

Global Climate Change:

Fact Sheets & Charges and Responses

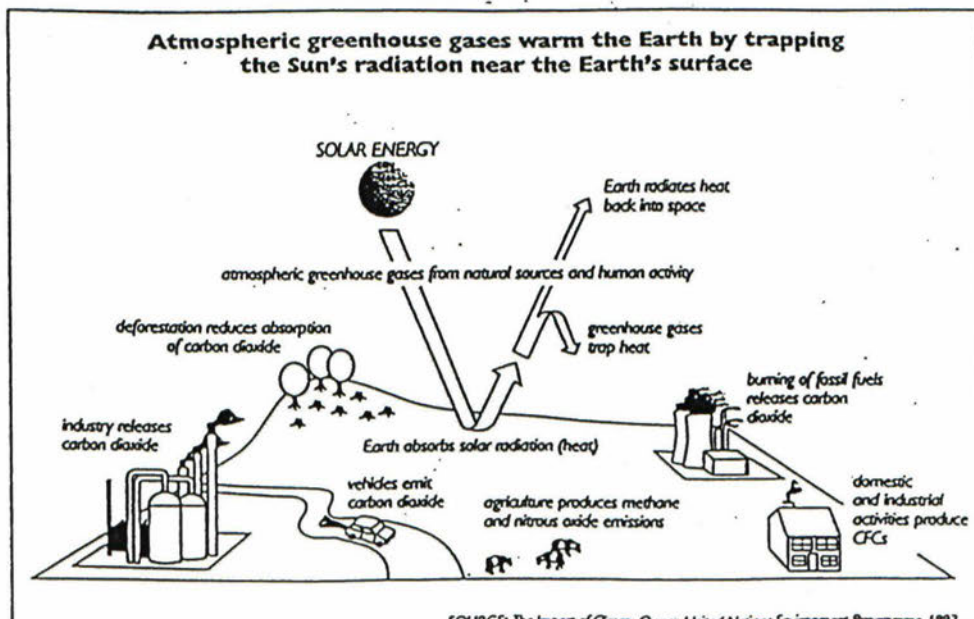
**DRAFT
8/14/97**

Climate Change Fact Sheets

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WHAT WE KNOW ABOUT THE SCIENCE

- ◇ Scientists have long understood that greenhouse gases (principally water vapor, carbon dioxide, methane, and nitrous oxide) in nature keep the Earth's temperature an estimated 60 degrees F warmer than it would otherwise be – sustaining life as we know it.
- ◇ Human activities are dramatically increasing the build-up of these gases in the atmosphere. Since the beginning of the Industrial Revolution, CO₂ concentrations have increased 30 percent, methane levels have doubled, and nitrous oxide concentrations are up by 15 percent.
- ◇ Since 1900, average global temperature has increased 0.5 - 1.0 degree F. Eleven of the warmest years on record have occurred since 1979, with 1995 being the warmest ever. Sea level has risen 4-10 inches. (Source: IPCC, 1995) Total precipitation in the U.S. is up 6 percent, while extreme precipitation events (> 2 inches a day) have increased 20 percent. (Source: NOAA)
- ◇ The natural variability of the climate system makes it difficult to separate the contribution of human activity to these changes. Nevertheless, the international scientific consensus as reflected by the Intergovernmental Panel on Climate Change (which includes the work of more than 2,000 scientists from more than 60 countries) is that, "the balance of evidence suggests a discernible human influence on global climate."
- ◇ Current projections show that absent controls on carbon dioxide emissions, atmospheric concentrations of this greenhouse gas will more than double from today's levels (to 750 parts per million) by 2100. This is predicted to warm the planet an additional 2.0 - 6.5 degrees F – a faster rate of warming than any observed in the past 10,000 years. (Source: IPCC, 1995)
- ◇ While many uncertainties remain in our understanding of the complexities of the climate system, it is clear that warming of this magnitude will have serious consequences. Sea level rise; greater intensity and frequency of floods and droughts; human health problems; shifts in agricultural patterns; and the disappearance of many natural ecosystems are among the predicted effects. (Source: IPCC, 1995)



THE U.S. POSITION ON CLIMATE CHANGE

- ◇ The Clinton Administration is convinced that further steps are required to address climate change and supports efforts to reach a comprehensive and cost-effective international treaty this December at the Third Conference of the Parties to the Framework Convention on Climate Change in Kyoto, Japan.
- ◇ This view is based on two key points. First, the scientific evidence indicates that human actions are changing the climate system, and that unless greenhouse gas emissions are reduced, such changes threaten unacceptable impacts on the United States and the world. Second, international efforts to date have not proved effective in dealing with the problem.
- ◇ The U.S. has proposed a three-part framework for a more effective international agreement:
 1. **Binding emissions targets for developed nations.** Almost all developed countries, including the United States, will fall short of the non-binding aim in the current Climate Convention, which calls on nations to reduce emissions to 1990 levels by 2000. Shifting to a medium-term, binding, realistic, and achievable target should spur greater commitment and action by countries to limit greenhouse gas emissions.
 2. **Flexibility to achieve cost-effective reductions.** The U.S. proposal calls for emissions trading and joint implementation. As it makes no environmental difference where emissions reductions are achieved, these proposals aim to allow the greatest reductions to be gained at the least cost. The U.S. has also called for multi-year emissions targets and the possibility of banking and borrowing emissions from one period to the next.
 3. **Participation of developing countries.** Based on the principle of “common but differentiated responsibilities” contained in the Climate Convention (signed by President Bush and ratified by the Senate), the U.S. has proposed a comprehensive package of elements on developing country commitments. In the near term, all would be required to take specific actions to mitigate their emissions and report on their activities, while the more advanced economies would adopt binding targets (though these targets would be necessarily less stringent than those of developed nations). Lastly, the U.S. has stipulated that *every* developing country agree to negotiate binding targets by 2005.
- ◇ In putting forward this framework, the U.S. has rejected proposals by some for what we believe to be unrealistic near-term cuts in emissions. These include a proposal from the Association of Small Island States for a 20 percent reduction below 1990 levels by 2005 and a proposal from the European Union for a 15 percent reduction below 1990 levels by 2010.
- ◇ The Administration expects to have specific proposals for emissions cuts, as well as other initiatives, as appropriate, to present in time for the Kyoto Conference.

CLIMATE CHANGE TIMELINE

- 1896 -- Arrhenius, a Swedish chemist, first advances the notion that CO₂ emissions from the burning of coal would enhance the greenhouse effect and warm the planet.
- 1967 -- The first reliable computer model predicts an increase of 4 degrees F in global average temperature when CO₂ concentrations double from pre-industrial times.
- 1987 -- Analysis of an Antarctic ice core reveals an extremely close correlation between CO₂ concentrations and temperature going back over 100,000 years.
- 1988 -- The Intergovernmental Panel on Climate Change (IPCC) is formed to bring together the world's best climate scientists to assess, and advise the world's governments on, the state of technical and scientific knowledge on climate change.
- 1992 -- 155 nations sign the UN Framework Convention on Climate Change (FCCC) which calls on developed nations to reduce emissions to 1990 levels by 2000 and which recognizes the "common but differentiated responsibilities" of all Parties.
 - The U.S. Senate ratifies the Convention later in the year.
- 1995 -- The Berlin Mandate is adopted at the First Conference of the Parties to the FCCC.
 - The IPCC releases its Second Assessment Report concluding that the "balance of evidence suggests a discernible human influence on global climate."
 - The year 1995 is determined to be the hottest ever recorded.
- 1996 -- The Geneva Declaration, affirming the latest science and calling on developed countries to accept binding emissions limits, is adopted at the Second Conference of the Parties to the FCCC.
- 1997 -- The U.S. submits its framework proposal for a new international agreement, emphasizing binding limits, flexibility, and global participation.
 - Over 2,000 economists, including 6 Nobel Laureates, conclude that climate change is a serious problem justifying preventive steps and state that, "Sound economic analysis shows that there are policy options that would slow climate change without harming American living standards, and these measures may in fact improve U.S. productivity in the longer run."
 - The nations of the world gather in Kyoto for the Third Conference of the Parties to the FCCC in hopes of reaching a new agreement on post-2000 emissions reductions.

CLIMATE CHANGE: WHO'S SAYING WHAT

"The balance of evidence suggests a discernible human influence on global climate."

-- Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers, 1995.

"Our familiarity with the scale, severity, and costs to human welfare of the disruptions that the climatic changes threaten leads us to introduce this note of urgency and to call for early domestic action to reduce U.S. emissions via the most cost-effective means." -- Scientists' Statement on Global Climatic Disruption, June 1997.

"We are performing a global experiment on our natural ecosystems for which we have little information to guide us. While plant and animal communities may be able to eventually adapt to a stable climate system that is warmer than the existing one, many species may not be able to survive a rapid transition to that new climate. The prudent course would be to limit climate change to the lowest rates feasible given current atmospheric accumulations of greenhouse gases." -- Ecologists' Statement on the Consequences of Rapid Climatic Change, May 1997.

"As economists, we believe that global climate change carries with it significant environmental, economic, social, and geopolitical risks, and that preventive steps are justified. Economic studies have found that there are many potential policies to reduce greenhouse-gas emissions for which the total benefits outweigh the total costs. For the United States, in particular, sound economic analysis shows that there are policy options that would slow climate change without harming American living standards, and these measures may in fact improve U.S. productivity in the longer run." -- Economists' Statement on Climate Change, January 1997.

"Based on the current status of climate research and on their experience as insurers and reinsurers, the member companies of the UNEP-Insurance Industry Initiative conclude that ... Man made climate change will lead to shifts in atmospheric and ocean circulation patterns. This will probably increase the likelihood of extreme weather events in certain areas. Such effects carry the risk of dramatically increased property damage, with serious implications for property insurers and reinsurers... We are convinced that in dealing with climate change risks, it is important to recognize the precautionary principle, in that it is not possible to quantify anticipated economic and social impacts of climate change fully before taking action. Research is needed to reduce uncertainty but cannot eliminate it entirely... We insist that in accordance with the precautionary principle, the negotiations for the Framework Convention on Climate Change must achieve early, substantial reductions in greenhouse gas emissions."

-- UNEP Insurance Initiative, Statement of Environmental Commitment by the Insurance Industry, Position Paper on Climate Change, July 1996.

Summary for Policymakers

Considerable progress has been made in the understanding of climate change¹ science since 1990 and new data and analyses have become available.

Greenhouse gas concentrations have continued to increase

Increases in greenhouse gas concentrations since pre-industrial times (i.e., since about 1750) have led to a positive *radiative forcing*² of climate, tending to warm the surface and to produce other changes of climate.

- The atmospheric concentrations of greenhouse gases, *inter alia* carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) have grown significantly: by about 30%, 145% and 15% respectively (values for 1992). These trends can be attributed largely to human activities, mostly fossil fuel use, land-use change and agriculture.
- The growth rates of CO₂, CH₄ and N₂O concentrations were low during the early 1990s. While this apparently natural variation is not yet fully explained, recent data indicate that the growth rates are currently comparable to those averaged over the 1980s.
- The direct radiative forcing of the long-lived greenhouse gases (2.45 Wm⁻²) is due primarily to increases in the concentrations of CO₂ (1.56 Wm⁻²), CH₄ (0.47 Wm⁻²) and N₂O (0.14 Wm⁻²) (values for 1992).
- Many greenhouse gases remain in the atmosphere for a long time (for CO₂ and N₂O, many decades to centuries), hence they affect radiative forcing on long time-scales.
- The direct radiative forcing due to the CFCs and HCFCs combined is 0.25 Wm⁻². However, their *net* radiative forcing is reduced by about 0.1 Wm⁻² because they have caused stratospheric ozone depletion which gives rise to a negative radiative forcing.
- Growth in the concentration of CFCs, but not HCFCs, has slowed to about zero. The concentrations of both CFCs and HCFCs, and their consequent ozone depletion, are expected to decrease substantially by 2050 through implementation of the Montreal Protocol and its Adjustments and Amendments.
- At present some long-lived greenhouse gases (particularly HFCs (a CFC substitute), PFCs and SF₆) contribute little to radiative forcing but their projected growth could contribute several per cent to radiative forcing during the 21st century.
- If carbon dioxide emissions were maintained at near current (1994) levels, they would lead to a nearly constant rate of increase in atmospheric concentrations for at least two centuries, reaching about 500 ppmv (approaching twice the pre-industrial concentration of 280 ppmv) by the end of the 21st century.

¹ Climate change in IPCC Working Group I usage refers to any change in climate over time whether due to natural variability or as a result of human activity. This differs from the usage in the Framework Convention on Climate Change where climate change refers to a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

² A simple measure of the importance of a potential climate change mechanism. Radiative forcing is the perturbation to the energy balance of the Earth-atmosphere system (in watts per square metre [Wm⁻²]).

