trade

emissions permits. In this way, companies or countries can purchase less expensive emissions permits from companies or countries that have more permits than they need. This is not only economically sensible but environmentally sound.

We have had a very positive experience with permit trading in our own acid rain program, which has reduced costs by 50 percent from what was expected. This has been confirmed by a number of experts in a recent *Wall Street Journal* article.

So the inclusion of these market-based mechanisms, and the right to trade in the open market, was a signal victory for the United States. Indeed, we went even further by achieving a conceptual understanding with several countries, including Australia, Canada, Japan, New Zealand, Russia and Ukraine, to trade emissions rights with each other. This umbrella group could further reduce compliance costs.

Let me be very clear. The commitment we made in Kyoto would not have been made, could not have been made, were it not for the flexibility that these mechanisms give us that were also agreed to. Until we're satisfied with the rules and procedures yet to be established, the promise of Kyoto will never be realized.

Our third objective was to secure meaningful participation of key developing countries. This is obviously a concern that the Congress shares, as evidenced by last summer's Hagel-Byrd Resolution in the Senate. Global warming is after all a global problem, it requires a global solution, not only for the developed but also from the key developing countries. By 2025 the developed world will be emitting less greenhouse gases and the developing world will be emitting more than the total of the developed world.

We encountered significant resistance in Kyoto by some developing countries to meaningful participation in solving the global warming problem. Still, developing countries may, as a pre-requisite for engaging in emissions trading, voluntarily assume binding emissions targets through amendment to the annex of the protocol that lists countries with targets.

Some developing countries seem to believe, wrongly, that the developed world is asking them to limit their capacity to industrialize. We have made it clear that we support an approach under which developing countries would continue to grow but, in a more environmentally sound and economically sustainable way.

Let me be very clear, the Kyoto agreement does not meet our requirements for developing country participation. Nevertheless, a significant down payment was made in the form of a provision advanced by Brazil and strongly backed by the United States. This defines a Clean Development Mechanism, which fully embraces the U.S.-backed concept of joint implementation with credit. This will build a bridge with incentives between the developed countries and developing nations, and will allow companies in the United States and elsewhere in the developed world to invest in projects abroad and get credits for them against their emissions targets, again lowering the burden on U.S. industry by allowing this kind of participation. They can either invest or they can simply purchase the permits.

In determining what developing countries ought to do, we, of course need to be aware that the circumstances of developing countries vary. Any one-size-fits-all approach to meaningful participation of developing countries is unlikely to prevail.

I'd like, Mr. Chairman and members of the committee, to deal very briefly with some misperceptions. The first is that the Kyoto Protocol will imperil the ability of our military to meet its worldwide responsibilities. This is absolutely untrue.

We took special pains, working with the Defense Department and with our uniformed military, both before and in Kyoto, to fully protect the unique position of the United States as the world's only superpower with global military responsibilities. We achieved everything they outlined as necessary to protect military operations and our national security. At Kyoto, the Parties took a decision to exempt key overseas military activities from any emissions targets, including exemptions for bunker fuels used in international aviation and maritime transport, and from emissions resulting from multilateral operations, such as self-defense, peacekeeping and humanitarian relief.

This exempts from our national targets not only multilateral operations expressly authorized by the UN Security Council, such as Desert Storm or Bosnia, but importantly, it also exempts multilateral operations that the United States initiates pursuant to the UN charter without express authorization, such as Grenada.

Furthermore, in terms of domestic implementation of the Kyoto Protocol, the President recently determined that, to ensure defense readiness, he will propose that military operations and training be held harmless from any national emissions

limits that might be adopted. Measures intended to promote reductions in emission of greenhouse gases will not impair or adversely affect operations and training or the ability to reallocate emissions resulting from overseas activities and bases. As Secretary of Defense Cohen wrote in a letter of February 24, 1998, to Congressperson Bachus, "Based on achieving our international objectives, the Department is fully satisfied with the Kyoto results."

A second misperception is that somehow the Protocol will create a super UN secretariat threatening U.S. sovereignty in national decision-making through alleged intrusive verification procedures and prior approval of individual emissions trades. This also is not so.

The review process in the Protocol largely codifies already existing practices under the 1992 Rio Convention. The review process is not by some secretariat; it's intergovernmental. Experts are nominated by governments. The review teams meet with government officials and with others by invitation. In reviews under the existing convention, the teams have met with congressional staff, with representatives of the private sector and environmental organizations, but only with their concurrence. Any other visits, such as site visits, would take place only -- and I underscore only -- if approved by the host country, including in this case the United States, and only if the private sector involved agrees to it.

So the notion that somehow people are going to be swooping down on U.S. private property is utterly, completely and totally false.

In addition, let me be unmistakably clear. We will not accept, nor do we anticipate an approach that would require prior approval of individual emissions trades by any international body. Trading will be done between interested nations and their companies based on market principles.