- A range of carbon cycle models indicates that stabilisation of atmospheric CO₂ concentrations at 450, 650 or 1000 ppmv could be achieved only if global anthropogenic CO₂ emissions drop to 1990 levels by, respectively, approximately 40, 140 or 240 years from now, and drop substantially below 1990 levels subsequently.
- Any eventual stabilised concentration is governed more by the accumulated anthropogenic CO₂ emissions from now until the time of stabilisation, than by the way those emissions change over the period. This means that, for a given stabilised concentration value, higher emissions in early decades require lower emissions later on. Among the range of stabilisation cases studied, for stabilisation at 450, 650 or 1000 ppmv accumulated anthropogenic emissions over the period 1991 to 2100 are 630 GtC¹, 1030 GtC, and 1410 GtC respectively ($\pm$ approximately 15% in each case). For comparison the corresponding accumulated emissions for IPCC IS92 emission scenarios range from 770 to 2190 GtC.
- Stabilisation of CH₄ and N₂O concentrations at today's levels would involve reductions in anthropogenic emissions of 8% and more than 50% respectively.
- There is evidence that tropospheric ozone concentrations in the Northern Hemisphere have increased since pre-industrial times because of human activity and that this has resulted in a positive radiative forcing. This forcing is not yet well characterised, but it is estimated to be about 0.4 Wm⁻² (15% of that from the long-lived greenhouse gases). However the observations of the most recent decade show that the upward trend has slowed significantly or stopped.

Anthropogenic aerosols tend to produce negative radiative forcings

- Tropospheric aerosols (microscopic airborne particles) resulting from combustion of fossil fuels, biomass burning and other sources have led to a negative direct forcing of about 0.5 Wm⁻², as a global average, and possibly also to a negative indirect forcing of a similar magnitude. While the negative forcing is focused in particular regions and subcontinental areas, it can have continental to hemispheric scale effects on climate patterns.
- Locally, the aerosol forcing can be large enough to more than offset the positive forcing due to greenhouse gases.
- In contrast to the long-lived greenhouse gases, anthropogenic aerosols are very short-lived in the atmosphere, hence their radiative forcing adjusts rapidly to increases or decreases in emissions.

Climate has changed over the past century

At any one location year-to-year variations in weather can be large, but analyses of meteorological and other data over large areas and over periods of decades or more have provided evidence for some important systematic changes.

- Global mean surface air temperature has increased by between about 0.3 and 0.6°C since the late 19th century; the additional data available since 1990 and the re-analyses since then have not significantly changed this range of estimated increase.
- Recent years have been among the warmest since 1860, i.e., in the period of instrumental record, despite the cooling effect of the 1991 Mt. Pinatubo volcanic eruption.

¹ 1 GtC = 1 billion (10⁹) tonnes of carbon.

- Night-time temperatures over land have generally increased more than daytime temperatures.
- Regional changes are also evident. For example, the recent warming has been greatest over the mid-latitude continents in winter and spring, with a few areas of cooling, such as the North Atlantic Ocean. Precipitation has increased over land in high latitudes of the Northern Hemisphere, especially during the cold season.
- Global sea level has risen by between 10 and 25 cm over the past 100 years and much of the rise may be related to the increase in global mean temperature.
- There are inadequate data to determine whether consistent global changes in climate variability or weather extremes have occurred over the 20th century. On regional scales there is clear evidence of changes in some extremes and climate variability indicators (e.g., fewer frosts in several widespread areas; an increase in the proportion of rainfall from extreme events over the contiguous states of the USA). Some of these changes have been toward greater variability; some have been toward lower variability.
- The 1990 to mid-1995 persistent warm-phase of the El Niño-Southern Oscillation (which causes droughts and floods in many areas) was unusual in the context of the last 120 years.

The balance of evidence suggests a discernible human influence on global climate

Any human-induced effect on climate will be superimposed on the background "noise" of natural climate variability, which results both from internal fluctuations and from external causes such as solar variability or volcanic eruptions. Detection and attribution studies attempt to distinguish between anthropogenic and natural influences. "Detection of change" is the process of demonstrating that an observed change in climate is highly unusual in a statistical sense, but does not provide a reason for the change. "Attribution" is the process of establishing cause and effect relations, including the testing of competing hypotheses.

Since the 1990 IPCC Report, considerable progress has been made in attempts to distinguish between natural and anthropogenic influences on climate. This progress has been achieved by including effects of sulphate aerosols in addition to greenhouse gases, thus leading to more realistic estimates of human-induced radiative forcing. These have then been used in climate models to provide more complete simulations of the human-induced climate-change "signal". In addition, new simulations with coupled atmosphere-ocean models have provided important information about decade to century time-scale natural internal climate variability. A further major area of progress is the shift of focus from studies of global-mean changes to comparisons of modelled and observed spatial and temporal patterns of climate change.

The most important results related to the issues of detection and attribution are:

- The limited available evidence from proxy climate indicators suggests that the 20th century global mean temperature is at least as warm as any other century since at least 1400 AD. Data prior to 1400 are too sparse to allow the reliable estimation of global mean temperature.
- Assessments of the statistical significance of the observed global mean surface air temperature trend over the last century have used a variety of new estimates of natural internal and externally forced variability. These are derived from instrumental data, palaeodata, simple and complex climate models, and statistical models fitted to observations. Most of these studies have detected a significant change and show that the observed warming trend is unlikely to be entirely natural in origin.

- More convincing recent evidence for the attribution of a human effect on climate is emerging from pattern-based studies, in which the modelled climate response to combined forcing by greenhouse gases and anthropogenic sulphate aerosols is compared with observed geographical, seasonal and vertical patterns of atmospheric temperature change. These studies show that such pattern correspondences increase with time, as one would expect as an anthropogenic signal increases in strength. Furthermore, the probability is very low that these correspondences could occur by chance as a result of natural internal variability only. The vertical patterns of change are also inconsistent with those expected for solar and volcanic forcing.
- 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. These include the magnitude and patterns of long-term natural variability and the time-evolving pattern of forcing by, and response to, changes in concentrations of greenhouse gases and aerosols, and land surface changes. Nevertheless, the balance of evidence suggests that there is a discernible human influence on global climate.

Climate is expected to continue to change in the future

The IPCC has developed a range of scenarios, IS92a-f, of future greenhouse gas and aerosol precursor emissions based on assumptions concerning population and economic growth, land-use, technological changes, energy availability and fuel mix during the period 1990 to 2100. Through understanding of the global carbon cycle and of atmospheric chemistry, these emissions can be used to project atmospheric concentrations of greenhouse gases and aerosols and the perturbation of natural radiative forcing. Climate models can then be used to develop projections of future climate.

- The increasing realism of simulations of current and past climate by coupled atmosphere-ocean climate models has increased our confidence in their use for projection of future climate change. Important uncertainties remain, but these have been taken into account in the full range of projections of global mean temperature and sea level change.
- For the mid-range IPCC emission scenario, IS92a, assuming the "best estimate" value of climate sensitivity¹ and including the effects of future increases in aerosol, models project an increase in global mean surface air temperature relative to 1990 of about 2°C by 2100. This estimate is approximately one third lower than the "best estimate" in 1990. This is due primarily to lower emission scenarios (particularly for CO₂ and the CFCs), the inclusion of the cooling effect of sulphate aerosols, and improvements in the treatment of the carbon cycle. Combining the lowest IPCC emission scenario (IS92c) with a "low" value of climate sensitivity and including the effects of future changes in aerosol concentrations leads to a projected increase of about 1°C by 2100. The corresponding projection for the highest IPCC scenario (IS92e) combined with a "high" value of climate sensitivity gives a warming of about 3.5°C. In all cases the average rate of warming would probably be greater than any seen in the last 10,000 years, but the actual annual to decadal changes would include considerable natural variability. Regional temperature changes could differ substantially from the global mean value. Because of the thermal inertia of the oceans, only 50-90% of the eventual equilibrium temperature change would have been realised by 2100 and temperature would continue to increase beyond 2100, even if concentrations of greenhouse gases were stabilised by that time.

¹ In IPCC reports, climate sensitivity usually refers to the long term (equilibrium) change in global mean surface temperature following a doubling of atmospheric equivalent CO₂ concentration. More generally, it refers to the equilibrium change in surface air temperature following a unit change in radiative forcing (°C/Wm⁻²).

- Average sea level is expected to rise as a result of thermal expansion of the oceans and melting of glaciers and ice-sheets. For the IS92a scenario, assuming the "best estimate" values of climate sensitivity and of ice melt sensitivity to warming, and including the effects of future changes in aerosol, models project an increase in sea level of about 50 cm from the present to 2100. This estimate is approximately 25% lower than the "best estimate" in 1990 due to the lower temperature projection, but also reflecting improvements in the climate and ice melt models. Combining the lowest emission scenario (IS92c) with the "low" climate and ice melt sensitivities and including aerosol effects gives a projected sea level rise of about 15 cm from the present to 2100. The corresponding projection for the highest emission scenario (IS92e) combined with "high" climate and ice-melt sensitivities gives a sea level rise of about 95 cm from the present to 2100. Sea level would continue to rise at a similar rate in future centuries beyond 2100, even if concentrations of greenhouse gases were stabilised by that time, and would continue to do so even beyond the time of stabilisation of global mean temperature. Regional sea level changes may differ from the global mean value owing to land movement and ocean current changes.
- Confidence is higher in the hemispheric-to-continental scale projections of coupled atmosphere-ocean climate models than in the regional projections, where confidence remains low. There is more confidence in temperature projections than hydrological changes.
- All model simulations, whether they were forced with increased concentrations of greenhouse gases and aerosols or with increased concentrations of greenhouse gases alone, show the following features: greater surface warming of the land than of the sea in winter; a maximum surface warming in high northern latitudes in winter, little surface warming over the Arctic in summer; an enhanced global mean hydrological cycle, and increased precipitation and soil moisture in high latitudes in winter. All these changes are associated with identifiable physical mechanisms.
- In addition, most simulations show a reduction in the strength of the North Atlantic thermohaline circulation and a widespread reduction in diurnal range of temperature. These features too can be explained in terms of identifiable physical mechanisms.
- The direct and indirect effects of anthropogenic aerosols have an important effect on the projections. Generally, the magnitudes of the temperature and precipitation changes are smaller when aerosol effects are represented, especially in northern mid-latitudes. Note that the cooling effect of aerosols is not a simple offset to the warming effect of greenhouse gases, but significantly affects some of the continental scale patterns of climate change, most noticeably in the summer hemisphere. For example, models that consider only the effects of greenhouse gases generally project an increase in precipitation and soil moisture in the Asian summer monsoon region, whereas models that include, in addition, some of the effects of aerosols suggest that monsoon precipitation may decrease. The spatial and temporal distribution of aerosols greatly influence regional projections, which are therefore more uncertain.
- A general warming is expected to lead to an increase in the occurrence of extremely hot days and a decrease in the occurrence of extremely cold days.
- Warmer temperatures will lead to a more vigorous hydrological cycle; this translates into prospects for more severe droughts and/or floods in some places and less severe droughts and/or floods in other places. Several models indicate an increase in precipitation intensity, suggesting a possibility for more extreme rainfall events. Knowledge is currently insufficient to say whether there will be any changes in the occurrence or geographical distribution of severe storms, e.g., tropical cyclones.

- Sustained rapid climate change could shift the competitive balance among species and even lead to forest dieback, altering the terrestrial uptake and release of carbon. The magnitude is uncertain, but could be between zero and 200 GtC over the next one to two centuries, depending on the rate of climate change.

There are still many uncertainties

Many factors currently limit our ability to project and detect future climate change. In particular, to reduce uncertainties further work is needed on the following priority topics:

- estimation of future emissions and biogeochemical cycling (including sources and sinks) of greenhouse gases, aerosols and aerosol precursors and projections of future concentrations and radiative properties;
- representation of climate processes in models, especially feedbacks associated with clouds, oceans, sea ice and vegetation, in order to improve projections of rates and regional patterns of climate change;
- systematic collection of long-term instrumental and proxy observations of climate system variables (e.g., solar output, atmospheric energy balance components, hydrological cycles, ocean characteristics and ecosystem changes) for the purposes of model testing, assessment of temporal and regional variability and for detection and attribution studies.

Future unexpected, large and rapid climate system changes (as have occurred in the past) are, by their nature, difficult to predict. This implies that future climate changes may also involve "surprises". In particular these arise from the non-linear nature of the climate system. When rapidly forced, non-linear systems are especially subject to unexpected behaviour. Progress can be made by investigating non-linear processes and sub-components of the climatic system. Examples of such non-linear behaviour include rapid circulation changes in the North Atlantic and feedbacks associated with terrestrial ecosystem changes.

Global Climatic Disruption

SCIENTISTS' STATEMENT ON GLOBAL CLIMATIC DISRUPTION

June 1997

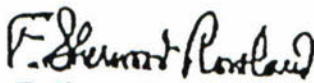
We are scientists who are familiar with the causes and effects of climatic change as summarized recently by the Intergovernmental Panel on Climate Change (IPCC). We endorse those reports and observe that the further accumulation of greenhouse gases commits the earth irreversibly to further global climatic change and consequent ecological, economic and social disruption. The risks associated with such changes justify preventive action through reductions in emissions of greenhouse gases. In ratifying the Framework Convention on Climate Change, the United States agreed in principle to reduce its emissions. It is time for the United States, as the largest emitter of greenhouse gases, to fulfill this commitment and demonstrate leadership in a global effort.

Human-induced global climatic change is under way. The IPCC concluded that global mean surface air temperature has increased by between about 0.5 and 1.1 degrees Fahrenheit in the last 100 years and anticipates a further continuing rise of 1.8 to 6.3 degrees Fahrenheit during the next century. Sea-level has risen on average 4-10 inches during the past 100 years and is expected to rise another 6 inches to 3 feet by 2100. Global warming from the increase in heat-trapping gases in the atmosphere causes an amplified hydrological cycle resulting in increased precipitation and flooding in some regions and more severe aridity in other areas. The IPCC concluded that "The balance of evidence suggests a discernible human influence on global climate." The warming is expected to expand the geographical ranges of malaria and dengue fever and to open large new areas to other human diseases and plant and animal pests. Effects of the disruption of climate are sufficiently complicated that it is appropriate to assume there will be effects not now anticipated.

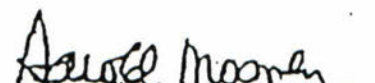
Our familiarity with the scale, severity, and costs to human welfare of the disruptions that the climatic changes threaten leads us to introduce this note of urgency and to call for early domestic action to reduce U.S. emissions via the most cost-effective means. We encourage other nations to join in similar actions with the purpose of producing a substantial and progressive global reduction in greenhouse gas emissions beginning immediately. We call attention to the fact that there are financial as well as environmental advantages to reducing emissions. More than 2000 economists recently observed that there are many potential policies to reduce greenhouse-gas emissions for which total benefits outweigh the total costs.

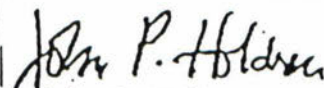
The Framework Convention on Climate Change, ratified by the United States and more than 165 other nations, calls for stabilization of greenhouse gas concentrations in the atmosphere at levels that will protect human interests and nature. The Parties to the Convention will meet in December, 1997, in Kyoto, Japan to prepare a protocol implementing the convention. We urge that the United States enter that meeting with a clear national plan to limit emissions, and a recommendation as to how the U.S. will assist other nations in significant steps toward achieving the joint purpose of stabilization.

Initial Signatories:

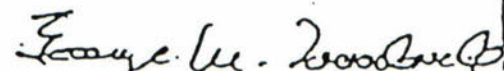

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May 21, 1997

President Bill Clinton
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Dear President Clinton:

Ecologists' Statement on the Consequences of Rapid Climatic Change

Climate change driven by emissions of greenhouse gases is projected to occur at a very rapid rate, significantly faster, on a sustained global basis, than rates of climatic change during the past 10,000 years (1). Rapid climate change coupled with pollution, habitat fragmentation and habitat loss may lead to the decline and disappearance of many plant and animal communities that might otherwise survive a future climate that is relatively stable but warmer.

We believe that this situation constitutes a dangerous anthropogenic interference with the climate system, one that may not "allow ecosystems to adapt naturally to climate change" as is called for in the Framework Convention on Climate Change (1992). Accordingly, we believe that the prudent course would be to limit climate change to the lowest rates feasible given emissions that have already occurred. These correspond to global rates of warming of no more than 1 degree C per century.

Much of the current debate over limiting global climate change has focused on targets for stabilization of greenhouse gas concentrations many decades in the future. However from an ecological standpoint, it is the *rapid rate* as well as the total magnitude of climate change projected to occur that is pertinent to the future well-being of plant and animal communities and to the continuous availability of goods and services they provide to our society. Global mean temperature could increase by as much as 1-3.5 degrees C (2-6 degrees F), over the next 100 years. At higher latitudes, which include large portions of the United States, temperature increases could be much greater.

Rapid climate change is more dangerous to plant and animal communities than gradual climate change even if the total amount of change that eventually occurs is exactly the same.

During rapid climate change, disturbances like fires, floods, erosion, droughts, storms, pests and pathogen outbreaks may increase with adverse effects on ecosystem functions as important as water supply, soil fertility and carbon sequestration. After disturbance, aggressive, 'weedy' species, including exotics that outcompete native vegetation, may come to dominate these areas. In some US temperate forests, rapid climate change could lead to widespread tree mortality, wildfires and replacement of the forests by grasslands. Species that are long-lived, rare, or endangered will be severely disadvantaged.

In an increasingly developed world, there are fewer and fewer areas available in which native trees and plants can grow. Cities, highways, agricultural fields and other human activities limit available habitat and create barriers to the migration of plants and animals. In fact, many natural areas now can be considered 'islands' in a sea of developed land. Protected areas like national parks and forests were established with current climates in mind. Rapid climate shifts may reduce appropriate native habitats within protected areas while development outside the boundaries of the protected areas would make much of the neighboring new habitat unavailable and limit corridors for species to migrate to suitable new habitats. It would be difficult to imagine, for example, how the imperiled species of Everglades National Park, such as the Cape Sable Sparrow and American Crocodile, could migrate north into the urban and agricultural landscapes of coastal and central Florida and successfully re-establish themselves. Overall, climate change, in combination with existing anthropogenic habitat disruption and loss, could lead to steep declines in worldwide biodiversity.

Furthermore, conditions for plant and animal communities are considerably less hospitable now than prior to the industrial revolution. In many cases, plant and animal populations are less healthy and ecosystems less resilient to further disturbance due to environmental stress from human-made pollutants and habitat degradation. These stresses may reduce significantly an individual's or ecosystem's ability to cope successfully with climate change.

Climate change may also result in rapid sea level rise. Rapid sea level rise causes beach erosion and threatens coastal marshes and mangrove forests. While many of these coastal natural areas have kept pace with historic rates of sea level rise, faster rates may lead to inundation of marshes and mangroves more rapidly than new wetlands can form. Onshore human development will further hamper new establishment of coastal natural areas. Loss of habitat for a substantial number of species of birds, fish, shellfish, microorganisms and animals could result. Marshes and mangroves also protect shorelines from storms and high tides and act as filters for pollutants such as sewage and other

effluents. Their loss would lead to increased erosion and degradation of onshore human development.

It is difficult to quantify precisely the response of a particular species or group of species to climate change. Because there are only sparse records of this type of rapid climate change available, we have little to guide our estimations. Scientists do know the following. Climate determines the distributions of many species. Significant climate change has in the past and will in the future require many species to shift their ranges. Species vary in their ability and opportunities to adapt or migrate. The rate of projected change is enough to threaten seriously the survival of many species. Pollution and human alteration of the landscape have reduced considerably the ability of plant and animal communities to adjust to rapid climate change. Ecosystems will experience a rate of sustained climate change that is unusually rapid and, for many areas, unprecedented during the past 10,000 years. The more rapid that rate, the more vulnerable to damage ecosystems will be.

We are performing a global experiment on our natural ecosystems for which we have little information to guide us. While plant and animal communities may be able to eventually adapt to a stable climate system that is warmer than the existing one, many species may not be able to survive a rapid transition to that new climate. The prudent course would be to limit climate change to the lowest rates feasible given current atmospheric accumulations of greenhouse gases. These correspond to global rates of warming of no more than 1 degree C per century.

(1) *Climate Change 1995 - Impacts, Adaptations and Mitigation of Climate Change: Scientific-Technical Analyses*. Contribution of Working Group II to the Second Assessment Report of the Intergovernmental Panel on Climate Change. Editors R.T. Watson, M.C. Zinyowera, R.H. Moss. Cambridge University Press, p. 21.

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ECONOMISTS' STATEMENT ON CLIMATE CHANGE

*Endorsed by Over 2000 Economists
including six Nobel Laureates*

I. The review conducted by a distinguished international panel of scientists under the auspices of the Intergovernmental Panel on Climate Change has determined that "the balance of evidence suggests a discernible human influence on global climate." As economists, we believe that global climate change carries with it significant environmental, economic, social, and geopolitical risks, and that preventive steps are justified.

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

III. The most efficient approach to slowing climate change is through market-based policies. In order for the world to achieve its climatic objectives at minimum cost, a cooperative approach among nations is required—such as an international emissions trading agreement. The United States and other nations can most efficiently implement their climate policies through market mechanisms, such as carbon taxes or the auction of emissions permits. The revenues generated from such policies can effectively be used to reduce the deficit or to lower existing taxes.

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Statement of Environmental Commitment by the Insurance Industry

Preamble

The insurance industry recognizes that economic development needs to be compatible with human welfare and a healthy environment. To ignore this is to risk increasing social, environmental and financial costs. Our Industry plays an important role in managing and reducing environmental risk, in conjunction with governments, individuals and organizations. We are committed to work together to address key issues such as pollution reduction, the efficient use of resources, and climate change. We endeavour to identify realistic, sustainable solutions.

1. General Principles of Sustainable Development

1.1 We regard sustainable development, defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs, as a fundamental aspect of sound business management.

1.2 We believe that sustainable development is best achieved by allowing markets to work within an appropriate framework of cost efficient regulations and economic instruments. Government has a leadership role in establishing and enforcing long term priorities and values.

1.3 We regard a strong, proactive insurance industry as an important contributor to sustainable development, through its interaction with other economic sectors and consumers.

1.4 We believe that the existing skills and techniques of our industry in understanding uncertainty, identifying and quantifying risk, and responding to risk, are core strengths in managing environmental problems.

1.5 We recognize the precautionary principle, in that it is not possible to quantify some concerns sufficiently, nor indeed to reconcile all impacts in purely financial terms. Research is needed to reduce uncertainty but cannot eliminate it entirely.

2. Environmental Management

2.1 We will reinforce the attention given to environmental risks in our core activities. These activities include risk management, loss prevention, product design, claims handling and asset management.

2.2 We are committed to manage internal operations and physical assets under our control in a manner that reflects environmental considerations.

2.3 We will periodically review our management practices, to integrate relevant developments of environmental management in our planning, marketing, employee communications and training as well as our other core activities.

2.4 We encourage research in these and related issues. Responses to environmental issues can vary in effectiveness and cost. We encourage research that identifies creative and effective solutions.

2.5 We support insurance products and services that promote sound environmental practice through measures such as loss prevention and contract terms and conditions. While satisfying requirements for security and profitability, we will seek to include environmental considerations in our asset management.

2.6 We will conduct regular internal environmental reviews, and will seek to create measurable environmental goals and standards.

2.7 We shall comply with all applicable local, national and international environmental regulations. Beyond compliance, we will strive to develop and adopt best practices in environmental management. We will support our clients, partners and suppliers to do likewise.

3. Public Awareness and Communications

3.1 Bearing in mind commercial confidence, we are committed to share relevant information with our stakeholders, including clients, intermediaries, shareholders, employees and regulators. By doing so we will improve society's response to environmental challenges.

3.2 Through dialogue with public authorities and other bodies we aim to contribute to the creation of a more effective framework for sustainable development.

3.3 We will work with the United Nations Environment Programme to further the principles and goals of this Statement, and look for UNEP's active support.

3.4 We will encourage other insurance institutions to support this Statement. We are committed to share with them our experiences and knowledge in order to extend best practices.

3.5 We will actively communicate our environmental activities to the public, review the success of this Statement periodically, and we expect all signatories to make real progress.

Steering Committee for the UNEP Insurance Industry Initiative:

General Accident, Perth, United Kingdom.

Gerling-Konzern Globale, Cologne, Germany.

N.P.I., London, United Kingdom.

Swiss Re, Zurich, Switzerland.

Sumitomo Marine & Fire, Tokyo, Japan.

Uni Storebrand, Oslo, Norway.

United Nations Environment Programme, Geneva, Switzerland.

UNEP INSURANCE INITIATIVE
POSITION PAPER ON CLIMATE CHANGE - 9TH JULY 1996

(1) PREAMBLE

1.1 The property insurance industry is the financial sector most likely to be directly affected by climate change, since it is vulnerable to variability in the frequency and severity of extreme weather events. Life insurance and pension fund investment portfolios are also likely to be affected.

1.2 The cost of such events could escalate dramatically as a consequence of the increased greenhouse effect due to human activities. The resultant climate change may alter the frequency and/or severity of extreme weather events and/or their regional distribution. The exact influence is not yet known, due to the limitations of today's understanding of the climate system. It is clear, though, that even small shifts of regional climate zones and/or storm patterns carry the potential of increased property damage, exacerbated by inadequate planning and construction in certain areas.

1.3 The implication of climate change for other lines of insurance cannot be assessed with confidence but cannot be ignored. Changes in human health (e.g. spreading of diseases) may affect the life assurance and pension industries. Returns on long-term investments and capital projects may be affected by mitigation measures that alter the economics of whole industries - for example, shifting from carbon fuels to renewable sources. The economics of selected regions, such as coastal zones and islands, may be disadvantaged.

1.4 Through its experience in managing the risk of natural catastrophes, the insurance sector can help to improve the response to property damage from extreme events by co-operating with the relevant authorities.

1.5 It is anticipated that structural changes in energy-intensive industries in response to measures to control greenhouse gas emissions will result in opportunities and challenges for the investment community, including for example alternative energy, efficiency programmes, and public transit systems. However, without political initiatives, market forces alone may not result in the efficient use of investment potential.

(2) CONCLUSIONS

2.1 Based on the current status of climate research and on their experience as insurers and reinsurers, the member companies of the UNEP-Insurance Industry Initiative conclude that:

2.1.1 Human activity is already affecting climate on a global scale, e.g. through the enhanced greenhouse effect. According to IPCC "the balance of evidence suggests a discernable human influence on global climate"

2.1.2 Man made climate change will lead to shifts in atmospheric and oceanic circulation patterns. This will probably increase the likelihood of extreme weather events in certain areas. Such effects carry the risk of

dramatically increased property damage, with serious implications for property insurers and reinsurers.

2.1.3 Potentially there could be large implications for investment activities as society plans for, and adapts to, the new climate regime.

2.2 We are convinced that:

2.2.1 In dealing with climate change risks it is important to recognize the precautionary principle, in that it is not possible to quantify anticipated economic and social impacts of climate change fully before taking action. Research is needed to reduce uncertainty but cannot eliminate it entirely.

2.2.2 In the case of climate change risks, the most efficient precautionary measure is a substantial reduction of greenhouse gas emissions with respect to a 'business as usual' scenario of greenhouse gas emissions.