A third concern is that, on the one hand, the Protocol will threaten U.S. sovereignty by dictating national decisions on implementation, and yet, on the other hand, that it lacks mechanisms or teeth to verify compliance. In fact, the Protocol strikes an appropriate balance between these two extremes.

We firmly opposed and succeeded in opposing mandatory, harmonized policies that were desired by others and that would have imposed on us uniform ways to reach our targets. We prevailed. The Protocol leaves to the Parties themselves to

decide how best to meet their targets based on national circumstances. If others want to do it by heavy carbon taxes or heavy central regulations, that's their business; we're going to do it by market-driven mechanisms alone.

At the same time we obviously couldn't tolerate a free-for-all. And so the protocol calls for national measurements of emissions, detailed reporting and in-depth reviews on an intergovernmental basis, not by some secretariat.

Finally, there are some who suggest that the protocol is going to result in a huge government transfer of foreign aid to Russia. This is also not true. U.S. private sector firms may choose to purchase international emissions credits from Russia and from others. This will be a private decision. And indeed, it's one of the crucial ways to achieve cost-effective emissions reductions for U.S. firms.

Now, where do we go from here? First, rules and procedures must be adopted to ensure that emissions, trading rights, joint implementation and the Clean Development Mechanism operate efficiently and smoothly. In addition, we'll work closely with our industries to be sure they are satisfied that the emissions trading system which is developed is as efficient and effective as possible to meet their needs. And I've already met with industry and I've told them, "You have to tell us if it satisfies your needs. We can't tell you."

Most significant, we have to work to secure the meaningful participation of key developing countries. As Secretary Albright said on Earth Day, we're putting on a full-court diplomatic press to bring developing nations into a meaningful role to help solve the global climate challenge. We will accept nothing less, nor would we expect the U.S. Congress to do so.

As the President has indicated, the U.S. should not assume binding obligations under the Protocol until key developing countries meaningfully participate in meeting the challenge of climate change. And more progress is clearly necessary. It obviously would be premature to submit something to the Senate when the Senate itself has asked for this kind of participation and we have not yet achieved it. That is the great obligation we have to assume over the coming months and, if necessary, years.

Further, let me say that we anticipate signing the Protocol within the one-year period provided for in the agreement, which runs from March 1998 to March 1999.

We have not, as yet, determined the precise timing due to tactical considerations. We will sign at a time that makes the most sense in terms of the overall diplomatic situation.

The President outlined last October a three-stage approach to address climate change at home. As a first installment, he announced in his State of the Union message a proposal for a \$6.3 billion Climate Change Technology Initiative over five years to cut U.S. greenhouse gas emissions. These will mean tax cuts combined with R&D incentives to take cost-effective, practical steps to position us to meet the challenge we face early in the next century.

Before concluding, let me also briefly address a concern that some have raised in recent weeks – namely that the Administration is somehow seeking to implement the Kyoto Protocol before submitting that treaty to the Senate for its advice and consent. This is not so. We are pursuing a host of actions as a matter of good environmental and good energy policy – including efforts to promote energy efficiency, to increase the use of renewable forms of energy, to improve air quality, and to develop new technologies. Our efforts in these areas predate the Kyoto Conference last December and the Kyoto Protocol adopted there. They represent a prudent effort to do things today that make sense, that will be good for business and good for our environment.

Last October, the President announced his intention to proceed with the Climate Change Technology Initiative – whether or not there was a successful outcome in Kyoto – because the development of sound energy policies is in our national interest. The President mentioned this initiative in his State of the Union message and included it in the Administration's budget proposals to the Congress. We have acted openly, transparently and in a spirit of full cooperation with the Congress.

Let me also note that United States has existing obligations under the United Nations Framework Convention on Climate Change to adopt policies and measures to mitigate climate change. The Framework Convention was negotiated during the Bush Administration, and the United States Senate overwhelmingly gave its advice and consent to the Framework Convention in 1992. To meet our commitments under the Framework Convention, President Clinton launched the Climate Change Action Plan in October 1993 which contained nearly 50 specific measures and

programs. And we continue to search for cost-effective ways to act responsibly in the face of this most significant threat to our global environment.

What we have not done -- what we will not do -- is take steps that would require mandatory action at the macro-economic level or with respect to specific sectors of our economy in order to reach the Kyoto target before the President has obtained the advice and consent of the Senate.

In closing, this Administration is committed to work with you in the Congress both to realize the potential of the Climate Change Technology Initiative of the President's and to craft our ongoing approach to climate change. We have the power to lead the global effort, and Congress holds the key. What is done or not done today will determine the kind of world we leave to future generations and the conditions of life they will face.

We cannot ignore what science is telling us. We would do so at our peril. And again, what we're looking for is a kind of insurance policy, one that we can afford, one that is prudent, but one, Mr. Chairman and members of the committee, if we fail to act, if we fail to recognize what these scientists in charge are telling us, that will be infinitely more costly to do in the future without action now.

Thank you very much, and I look forward to your questions and comments.