2.2.3 The problem of climate change can be counteracted only by the joint efforts of governments, political and social institutions, industrial and commercial enterprise [including insurers and reinsurers], and of all individuals. This requires an enhanced level of public discussion and international political agreement.

2.3 We insist that:

2.3.1 In accordance with the precautionary principle, the negotiations for the Framework Convention on Climate Change must achieve early, substantial reductions in greenhouse gas emissions.

2.3.2 The Framework Convention on Climate Change should urgently try to establish what concentration level and rate of increase of greenhouse gases is likely to be "dangerous", through further scientific research.

2.3.3 Mechanisms be created for direct inputs of NGOs [including business NGOs] to the negotiations, and for communicating the issues and decisions to all stakeholders.

2.3.4 The position of the insurance and reinsurance sector be represented when discussing or negotiating possible solutions.

2.3.5 A transparent framework of political, social and economic measures be established to promote sustainable development, taking into account the risks of climate change, and considerations of equity between emerging, transitional and mature economies, and over time.

This paper has been discussed and approved for publication by the members of the UNEP Insurance Industry Initiative as a contribution to the climate change debate. It does not claim to represent a unanimous view of UNEP I.I.I. members, nor does it in any way represent a UNEP position.

Status of the UNEP Statement of Environmental Commitment
by the Insurance Industry

30th October 1996

1. - Aachener Rückversicherungs, Germany
2. - Aachener und Münchener Versicherung, Germany
3. - AEGIS Insurance Company Ltd., South Africa
4. - Bangkok Insurance Public Company Limited, Thailand
5. - Basler Versicherungs-Gesellschaft, Switzerland
6. - Bayerische Beamten Versicherung AG, Germany
7. - CIGNA Insurance Company, Japan
8. - Daiichi Mutual Fire and Marine Insurance Company, Japan
9. - Delvag Luftfahrtversicherungs-AG, Germany
10. - Dominion of Canada General Insurance Company, Canada
11. - Elvia Versicherungen, Switzerland
12. - Employers Reinsurance Corporation, United States of America
13. - Folksam, Sweden
14. - La Fondiaria Assicurazioni S.p.A., Italy
15. - General Accident and Life Assurance Corporation, United Kingdom
16. - Gerling-Konzern, Germany
17. - Grupo Fortuna SA, Argentina
18. - Helvetia Patria Versicherungen, Switzerland
19. - Hyundai Marine and Fire Insurance Co.Ltd., South Korea
20. - Imperio S.A., Portugal
21. - Independent Insurance Company Ltd., United Kingdom
22. - Iron Trades Insurance Group, United Kingdom
23. - Istituto Nazionale delle Assicurazioni, Italy
24. - Ji Accident & Fire Insurance Co. Ltd., Japan
25. - Landesschadenhilfe Versicherung VaG, Germany
26. - Mannheimer Versicherungen, Germany
27. - MUSINI, Spain
28. - National Corporation of Tanzania Ltd., Tanzania
29. - National Insurance, New Zealand
30. - National Provident Institutions, United Kingdom
31. - NatWest Insurance Services, United Kingdom
32. - Nürnberger Allgemeine Versicherungen, Germany
33. - Overseas Union Insurance Limited, Singapore
34. - QBE Insurance Group Ltd., Australia
35. - Rentenanstalt/Swiss Life, Switzerland
36. - Rheinland Versicherungen, Germany
37. - Riunione Adriatica di Sicurtà, Italy
38. - R&V Versicherungsgruppe, Germany
39. - Schweizerische Mobiliar, Switzerland
40. - Sibrosso Insurance Co., Russia
41. - Skandia Insurance Company Ltd., Sweden
42. - Sovereign Assurance, New Zealand
43. - Stuttgarter Allgemeine Versicherung, Germany
44. - Stuttgarter Lebensversicherung AG, Germany
45. - Sumitomo Marine & Fire Insurance Co., Japan
46. - Sumitomo Marine & Fire Insurance Co.(Europe)Ltd, United Kingdom
47. - Sumitomo Marine & Pool Insurance, Indonesia

- 48. - Sumitomo Property & Casualty insurance Co.(Hong Kong) Ltd, Hong Kong
- 49. - Swiss-Reinsurance Company, Switzerland
- 50. - Swiss Union General Insurance Company, Switzerland
- 51. - Trygg-Hansa, Sweden
- 52. - Uni Storebrand, Norway
- 53. - Vaudoise Générale Compagnie d'Assurances, Switzerland
- 54. - Vereinte Versicherung AG, Germany
- 55. - Volksfürsorge Holding AG, Germany
- 56. - WASA Försäkring, Sweden
- 57. - Wiener Städtische Allgemeine, Austria
- 58. - Winterthur Versicherungen, Switzerland
- 59. - Württembergische Versicherung AG, Germany
- 60. - Yasuda Fire and Marine Insurance Co.Ltd., Japan
- 61. - Zurich Insurance Company, Switzerland

Climate Change Charges and Responses

A. Science

1. Claim that the climate is not changing
2. Claim that any climate changes are natural
3. Claim on the lack of scientific consensus
4. Claim that the uncertainty is too great to act
5. Claim that the climate models are inaccurate
6. Claim on misinterpretation of the IPCC
7. Claim on the validity of the IPCC
8. Claim on satellite vs. surface temperature readings
9. Claim that climate changes will be positive
10. Claim that we should simply adapt to climate change

B. Economics

1. Claim on insufficient economic analysis
2. Claim that any response will cost too much
3. Claim that Clinton plans will devastate the economy
4. Claim on American jobs moving overseas
5. Claim on economic impacts on the poor
6. Claim that massive long-term reductions are in store
7. Claim on new taxes
8. Claim that voluntary efforts are sufficient
9. Claim on the Argonne Lab study
10. Claim that emissions trading & JI are not realistic

C. Developing countries

1. Claim that developing countries are exempt
2. Claim that China/India should take equal steps to ours
3. Claim on the meaning of the Byrd Resolution
4. Claim on problems with the Berlin Mandate

D. Other

1. Claim that current actions are too little, too late
2. Claim that the policy is already decided
3. Claim on loss of sovereignty
4. Claim that the President is not serious
5. Claim on the European Union position

CLAIM THAT THE CLIMATE IS NOT CHANGING

CHARGE: *The climate has not warmed as many have claimed and as dire global warming theories would predict.*

FACT: **The climate is changing, and the effects can be felt here in the U.S.**

- In this century:
 - ⇒ **Surface temperature** is as warm or warmer than in any century since 1400 AD. (Source: IPCC, 1995)
 - ⇒ **Global average temperature** has risen by almost 1 degree F. (Source: IPCC, 1995)
 - ⇒ **Sea level** has risen 4-10 inches. (Source: IPCC, 1995)
 - ⇒ **Mountain glaciers** around the world are melting. For example, Glacier National Park has lost 70 percent of its glacial area since 1900.
 - ⇒ **In the U.S., total precipitation** has increased by 6 percent, while **intense precipitation events** (over 2 inches in a day) have increased by about 20 percent. (Source: NOAA)
- The last few decades have been the warmest this century. (Source: IPCC, 1995)
- The ten warmest years since 1900 have all occurred since 1980, with **1995 being the warmest year ever on record.** (Source: IPCC, 1995)
- From 1981 to 1991, high latitudes (between 45 and 70 degrees North) sustained a longer growing season, and an advance of up to seven days in “greening” in spring and summer. (Source: *Nature*, April 17, 1997)

“So I believe in my own mind and heart that something is happening out there. Something is happening. Something is happening to our climate.”

– Senator Robert Byrd, July 25, 1997

CLAIM THAT ANY CLIMATE CHANGES ARE NATURAL

CHARGE: *Any changes in the Earth's climate reflect natural variability, not human actions.*

FACT: **The scientific evidence is clear and compelling that human activity – notably the increasing use of fossil fuels – is altering the makeup of the atmosphere and is the likely culprit behind observed changes in the last century.**

- 2,600 of the world's leading scientists have endorsed the report of the Intergovernmental Panel on Climate Change (IPCC) which concludes, **"the balance of evidence suggests a discernible human influence on climate change."**
- Since 1860, roughly the start of the Industrial Revolution, carbon dioxide concentrations in the atmosphere have increased by 30 percent. Without specific policies to reduce the growth of these emissions, it is estimated that carbon dioxide concentrations will double from today's levels by 2100. This would result in the highest levels of CO₂ in the atmosphere in 50 million years. (Source: IPCC, 1995)
- During the same period, concentrations of other greenhouse gases have also risen substantially. Methane levels have more than doubled while nitrous oxide concentrations have increased by 15 percent. (Source: IPCC, 1995)
- The magnitude, timing, and geographic pattern of recent temperature changes are unlike any ever seen in the natural record and track closely with models projecting the effects of human activities. (Source: IPCC, 1995)

What is the IPCC?

The Intergovernmental Panel on Climate Change (IPCC) was established by the United Nations Environment Programme and the World Meteorological Association in 1988. It relies upon the work of some 2,000 of the world's leading scientific experts from more than 60 countries.

The IPCC is the authoritative scientific and technical body assessing climate change. It synthesizes information on the scientific and technical literature related to all significant components of the issue, provides the scientific underpinnings for understanding global climate change, and functions as the official advisory body to the world's governments on the state of the science.

CLAIM ON THE LACK OF SCIENTIFIC CONSENSUS

CHARGE: *Proponents of climate change theory have their own scientists. Skeptics have theirs. For the average person, there is no detectable consensus that we have a problem.*

FACT: **The scientific consensus that human induced climate change is occurring is overwhelming. Those who disagree represent a tiny fraction of the scientific community.**

- The Intergovernmental Panel on Climate Change (IPCC), the authoritative international scientific body on this subject, has concluded that climate change is occurring, that “the balance of evidence suggests a discernible human influence on global climate,” and that as greenhouse gas concentrations increase in the atmosphere additional, largely disruptive, disturbances are likely.
- In reaching its conclusions, the IPCC relied upon the preparation and review of documents by some 2,000 of the world’s leading experts on climate change and its consequences from some 60 nations.
- Criticism of the IPCC’s work comes from a tiny band of skeptics.
- In many cases, these skeptics are supported by energy industry groups that are opposed to any further action to address climate change.

“There is no debate among any statures scientists of what is happening... The only debate is the rate at which it's happening... Scientists, by nature, are very conservative... They don't want to overstate things. In this debate, the skeptics are atypical of the general scientific community. The irony is that when you find scientists who are adamant on any side, they look very curious within the scientific community. But to the general public, they come across as the most knowledgeable and authoritative of all.”

-- Harvard University earth scientist James McCarthy, The Washington Post, 5/25/97

CLAIM THAT THE UNCERTAINTY IS TOO GREAT TO ACT

CHARGE: *Enormous uncertainty exists about the probable level of future warming, and any meaningful action should wait until the science is better understood.*

FACT: **Climate change has been studied perhaps as much as any other environmental problem in history, and, while uncertainties remain, the imperative for action is clear.**

- If we continue on a “business as usual” path for the next century, we can expect an additional rise in temperature of between 2.0-6.5 degrees F. This would represent a faster rate of warming than at any time in the last 10,000 years. (Source: IPCC, 1995) According to the IPCC, the impacts are likely to include:
 - ⇒ **Human health** – increased fatalities from heat stress of the kind that killed 465 in Chicago in 1995 and an expansion of the range of diseases like malaria and dengue fever.
 - ⇒ **Extreme weather** – increased frequency and intensity of floods and droughts.
 - ⇒ **Sea level rise** – a “best guess” estimate of 20 inches by 2100 would inundate 7,000 square miles of the United States, threatening in particular Florida and the Gulf Coast.
 - ⇒ **Agricultural impacts** – regional shifts in food productivity, with decreases in food production in many of the world’s poorest regions.
 - ⇒ **Natural ecosystems** – the climatic zone for certain forest types will shift faster than many species can migrate. The Northeast, for example, may lose its beech trees and sugar maples.
- Uncertainty is also a two-sided coin. More than 2,000 scientists believe that, “Effects of the disruption of climate are sufficiently complicated that it is appropriate to assume there will be effects not now anticipated.” (Source: Scientists Statement on Global Climatic Disruption, June 1997) Considering that CO₂ remains in the atmosphere for long periods, the time to begin taking sensible actions is now.

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

-- John Browne, Group Chief Executive, British Petroleum

CLAIM THAT THE CLIMATE MODELS ARE INACCURATE

CHARGE: *Climate models cannot be trusted to provide accurate predictions of future climate changes. The climate system is simply too complex. These models are no more useful than the economic models which the Administration admits cannot accurately represent the costs of taking action.*

FACT: **Climate models have proved highly accurate in providing insight into how the Earth's climate system works.**

- Climate models are based on fundamental physical and thermodynamic laws. The processes that determine temperature, winds, and pressure, and their distribution over the planet, are quite well understood and, to a large extent, their global scale influences can be represented in the climate models.
- Climate models are largely self-consistent, responsive to changes in physical and chemical parameters (like the carbon dioxide concentration) and effective in giving indications of how the weather and climate will change as a result of human influences.
- Economic models are fundamentally based on rules derived from observed social and economic behavior, which are generally not universal and may change over time.
- When tested against the historical climate record, the most recent general circulation climate models tend to *underestimate* changes, suggesting that predictions of future changes may be conservative rather than overstated, as charged by many skeptics.
- Still, modeling future climate changes as many as 100 years into the future is highly complex, and uncertainties do exist. In the IPCC estimates of climate change by the year 2100, uncertainties in the scenarios of human activities and uncertainties in the responsiveness of the climatic system to changes in atmospheric concentration contributed about equally to the range of predicted temperature increases.
- The U.S. spends about \$1.8 billion annually on global change research. This effort already has and will continue to vastly improve our understanding of climate change and the tools for predicting future climatic responses.

CLAIM ON MISINTERPRETATION OF THE IPCC

CHARGE: *The level of certainty attributed to the conclusions of the Intergovernmental Panel on Climate Change (IPCC) has been overstated. The IPCC has not in fact determined that humans are influencing the climate system.*

FACT: **In the Summary for Policymakers of the IPCC's Second Assessment Report, the scientists clearly conclude that "the balance of evidence suggests a discernible human influence on global climate."**

- While few things in science are absolutely certain, the IPCC suggests that the sum of evidence makes it virtually impossible to conclude that observed warming over the past century is primarily a natural phenomenon. (Source: IPCC, 1995)
- Even more important, the IPCC report concludes that we are only in the early stages of seeing the effects from human-induced warming. As concentrations of greenhouse gases continue to rise in the next century, the resulting disruption of the climate will become more and more noticeable. (Source: IPCC, 1995)

"It would be unfortunate if the current debate over this ultimately transitory issue [the statistical uncertainties in the detection of anthropogenic climate change] should distract from the far more serious problem of the long-term evolution of global warming once the signal has been unequivocally detected above the background noise."

– Klaus Hasselmann, *Science*, 9 May 1997

CLAIM ON THE VALIDITY OF THE IPCC

CHARGE: *The IPCC is not the authoritative scientific body it has been made out to be. Many of its key conclusions are the work of selective rewriting that has hidden the range of uncertainty that exists within its ranks.*

FACT: **The overall IPCC report is based on the contributions of over 2,000 of the best scientists in the world. Its conclusions, including the statement suggesting a human influence on climate, reflect the consensus view of the expert scientists in each area of study.**

- The IPCC report translates key scientific conclusions and findings into the best available guidance for policymakers. While the report makes it abundantly clear that many detailed uncertainties remain in the scientific understanding of climate change, the main findings are clearly stated and widely agreed to.
- The IPCC report has been unanimously approved by over 100 governments, each of which asked its best scientists to contribute to and review it.
- Allegations that key parts of the IPCC Second Assessment Report were changed at the last minute to hide scientific uncertainties are entirely unfounded. Modifications and editorial changes were made to the final draft to reduce repetition and clarify the agreed views of the scientists concerned.

CLAIM ON SATELLITE VS. SURFACE TEMPERATURE READINGS

CHARGE: *While surface measurements may in fact show some recent warming, far more accurate satellite measurements reflect a slight cooling over the same period.*

FACT: **While differences exist, both the satellite and surface records indicate that human activities are having a warming influence.**

- Satellite and surface observations measure different aspects of global temperature, and both techniques are influenced by a range of different factors.
- Surface measurements show a clear warming in both the Northern and Southern Hemispheres over the past century. The consistency of these measurements across wide geographic regions eliminates the possibility of their being influenced by urban heat islands or other localized factors.
- At the higher altitudes where the satellites measure, the wide range of temperature fluctuations and the relatively short record make it difficult to separate the human-induced warming trend from normal climate variability. However, when natural variations are taken into account, an underlying global warming trend in the satellite record that is roughly consistent with model predictions is evident.
- While there are very strong indications of the human influence on climate, continued research efforts are needed to further reduce uncertainties and to detect potential surprises that may emerge.

CLAIM THAT CLIMATE CHANGES WILL BE POSITIVE

CHARGE: *If man-made climate changes do occur, they are likely on balance to be positive.*

FACT: This is entirely incorrect. The projected impacts of increased climate change are overwhelmingly negative, affecting human health, food security, water resources, coastal areas, and natural ecosystems.

- The impacts of climate change will vary greatly from region to region, and it is difficult today to say with certainty how and when any given region will be affected. Nevertheless, we can make some fairly safe broad predictions.
- Certain regions may experience benefits from climate change. For example, in areas where it is now too cold for agriculture, climate change may lengthen the growing season. Furthermore, increased carbon dioxide concentrations in the atmosphere may stimulate plant growth under certain conditions.
- In most areas, however, the impacts are likely to be highly negative. Consider the United States:
 - ⇒ In the arid West, changing precipitation patterns are likely to result in less snow accumulation at higher elevations. The corresponding reduction in summer runoff could have **disastrous impacts on agriculture and urban water supplies.**
 - ⇒ In the Midwest, increased heat and generally drier conditions could reduce soil moisture, **threatening agricultural production.**
 - ⇒ In the Southeast, rising sea levels could **flood large areas of low-lying coastal wetlands and estuaries**, while further exposing coastal communities to **damage from hurricanes and storm surges.**
 - ⇒ In the Northeast, increasing temperatures are predicted to **alter forest composition**, while changing ocean temperatures could force **shifts in traditional fisheries.**

"Global climatic change is probably the single most important issue facing the world today... If we don't do something about the climatic changes on a global level, we will see some changes that will alter the lifestyle of our children and grandchildren." -- Kaj Ahlmann, President, Employers Reinsurance Corp.

CLAIM THAT WE SHOULD SIMPLY ADAPT TO CLIMATE CHANGE

CHARGE: *The best way of coping with climate change is to adapt to it rather than to promote expensive policies which are unlikely to solve the problem anyway.*

FACT: **Some adaptation is inevitable, as even the world's strongest effort cannot avert at least a certain level of human-induced warming. Unchecked global warming, however, has the potential to impose almost unthinkable economic, environmental, and social costs on the United States and the world.**

- Societies everywhere depend on the climates they have known for centuries.
 - ⇒ For example, Africa, India, and China depend entirely on the timing of heavy seasonal rains for their agricultural production.
 - ⇒ Cities and communities around the world, particularly in arid regions, need recurring rains to fill reservoirs, rivers, and groundwater aquifers.
- Predicted climate disruptions could threaten these precipitation patterns, with severe consequences for hundreds of millions of people who depend on them.
- Arguably, the most devastating effects of climate change will occur in the developing world where most countries are ill-equipped to take even basic adaptation measures.
- Responding to natural disasters is a hugely expensive undertaking in the United States. In 1996 alone, five weather-related disasters – from drought in the Southern Plains to flooding in the Pacific Northwest – did an estimated \$16 billion worth of damage. (Source: NOAA) These costs are likely to escalate as climate change brings more extreme weather events and sea level rise.
- Over 2,300 economists, including six Nobel Laureates, have argued that responding to climate change is justified and that sensible measures can be taken that will not negatively affect the U.S. economy and may, over the long run, strengthen it. (Source: 1/97 Economists Statement on Climate Change)

CLAIM ON INSUFFICIENT ECONOMIC ANALYSIS

CHARGE: *The Administration has not done sufficient analysis to understand what a treaty that binds us to specific emissions reductions could mean for the domestic economy.*

FACT: **The Administration has carefully examined a range of economic models and emissions reduction scenarios to look at possible effects on the economy of meaningful actions to address climate change.**

- Our review of the economic literature clearly indicates that there are sensible steps that can be taken to slow climate change without causing damage to the economy. This conclusion has been validated by over 2,300 economists.
(Source: 1/97 Economists Statement on Climate Change)
- The long-term nature and range of variables inherent in economic modeling on climate change make it impossible to reliably estimate the exact costs of tackling the problem. We can come up with a range of economic impacts but not with a precise cost.
- Several broad conclusions are almost universally agreed:
 - ⇒ **flexibility matters** – taking advantage of market-based options such as emissions trading and joint implementation can make an enormous difference in lowering the cost of emissions reductions.
 - ⇒ **technology is vital** – the speed at which new technologies can be developed and deployed that improve energy efficiency and increase reliance on renewable energy sources, will play a major role in determining the costs of needed emissions reductions
 - ⇒ **all countries must participate** – developed and developing countries must both be part of the process if environmental gains are to be achieved, if a level playing field is to be created, and if American competitiveness is to be preserved.
- U.S. climate change policy under President Clinton has consistently emphasized these points.
- Before specific emissions reduction policies are chosen, the President has committed to engaging the American people and listening to a wide range of interests to ensure that the most sensible options are selected.

CLAIM THAT ANY RESPONSE WILL COST TOO MUCH

CHARGE: *Any serious effort to confront climate change would inevitably wreak havoc on the American economy.*

FACT: **More than 2,300 of the nation's top economists, including six Nobel Laureates, disagree emphatically.**

- "For the United States, in particular, sound economic analysis shows that there are policy options that would slow climate change without harming American living standards, and these measures may in fact improve U.S. productivity in the longer run." (Source: 1/97 Economists Statement on Climate Change)
- Despite claims to the contrary, taking steps to protect the environment need not jeopardize economic progress. Numerous studies have shown "that there is little to document the view that environmental regulations have had a measurably adverse effect on competitiveness." [Sources: Jaffe, Peterson, Portney, and Stavins, "Environmental Regulation and International Competitiveness: What Does the Evidence Tell Us?" Resources for the Future, Discussion Paper 94-08; Also see Palmer, Oates, and Portney, "Tightening Environmental Standards: The Benefit-Cost of the No-Cost Paradigm?" *Journal of Economic Perspectives* 9 (1995), 119-132; and Daniel Esty, *Greening the GATT* (Institute for International Economics, 1994).]
- The United States has taken the lead in proposing market-oriented policies to ensure that emissions reductions are achieved as efficiently and cost-effectively as possible. These include the trading of emissions and the opportunity to conduct joint projects with other countries to reduce emissions.
- President Clinton has made it clear that he will not propose specific levels of emissions reductions without ensuring that they can be attained consistent with continued economic prosperity.
- Revitalizing the American economy has been, and will continue to be, the President's top priority. His leadership has brought strong growth, low unemployment and inflation, and millions of new jobs. He is demonstrating on this issue, as he has on many others, that economic growth and environmental protection go best when they go hand in hand.

"I have devoted my passion and the best ideas I could come up with to try to get this country in good shape economically and socially. But I do believe it is folly for us to believe that we can go into the next century without a strategy that says we're going to be responsible and we're going to do our part and lead the world on environmental issues... Let's find a way to preserve the environment, to meet our international responsibilities, to meet our responsibilities to our children, and grow the economy at the same time." -- President Clinton

CLAIM THAT CLINTON PLANS WILL DEVASTATE THE ECONOMY

CHARGE: *The Administration's plans on climate change would devastate the U.S. economy. By some estimates, they would increase U.S. unemployment by 0.25 percent and reduce the GDP by 3.3 percent, costing 250,000 American jobs.*

FACT: **These are groundless assertions.**

- There is no "Clinton plan" yet. The Administration is examining a variety of scenarios and talking to a range of experts to determine how to achieve needed environmental benefits without sacrificing continued economic prosperity.
- Any policy that is chosen will be consistent with the President's commitment to sustaining a healthy and robust economy. Since President Clinton took office, the private sector of the economy has grown at more than twice the rate of the previous four years, business investment has boomed at a rate not seen since the Kennedy Administration, unemployment is as low as it has been in 24 years, and 12.9 million new jobs have been created. (Sources: Bureau of Economic Analysis, Department of Commerce; Bureau of Labor Statistics, Department of Labor)
- More than 2,300 economists believe that taking preventive steps to confront climate change is justified and that it is possible to do so without harming American living standards. In fact, they state that long-term productivity could be improved by such steps. (Source: 1/97 Economists Statement on Climate Change)
- Providing a definitive answer on how much it will cost to slow climate change is virtually impossible. Different economic models come up with different numbers based on different assumptions. Common sense dictates that the cost will depend on several broad factors, including the manner in which a policy is implemented and the speed at which the economy adapts.
- The Clinton Administration is committed to tackling climate change by maximizing efficiency and innovation. That means supporting market-based policies such as *emissions trading* and *joint implementation*, and it means making major investments in developing new energy technologies. The President is also resolved that *all* countries must take meaningful steps to address climate change. Otherwise, it will be impossible to solve the environmental problem and to ensure a level international playing field.
- Tackling climate change will entail costs to particular economic sectors, just as it is likely to create opportunities in others. No matter what specific emissions reduction policies are chosen, the Administration will work to ensure that such costs are minimized.

CLAIM ON AMERICAN JOBS MOVING OVERSEAS

CHARGE: *A global climate change treaty, particularly one without strong developing country commitments, would injure U.S. competitiveness and send jobs overseas.*

FACT: **Despite claims to the contrary, academic studies have generally found that taking steps to protect the environment need not lead to a deterioration in competitiveness. This is expected to be true with regard to climate change.**

- Non-tradeable sectors represent a substantial share of carbon emissions, with transportation and buildings accounting for roughly two-thirds of the U.S. total. For these sectors, competitiveness seems largely like a non-issue.
- For most industries, energy costs are too small relative to other factors – such as labor costs, productivity, and infrastructure – to affect plant locations or trade flows. Energy costs for manufacturing industries in the United States, for example, average only roughly 2.2 percent of total costs. (Source: 1995 Annual Census of Manufacturers)
- For several industries – accounting for perhaps 2 to 3 percent of total industrial output – energy costs *are* a significant share of total costs. This is particularly true for primary aluminum production (21.4 percent), hydraulic cement (20.5 percent), and inorganic chemicals (13.7 percent). It also includes industries such as pulp and paper and steel. The impact of climate policies on these industries will depend on how such policies are implemented.

FACT: **The United States has led the world in its call for developing country obligations in any new treaty on climate change. We will not sign any agreement that leaves developing countries out of the equation.**

- It must be recognized that developing countries cannot at the outset be expected to shoulder the same commitments we do. Their contributions to global emissions are far less than ours, as are their emissions on a per capita basis. Our responsibility must be to devise sensible and meaningful steps that developing countries can take now, while reaching agreement that the obligations of such countries will increase over time.
- Addressing climate change also has the potential to provide opportunities for American business. Today the global market for environmental technologies is worth some \$4 billion annually. As countries work to increase energy efficiency and reduce their reliance on fossil fuels, this market is likely to grow dramatically. By investing in the development of such technologies, the U.S. can lead the world in marketing solutions to the climate change problem.

CLAIM ON ECONOMIC IMPACTS ON THE POOR

CHARGE: *Lower income Americans, specifically those just coming off the welfare rolls, would be particularly hard-hit by any effort to address climate change as they would be forced to pay more for heating, cooling, and transportation.*

FACT: **The President is not going to support policies that disproportionately affect lower income Americans.**

- No specific policies for attaining further emissions reductions have been decided. And they will not be decided until the President has heard from the American people and developed an approach that protects the environment, ensures continued economic prosperity, and guarantees fairness in distributing the costs.
- Since taking office, the President's top priority has been sustaining a healthy and robust economy. In the past four and a half years, the private sector of the economy has grown at more than twice the rate of the previous four years, business investment has boomed at a rate not seen since the Kennedy Administration, unemployment is as low as it has been in 24 years, and 12.9 million new jobs have been created. (Sources: Bureau of Economic Analysis, Department of Commerce; Bureau of Labor Statistics, Department of Labor)
- The substantive economic literature on climate change indicates that a number of ways exist to achieve substantial reductions in U.S. emissions without imposing severe economic costs.

CLAIM THAT MASSIVE LONG-TERM REDUCTIONS ARE IN STORE

CHARGE: *At least one Administration official has suggested that solving this problem means eventually reducing our consumption of fossil fuels by 70%. Such a goal is unattainable, and efforts to reach it are destined to cause major economic disruption.*

FACT: **The Administration has not settled on any specific emissions reduction target, either medium-term binding limits to be negotiated in Kyoto or a longer-term objective.**

- Solving climate change is a long-term proposition that will require a progressive series of steps over a sustained period.
- The Administration is not about to propose Draconian measures that would needlessly jolt the economy or diminish American living standards. Any policy that is chosen will be consistent with the President's commitment to sustaining a healthy and robust economy. Since President Clinton took office, the private sector of the economy has grown at more than twice the rate of the previous four years, business investment has boomed at a rate not seen since the Kennedy Administration, unemployment is as low as it has been in 24 years, and 12.9 million new jobs have been created. (Sources: Bureau of Economic Analysis, Department of Commerce; Bureau of Labor Statistics, Department of Labor)
- It is true that over the long-term the only way to address climate change responsibly is to substantially reduce our emissions of greenhouse gases. Otherwise it would not be possible to stabilize concentrations of these gases in the atmosphere at a safe level.
- The key to these reductions will be the development and deployment of new technologies that use energy far more efficiently and that emphasize renewable energy sources.
- Our challenge today is to make the right kinds of investments to encourage these technologies, so that substantial emissions reductions can be achieved down the road with minimal economic cost.

CLAIM ON NEW TAXES

CHARGE: *The Administration proposal is really about more taxes. Solving climate change would mean major tax increases for gas, oil, etc.*

FACT: **The Administration does not believe that new taxes are the best approach for solving the problem. Instead, we prefer the use of market-based mechanisms that encourage innovation and efficiency.**

- Energy taxes or carbon taxes of some kind are clearly one of a number of options that could stimulate a reduction in U.S. greenhouse gas emissions. Accordingly, a wide range of economists have speculated on what levels of new taxes could be imposed to generate given levels of emission reductions.
- The Administration has not endorsed any energy or carbon tax proposal to address climate change. Instead, the President has focused on concepts such as emissions trading and joint implementation which can bring about substantial reductions without the imposition of new taxes.
- The President has also demonstrated a commitment to investing in tomorrow's technologies to stimulate the kind of innovation and efficiency that will be vital if we are to achieve serious emissions reductions over the long-term.
- Furthermore, through the President's 1993 **Climate Change Action Plan (CCAP)**, it has been shown that meaningful emissions reductions can be achieved through voluntary partnerships between government and industry. By 2000, it is estimated that CCAP programs will have provided 76 million metric tons of CO₂ reductions. This is true even Congress has cut funding for CCAP programs 40 percent below requested levels in recent years.

CLAIM THAT VOLUNTARY PROGRAMS ARE SUFFICIENT

CHARGE: *Voluntary actions, not binding limits and more government regulation, are the best way to obtain meaningful emissions reductions cost effectively.*

FACT: **Voluntary actions are an important component in any plan to reduce emissions, but on their own are not sufficient to produce the needed environmental benefits.**

- Voluntary programs under the President's 1993 Climate Change Action Plan will have provided a 76 million metric ton reduction of carbon equivalent by 2000. (Source: U.S. Climate Action Report, 1997) This is an important down payment on our national effort to reduce greenhouse gas emissions.
- Nevertheless, the U.S. will fail to meet the Rio goal (agreed to by President Bush and ratified by the Senate) of reducing emissions to 1990 levels by the year 2000. (Source: U.S. Climate Action Report, 1997) Most other industrialized nations will likewise fail to do so.
- In light of this, and of the mounting scientific evidence on the seriousness of the problem, it is clear that the U.S. and other nations must do more.
- The President has committed to the concept of binding emissions limits to be achieved using market-oriented policies. Such policies, including *emissions trading* and *joint implementation*, promise to substantially lower the cost of obtaining emissions reductions.
- The concept of emissions trading is already being used successfully in the U.S. to reduce emissions of sulfur dioxide, the primary culprit in causing acid rain.

CLAIM ON THE ARGONNE LAB STUDY

CHARGE: *A study by the Department of Energy's Argonne Lab predicts major economic disruption to key U.S. industries from a new climate change treaty.*

FACT: **While it provides some valuable information, the Argonne Lab study does not take into account key policies being advocated by the Clinton Administration that will substantially reduce the cost of emissions reductions.**

- The Argonne Lab study examined the possible effects of a set of hypothetical fuel price increases on six energy intensive industries that are subject to significant foreign competition: basic chemicals, iron and steel, petroleum refining, paper and allied products, aluminum, and cement.
- Overall, the participants reported negative impacts on the six industries, predicting reductions in output and employment and an increasing share of the respective markets for developing countries. They also speculated that some industries would build new plants in developing countries, while others would increase the utilization of existing facilities already located in these areas.
- Significantly, the study's conclusions are predicated on specific energy price scenarios that do not reflect the potential impact of multi-year emissions budgets, international emissions trading, joint implementation, and other fundamental aspects of the U.S. negotiating position on climate change. Neither do they factor in the U.S.'s firm commitment to secure meaningful obligations from developing countries. Taken together, these policies will substantially lower the costs of reducing U.S. emissions.
- In the Administration's view, the Argonne study points to important economic risks in key industrial sectors from certain climate change policies and underscores the critical need for flexibility in securing emissions reductions.

CLAIM THAT EMISSIONS TRADING & JI ARE NOT REALISTIC

CHARGE: *Key elements of the U.S. proposal, namely emissions trading and joint implementation, are unworkable and would cost a fortune to monitor effectively.*

FACT: **Emissions trading and joint implementation represent the best way to use market forces to obtain the greatest emissions reductions at the least cost.**

- *Emissions trading* involves placing a cap on total carbon emissions and allowing the trading of emissions permits between entities. The U.S. envisions domestic trading of emissions between U.S. companies as well as a mechanism to provide for international trading.
- Emissions trading has been used very successfully in the U.S. to reduce the sulfur dioxide emissions that cause acid rain. Since trading became effective in 1995, SO₂ emissions have been reduced substantially below the allowable cap at costs well below what was expected.
- *Joint implementation* refers to cooperative efforts between countries or entities within them to reduce net greenhouse gas emissions. In addition to offering significant potential to combat climate change in a highly cost-effective way, JI projects promote sustainable development, encourage private sector investment in developing countries, and provide local health, environmental, and economic benefits.
- Through the U.S. Initiative on Joint Implementation (USIJI), a part of the President's Climate Change Action Plan, the U.S. has proven the effectiveness of joint implementation in achieving measurable emissions reductions.
- Since 1994, USIJI has accepted 25 projects in eleven countries. These projects apply a variety of technologies and practices, including wind, geothermal, hydroelectric, and solar energy; coal to natural gas fuel switching, methane gas capture; and sustainable forest management and preservation.
(Source: U.S. Climate Action Report, 1997)

Joint Implementation Case Study – The Czech Republic: *The City of Decin in the Czech Republic supplies both heat and potable hot water to local apartment blocks. This project has converted the district heating plant from coal to natural gas. A cogeneration facility has also been built to provide steam and electricity. USIJI partners include the City of Decin, Center for Clean Air Policy, Wisconsin Electric Power Company, Commonwealth Edison Company, and NIPSCO Development Company. (Source: U.S. Climate Action Report, 1997)*

CLAIM THAT DEVELOPING COUNTRIES ARE EXEMPT

CHARGE: *The U.S. position in the climate negotiations would force developed countries to accept binding emissions targets while giving developing nations a free ride.*

FACT: **This is simply not true.**

- The United States has consistently maintained that meaningful obligations from developing countries must be a cornerstone of any treaty we would sign.
- The Framework Convention on Climate Change, signed by President Bush in 1992 and ratified by the Senate, recognizes that developed and developing nations have different capabilities and responsibilities to reduce emissions. This reflects the reality that developed nations today emit the vast majority of greenhouse gases and also have the greatest capacity for emissions reductions.
- Any new climate agreement must likewise recognize these differences. Nevertheless, it is clear that as the emissions from nations like China and India increase over time, so too must the obligations of those nations.
- The current U.S. proposal has three specific elements relating to developing country commitments. They go far beyond what others have put forward in the negotiations and are designed to ensure that these countries take serious steps today while agreeing that their obligations will increase with time.
 - ⇒ First, the U.S. calls on all Convention Parties to take a series of **specific actions to mitigate their emissions and report on their activities.**
 - ⇒ Second, the U.S. proposes that the **more advanced developing country economies accept binding targets today** (i.e. those seeking admittance to the OECD).
 - ⇒ Third, the U.S. stipulates that **all developing nations should agree to binding targets by the year 2005.**
- Another key aspect of our proposal is the concept of *joint implementation*, by which American companies would receive credit for undertaking projects in the developing world to reduce emissions.
- In working to develop a more specific policy, the U.S. will also consider, as appropriate, further initiatives, including on developing countries.

CLAIM THAT CHINA/INDIA SHOULD TAKE EQUAL STEPS TO OURS

CHARGE: *The U.S. should not agree to any international agreement unless China, India, and other developing nations take on the same level of commitment.*

FACT: **This is neither realistic nor equitable.**

- Climate change is a global issue, requiring a global response. We must, however, keep several facts in mind:
 - ⇒ **Developed countries have contributed 75 percent** of total greenhouse gas emissions since the beginning of the Industrial Revolution.
 - ⇒ With 4 percent of the world's population, the U.S. is **today responsible for over 20 percent** of worldwide emissions.
 - ⇒ Our per capita emissions are **more than eight times** that of China.
- For these reasons, China, India, and other developing nations cannot be expected to assume the same commitments as the United States in the initial stages of an effort to combat global warming. We must take the lead.
- Nevertheless, emissions from the developing world are likely to exceed those of the developed world by 2035 (though their contribution to atmospheric concentrations of such gases will not match ours until well after).
- Accordingly, the environmental problem cannot be solved if developing countries will not agree to participate meaningfully in a global agreement and to recognize that their commitments must increase over time.
- That is why the United States has made the involvement of developing countries a cornerstone of our position. Our proposal includes provisions for developing nations to take concrete steps to mitigate and report on their emissions. It calls for the more advanced nations, such as those seeking admittance to the OECD, to accept binding emissions targets. And it calls for a next negotiation by which all countries will accept binding targets by 2005.
- In working over the coming months to develop a more specific policy, the U.S. will also consider, as appropriate, further initiatives, including on developing countries.

CLAIM ON THE MEANING OF THE BYRD RESOLUTION

CHARGE: *The Byrd Resolution, passed by the Senate 95-0, is effectively a repudiation of the approach taken by the Administration in dealing with the developing country issue in the negotiations.*

FACT: **The Administration has consistently supported the thrust of the Byrd Resolution, namely that developing nations must commit to meaningful steps to address the problem of climate change.**

- The level of developing country commitments in any new climate change agreement is the most difficult issue in the international negotiations.
 - ⇒ **Developed nations have done by far the most to cause the problem,** and have basically failed to live up to their commitments to reduce emissions.
 - ⇒ **Developing countries are rapidly increasing their emissions,** and it is clear that climate change cannot be solved unless they take meaningful steps.
 - ⇒ **Complicating the issue is the importance of energy use** to every nation's economy, and the concern that imbalanced actions will result in a shift in economic strength.
- The United States has been pushing harder than any other Party for developing countries to take meaningful actions. Our proposal includes provisions for developing nations to take concrete steps to mitigate and report on their emissions. It calls for the more advanced nations, such as those seeking admittance to the OECD, to accept binding emissions targets. And it calls for a next negotiation by which all countries will accept binding targets by 2005.
- Any difference with the Senate is not over the *whether* of developing country commitments but instead over the *how* and the *when*. The President has committed to working intensively over the next few months to consult with the Congress, to further explain the Administration position, and to develop, as appropriate, further initiatives, including on developing countries.

CLAIM ON THE PROBLEMS WITH THE BERLIN MANDATE

CHARGE: *The Clinton Administration sealed our fate two years ago by agreeing to the Berlin Mandate which calls for stringent actions by industrialized nations while effectively exempting developing countries from further obligations.*

FACT: **The Clinton Administration has consistently taken the position that developing countries must take on meaningful obligations to limit their emissions.**

- The Berlin Mandate recognizes that developed and developing nations have different responsibilities and capabilities in reducing emissions. This principle was enshrined in the 1992 Framework Convention on Climate Change, signed by President Bush and ratified by the Senate.
- Current and historic emissions from the industrialized world far exceed those of the developing world. With 4 percent of the world's population, the U.S. alone is responsible for over 20 percent of global emissions. That is why we have a special responsibility to take the lead in addressing climate change.
- Developing country emissions are increasing fast and will overtake those from the industrialized world by 2035 (even though it will take another half century for their contribution to atmospheric concentrations of such gases to equal ours). It, therefore, is imperative that developing countries also start soon to take steps to reduce their emissions.
- The United States has been the world's leading proponent for developing countries to take meaningful actions. Our proposal includes provisions for developing nations to take concrete steps to mitigate and report on their emissions. It calls for the more advanced nations, such as those seeking admittance to the OECD, to accept binding emissions targets. And it calls for a next negotiation by which all countries will accept binding targets by 2005.
- The President has committed to working intensively over the next few months to consult with the Congress, to further explain the Administration position, and to develop, as appropriate, further initiatives, including on developing countries.

CLAIM THAT CURRENT ACTIONS ARE TOO LITTLE, TOO LATE

CHARGE: *The President's actions on this issue are too little, too late. He is trying to rush the U.S. into signing a treaty that cannot possibly be good for the American economy and that will have little chance of solving the environmental problem.*

FACT: **The United States will be prepared to go to Kyoto with a policy that protects the environment and ensures continued economic prosperity. We will not sign a treaty that does not accomplish these dual objectives.**

- The President believes the scientific evidence is clear and compelling that climate change is a real and serious threat and that we must begin taking meaningful actions to address it.
- At the same time, the President's top priority since being elected has been to restore the vitality of the American economy. And the results of his effort are clear: strong economic growth, unemployment at its lowest rate in a quarter century, 12.9 million new jobs, and low inflation.
- Whether in setting standards for clean air, improving the quality of drinking water, or protecting America's natural heritage, the President has proven that environmental protection and economic growth can go hand-in-hand. He is bringing the same philosophy to the issue of climate change.
- Over a year ago, the Administration proposed a framework for a Kyoto agreement that emphasizes environmental protection, flexible implementation, and global participation. We have been working ever since to refine this framework and to develop specific policies that support it.
- A large part of this effort has been soliciting the views of industry, environmentalists, Congress, and the American people. This outreach effort will culminate with a Presidential Conference on Climate Change in early October, the purpose of which is to help inform our climate change policy.
- When we go to Kyoto, it will be with a strong position that reflects the best interests of the environment, the economy, and the American people. The U.S. will not sign an agreement that fails to serve each of these interests.

CLAIM THAT THE POLICY IS ALREADY DECIDED

CHARGE: *The Administration has already locked in a policy on climate change without consulting Congress, industry, or the American people.*

FACT: Not true.

- The Clinton Administration *has not* decided on any specific policy related to levels of emissions reductions.
- The Clinton Administration *has* proposed a broad framework to guide the international negotiations aimed at reaching a new agreement to reduce emissions after the year 2000.
- This framework was developed after extensive consultations with industry, the environmental community, and other stakeholders. It reflects the compelling scientific evidence that climate change is a serious and growing problem, the fact that international actions to date have not been fully successful, and the need to achieve emissions reductions as cost-effectively as possible.
- The Administration is currently undertaking a major effort to develop specific policies on levels and timetables of emissions reductions and on mechanisms for achieving them. Throughout this process, the President and others in the Administration are actively soliciting the views of a wide range of outside groups.
- The goal of this effort is to develop a sensible, comprehensive U.S. position that protects the environment, ensures continued economic prosperity, and is in the overall best interests of the American people. The President has committed to developing such a position in time for the climate change negotiations in Kyoto this December.

CLAIM ON LOSS OF SOVEREIGNTY

CHARGE: *By signing an international treaty mandating reductions in greenhouse gases, the U.S. is ceding authority over domestic policy to the United Nations.*

FACT: **There is no truth to this assertion, whatsoever.**

- Any climate change treaty that the U.S. would agree to would be implemented at the national level. While certain other nations have called for internationally standardized policies and measures to reduce emissions, the United States has made clear that such proposals are out of the question.
- The U.S. approach is to allow each country to take advantage of its own economic circumstances to fashion a response to climate change.
- While arguing that nations must accept binding emissions limits that are internationally agreed, the U.S. is pursuing policies that ensure maximum domestic flexibility in reaching such limits, including through the trading of emissions.
- And the President has made clear that any binding limits that are agreed to must not only produce needed environmental benefits but also must provide for continued economic growth.
- Any treaty that is signed would also, of course, require the advice and consent of the U.S. Senate.

CLAIM THAT THE PRESIDENT IS NOT SERIOUS

CHARGE: *The Administration's recent overtures on climate change reflect an attempt to make the President appear engaged, even though he hasn't done much on this issue.*

FACT: **The Clinton Administration has a strong record in confronting climate change.**

- In 1993, President Clinton developed the **Climate Change Action Plan (CCAP)** with the goal of returning total U.S. greenhouse gas emissions to their 1990 levels by 2000. Although lower-than-expected fuel prices and higher-than-expected economic growth and electricity demand have caused CCAP to fall short of its goal, its programs will result in a reduction of 76 million metric tons of carbon equivalent. (Source: U.S. Climate Action Report, 1997)
- Through almost 50 initiatives with a wide range of industry sectors, this effort has demonstrated that government and the private sector can work together successfully to cut emissions.
- Had the Congress not substantially cut funding for these programs (about 40% in recent years), they would have brought the U.S. closer to the objective of lowering emissions to 1990 levels by the year 2000.
- Additional initiatives, including the **Partnership for a New Generation of Vehicles** and the **Million Solar Roofs**, demonstrate the President's commitment to developing the technologies that will ultimately be needed to solve the climate change problem.

CLAIM ON THE EUROPEAN UNION POSITION

CHARGE: *The European Union has proposed an emissions target of 15 percent below 1990 levels by 2010. If they can make those kinds of cuts, why can't the U.S.?*

FACT: **The U.S. believes that the EU position is unrealistic and unnecessarily stringent. We will not support binding targets that cannot be achieved or that would impose undue costs on the economy.**

- The EU target represents a target for the block as a whole, not for each country. While some nations within the EU are to reduce their emissions, others will actually increase theirs. The ultimate goal is to have a total reduction of 15 percent below 1990 levels.
- Despite this "bubble" concept, the EU has not supported the proposals put forward by the U.S. to allow other nations to trade emissions, nor have they endorsed the concept of joint implementation.
- Amongst themselves, the EU has only been able to work out burden sharing that would take them to 10 percent below 1990 levels by 2010. Nevertheless, they still advocate a 15 percent cut in the negotiations.
- The EU favors a set of mandatory, harmonized policies and measures for reducing emissions. These include carbon taxes, energy efficiency standards, and other mechanisms.
- The U.S. has not seen evidence to convincingly demonstrate how the policies advanced by the EU, if indeed they could even succeed in putting them in place, would result in the kinds of emissions cuts they have advocated.
- The EU has been virtually silent on the issue of developing country commitments.
- The U.S. will not propose a target that we believe to be unrealistic or overly stringent. The Administration is carefully considering what level of cuts we would find acceptable. Furthermore, the U.S. will not sign an agreement that prescribes internationally mandated policies and measures for reducing emissions. We believe strongly that those decisions must be left to individual governments which should be given the widest range of options possible for attaining cuts cost-effectively. Lastly, the U.S. will not consider an agreement that exempts developing countries. This is neither environmentally nor economically justifiable.

Charge & response

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CLAIM ON AMERICAN JOBS MOVING OVERSEAS '13.

CHARGE: A global climate change treaty, particularly one without strong developing country commitments, would injure U.S. competitiveness and send jobs overseas.

FACT: Despite claims to the contrary, academic studies have generally found that taking steps to protect the environment need not lead to a deterioration in competitiveness. This is expected to be true with regard to climate change.

Need too much
knowledge
to understand
this

- Non-tradeable sectors represent a substantial share of carbon emissions, with transportation and buildings accounting for roughly two-thirds of the U.S. total. For these sectors, competitiveness seems largely like a non-issue.
- For most industries, energy costs are too small relative to other factors – such as labor costs, productivity, and infrastructure – to affect plant locations or trade flows. Energy costs for manufacturing industries in the United States, for example, average only roughly 2.2 percent of total costs. (Source: 1995 Annual Census of Manufacturers)
- For several industries – accounting for perhaps 2 to 3 percent of total industrial output – energy costs are a significant share of total costs. This is particularly true for primary aluminum production (21.4 percent), hydraulic cement (20.5 percent), and inorganic chemicals (13.7 percent). It also includes industries such as pulp and paper and steel. The impact of climate policies on these industries will depend on how such policies are implemented.

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FACT: The United States has led the world in its call for developing country obligations in any new treaty on climate change. We will not sign any agreement that leaves developing countries out of the equation.

- It must be recognized that developing countries cannot at the outset be expected to ~~shoulder~~ ^{take on} the same commitments we do. Their contributions to global emissions are far less than ours, as are their emissions on a per capita basis. Our responsibility must be to devise sensible and meaningful steps that developing countries can take now, while reaching agreement that the obligations of such countries will increase over time.
- Addressing climate change also has the potential to provide opportunities for American business. Today the global market for environmental technologies is worth some \$4 billion annually. As countries work to increase energy efficiency and reduce their reliance on fossil fuels, this market is likely to grow dramatically. By investing in the development of such technologies, the U.S. can lead the world in marketing solutions to the climate change problem.

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CLAIM ON ECONOMIC IMPACTS ON THE POOR

CHARGE: *Lower income Americans, specifically those just coming off the welfare rolls, would be particularly hard-hit by any effort to address climate change as they would be forced to pay more for heating, cooling, and transportation.*

FACT: **The President is not going to support policies that disproportionately affect lower income Americans.**

- No specific policies for attaining further emissions reductions have been decided. And they will not be decided until the President has heard from the American people and developed an approach that protects the environment, ensures continued economic prosperity, and guarantees fairness in distributing the costs.
- Since taking office, the President's top priority has been sustaining a healthy and robust economy. In the past four and a half years, the private sector of the economy has grown at more than twice the rate of the previous four years, business investment has boomed at a rate not seen since the Kennedy Administration, unemployment is as low as it has been in 24 years, and 12.9 million new jobs have been created. (Sources: Bureau of Economic Analysis, Department of Commerce; Bureau of Labor Statistics, Department of Labor)

- The substantive economic literature on climate change indicates that a number of ways exist to achieve substantial reductions in U.S. emissions without imposing severe economic costs.

Do the econ. letter

CLAIM THAT MASSIVE LONG-TERM REDUCTIONS ARE IN STORE

CHARGE: *At least one Administration official has suggested that solving this problem means eventually reducing our consumption of fossil fuels by 70%. Such a goal is unattainable, and efforts to reach it are destined to cause major economic disruption.*

FACT: **The Administration has not settled on any specific emissions reduction target, either medium-term binding limits to be negotiated in Kyoto or a longer-term objective.**

- Solving climate change is a long-term proposition that will require a progressive series of steps over a sustained period.
- ^{Pres -} The Administration is not about to propose ~~Draconian~~ measures that would needlessly jolt the economy or diminish American living standards. Any policy that is chosen will be consistent with the President's commitment to sustaining a healthy and robust economy. Since President Clinton took office, the private sector of the economy has grown at more than twice the rate of the previous four years, business investment has boomed at a rate not seen since the Kennedy Administration, unemployment is as low as it has been in 24 years, and 12.9 million new jobs have been created. (Sources: Bureau of Economic Analysis, Department of Commerce; Bureau of Labor Statistics, Department of Labor)
- It is true that over the long-term the only way to address climate change responsibly is to substantially reduce our emissions of greenhouse gases. Otherwise it would not be possible to stabilize concentrations of these gases in the atmosphere at a safe level.
- The key to these reductions will be the development and deployment of new technologies that use energy far more efficiently and that emphasize renewable energy sources.
- Our challenge today is to make the right kinds of investments to encourage these technologies, so that substantial emissions reductions can be achieved down the road with minimal economic cost. *we will be able to achieve steeper reductions without*

The important thing is to ~~begin~~ take strong ~~significant~~ realistic steps now to put the U.S. & the world ~~on~~ a path the current path is onto a ~~bad~~ path toward reduced emissions of ghg. In the future, if we have made

CLAIM ON NEW TAXES

CHARGE: *The Administration proposal is really about more taxes. Solving climate change would mean major tax increases for gas, oil, etc.*

FACT: **The Administration does not believe that new taxes are the best approach for solving the problem. Instead, we prefer the use of market-based mechanisms that encourage innovation and efficiency.**

- Energy taxes or carbon taxes of some kind are clearly one of a number of options that could stimulate a reduction in U.S. greenhouse gas emissions. Accordingly, a wide range of economists have speculated on what levels of new taxes could be imposed to generate given levels of emission reductions.
- The Administration has not endorsed any energy or carbon tax proposal to address climate change. Instead, the President has focused on concepts such as emissions trading and joint implementation which can bring about substantial reductions without the imposition of new taxes.
- The President has also demonstrated a commitment to investing in tomorrow's technologies to stimulate the kind of innovation and efficiency that will be vital if we are to achieve serious emissions reductions over the long-term.
- Furthermore, through the President's 1993 Climate Change Action Plan (CCAP), it has been shown that meaningful emissions reductions can be achieved through voluntary partnerships between government and industry. By 2000, it is estimated that CCAP programs will have provided 76 million metric tons of CO₂ reductions. This is true even Congress has cut funding for CCAP programs 40 percent below requested levels in recent years.

ok?
which has worked well in other contexts, such as acid rain

market based mechanisms

Adm has not proposed or suggested new taxes.

Some economists have argued that energy taxes of some sort -- including a revenue neutral tax to offset by a cut in other taxes -- could most effectively reduce ghg emissions. [source] But Adm has not endorsed this approach

CLAIM THAT VOLUNTARY PROGRAMS ARE SUFFICIENT

CHARGE: *Voluntary actions, not binding limits and more government regulation, are the best way to obtain meaningful emissions reductions cost effectively.*

FACT: Voluntary actions ^{can play} ^{part} are an important component in any plan to reduce emissions, but on their own are not sufficient to produce the needed environmental benefits. ^{are expected to yield}

- Voluntary programs under the President's 1993 Climate Change Action Plan will have provided a 76 million metric ton reduction of carbon equivalent by 2000. (Source: U.S. Climate Action Report, 1997) This is an important down payment on our national effort to reduce greenhouse gas emissions. ^{I thought only 15 million or 74 million}

Nevertheless, the U.S. will fail to meet the Rio goal (agreed to by President Bush and ratified by the Senate) of reducing emissions to 1990 levels by the year 2000. (Source: U.S. Climate Action Report, 1997) Most other industrialized nations will likewise fail to do so.

- In light of this, and of the mounting scientific evidence on the seriousness of the problem, it is clear that the U.S. and other nations must do more.
- The President has committed to the concept of binding emissions limits to be achieved using market-oriented policies. Such policies, including *emissions trading* and *joint implementation*, promise to substantially lower the cost of obtaining emissions reductions.
- The concept of emissions trading is already being used successfully in the U.S. to reduce emissions of sulfur dioxide, the primary culprit in causing acid rain.

Most of the signatures of the Treaty signed in Rio - which set voluntary, non-binding targets -- will fall substantially short of the goal

CLAIM ON THE ARGONNE LAB STUDY

CHARGE: *A study by the Department of Energy's Argonne Lab predicts major economic disruption to key U.S. industries from a new climate change treaty.*

FACT: While it provides some valuable information, the Argonne Lab study does not take into account key policies being advocated by the Clinton Administration that will substantially reduce the cost of emissions reductions.

- The Argonne Lab study examined the possible effects of a set of hypothetical fuel price increases on six energy intensive industries that are subject to significant foreign competition: basic chemicals, iron and steel, petroleum refining, paper and allied products, aluminum, and cement. [Argonne -]
- Overall, the participants reported negative impacts on the six industries, ^{but} predicting reductions in output and employment and an increasing share of the respective markets for developing countries. They also speculated that some industries would build new plants in developing countries, while others would increase the utilization of existing facilities already located in these areas.
- ^{reports} Significantly, the study's conclusions are predicated on specific energy price scenarios that do not reflect the potential impact of multi-year emissions budgets, international emissions trading, joint implementation, and other fundamental aspects of the U.S. negotiating position on climate change. Neither do they factor in the U.S.'s firm commitment to secure meaningful obligations from developing countries. Taken together, these policies will ^{can} substantially lower the costs of reducing U.S. emissions.
- In the Administration's view, the Argonne study ~~points to important economic risks in key industrial sectors from certain climate change policies and~~ underscores the critical need for flexibility in securing emissions reductions.

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CLAIM THAT EMISSIONS TRADING & JI ARE NOT REALISTIC

CHARGE: *Key elements of the U.S. proposal, namely emissions trading and joint implementation, are unworkable and would cost a fortune to monitor effectively.*

FACT: **Emissions trading and joint implementation represent the best way to use market forces to obtain the greatest emissions reductions at the least cost.**

- ✓ *Emissions trading* involves placing a cap on total carbon emissions and allowing the trading of emissions permits between entities. The U.S. envisions domestic trading of emissions between U.S. companies as well as a mechanism to provide for international trading.
- Emissions trading has been used very successfully in the U.S. to reduce the sulfur dioxide emissions that cause acid rain. Since trading became effective in 1995, SO₂ emissions have been reduced substantially below the allowable cap at costs well below what was expected.
- Developed and Developing* *joint implementation* refers to cooperative efforts between countries or entities within them to reduce net greenhouse gas emissions. In addition to offering significant potential to combat climate change in a highly cost-effective way, JI projects promote sustainable development, encourage private sector investment in developing countries, and provide local health, environmental, and economic benefits.
- Through the U.S. Initiative on Joint Implementation (USIJI), a part of the President's Climate Change Action Plan, the U.S. has proven the effectiveness of joint implementation in achieving measurable emissions reductions.
- Since 1994, USIJI has accepted 25 projects in eleven countries. These projects apply a variety of technologies and practices, including wind, geothermal, hydroelectric, and solar energy; coal to natural gas fuel switching, methane gas capture; and sustainable forest management and preservation.
(Source: U.S. Climate Action Report, 1997)

Joint Implementation Case Study – The Czech Republic: *The City of Decin in the Czech Republic supplies both heat and potable hot water to local apartment blocks. This project has converted the district heating plant from coal to natural gas. A cogeneration facility has also been built to provide steam and electricity. USIJI partners include the City of Decin, Center for Clean Air Policy, Wisconsin Electric Power Company, Commonwealth Edison Company, and NIPSCO Development Company. (Source: U.S. Climate Action Report, 1997)*

CLAIM THAT DEVELOPING COUNTRIES ARE EXEMPT

CHARGE: *The U.S. position in the climate negotiations would force developed countries to accept binding emissions targets while giving developing nations a free ride.*

FACT: **This is simply not true.**

- The United States has consistently maintained that meaningful obligations from developing countries must be a cornerstone of any treaty we would sign.
- The Framework Convention on Climate Change, signed by President Bush in 1992 and ratified by the Senate, recognizes that developed and developing nations have different capabilities and responsibilities to reduce emissions. This reflects the reality that developed nations today emit the vast majority of greenhouse gases and also have the greatest capacity for emissions reductions.
- Any new climate agreement must likewise recognize these differences. Nevertheless, it is clear that as the emissions from nations like China and India increase over time, so too must the obligations of those nations.
- The current U.S. proposal has three specific elements relating to developing country commitments. They go far beyond what others have put forward in the negotiations and are designed to ensure that these countries take serious steps today while agreeing that their obligations will increase with time.
 - ⇒ First, the U.S. calls on all Convention Parties to take a series of **specific actions to mitigate their emissions and report on their activities.**
 - ⇒ Second, the U.S. proposes that the **more advanced developing country economies accept binding targets today** (i.e. those seeking admittance to the OECD).
 - ⇒ Third, the U.S. stipulates that **all developing nations should agree to binding targets by the year 2005.**
- Another key aspect of our proposal is the concept of *joint implementation*, by which American companies would receive credit for undertaking projects in the developing world to reduce emissions.
- In working to develop a more specific policy, the U.S. will also consider, as appropriate, further initiatives, including on developing countries.

CLAIM THAT CHINA/INDIA SHOULD TAKE EQUAL STEPS TO OURS

CHARGE: *The U.S. should not agree to any international agreement unless China, India, and other developing nations take on the same level of commitment.*

FACT: This is neither realistic nor equitable.

[This is all the H₂O that we're back. Why not say of course developing countries can't free themselves in poverty, etc.]

- Climate change is a global issue, requiring a global response. We must, however, keep several facts in mind:
 - ⇒ **Developed countries have contributed 75 percent of total greenhouse gas emissions since the beginning of the Industrial Revolution.**
 - ⇒ **With 4 percent of the world's population, the U.S. is today responsible for over 20 percent of worldwide emissions.**
 - ⇒ **Our per capita emissions are more than eight times that of China.**
- For these reasons, China, India, and other developing nations cannot be expected to assume the same commitments as the United States in the initial stages of an effort to combat global warming. We must take the lead.
- Nevertheless, emissions from the developing world are likely to exceed those of the developed world by 2035 (though their contribution to atmospheric concentrations of such gases will not match ours until well after).
- Accordingly, the environmental problem cannot be solved if developing countries will not agree to participate meaningfully in a global agreement and to recognize that their commitments must increase over time.
- That is why the United States has made the involvement of developing countries a cornerstone of our position. Our proposal includes provisions for developing nations to take concrete steps to mitigate and report on their emissions. It calls for the more advanced nations, such as those seeking admittance to the OECD, to accept binding emissions targets. And it calls for a next negotiation by which all countries will accept binding targets by 2005.
- In working over the coming months to develop a more specific policy, the U.S. will also consider, as appropriate, further initiatives, including on developing countries.

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CLAIM ON THE MEANING OF THE BYRD RESOLUTION

CHARGE: *The Byrd Resolution, passed by the Senate 95-0, is effectively a repudiation of the approach taken by the Administration in dealing with the developing country issue in the negotiations.*

FACT: **The Administration has consistently supported the thrust of the Byrd Resolution, namely that developing nations must commit to meaningful steps to address the problem of climate change.**

- The level of developing country commitments in any new climate change agreement is the most difficult issue in the international negotiations.

⇒ **Developed nations have done by far the most to cause the problem, and have basically failed to live up to their commitments to reduce emissions.**

⇒ **Developing countries are rapidly increasing their emissions, and it is clear that climate change cannot be solved unless they take meaningful steps.**

⇒ **Complicating the issue is the importance of energy use to every nation's economy, and the concern that imbalanced actions will result in a shift in economic strength.**

- The United States has been pushing harder than any other Party for developing countries to take meaningful actions. Our proposal includes provisions for developing nations to take concrete steps to mitigate and report on their emissions. It calls for the more advanced nations, such as those seeking admittance to the OECD, to accept binding emissions targets. And it calls for a next negotiation by which all countries will accept binding targets by 2005.
- Any difference with the Senate is not over the *whether* of developing country commitments but instead over the *how* and the *when*. The President has committed to working intensively over the next few months to consult with the Congress, to further explain the Administration position, and to develop, as appropriate, further initiatives, including on developing countries.

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CLAIM ON THE PROBLEMS WITH THE BERLIN MANDATE

CHARGE: *The Clinton Administration sealed our fate two years ago by agreeing to the Berlin Mandate which calls for stringent actions by industrialized nations while effectively exempting developing countries from further obligations.*

FACT: **The Clinton Administration has consistently taken the position that developing countries must take on meaningful obligations to limit their emissions.**

- The Berlin Mandate recognizes that developed and developing nations have different responsibilities and capabilities in reducing emissions. This principle was enshrined in the 1992 Framework Convention on Climate Change, signed by President Bush and ratified by the Senate.
- Current and historic emissions from the industrialized world far exceed those of the developing world. With 4 percent of the world's population, the U.S. alone is responsible for over 20 percent of global emissions. That is why we have a special responsibility to take the lead in addressing climate change.
- Developing country emissions are increasing fast and will overtake those from the industrialized world by 2035 (even though it will take another half century for their contribution to atmospheric concentrations of such gases to equal ours). It, therefore, is imperative that developing countries also start soon to take steps to reduce their emissions.
- The United States has been the world's leading proponent for developing countries to take meaningful actions. Our proposal includes provisions for developing nations to take concrete steps to mitigate and report on their emissions. It calls for the more advanced nations, such as those seeking admittance to the OECD, to accept binding emissions targets. And it calls for a next negotiation by which all countries will accept binding targets by 2005.
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CLAIM THAT CURRENT ACTIONS ARE TOO LITTLE, TOO LATE

CHARGE: *The President's actions on this issue are too little, too late. He is trying to rush the U.S. into signing a treaty that cannot possibly be good for the American economy and that will have little chance of solving the environmental problem.*

FACT: **The United States will be prepared to go to Kyoto with a policy that protects the environment and ensures continued economic prosperity. We will not sign a treaty that does not accomplish these dual objectives.**

- ✓ The President believes the scientific evidence is ~~clear and~~ compelling that climate change is a real and serious threat and that we must begin taking meaningful actions to address it.
- At the same time, the President's top priority since being elected has been to restore the vitality of the American economy. And the results of his effort are clear: strong economic growth, unemployment at its lowest rate in a quarter century, 12.9 million new jobs, and low inflation.
- Whether in setting standards for clean air, improving the quality of drinking water, or protecting America's natural heritage, the President ~~has proven that~~ environmental protection and economic growth can go hand-in-hand. He is bringing the same philosophy to the issue of climate change.
- Over a year ago, the Administration proposed a framework for a Kyoto agreement that emphasizes environmental protection, flexible implementation, and global participation. We have been working ever since to refine this framework and to develop specific policies that support it.
- A large part of ~~this effort has~~ been soliciting the views of industry, environmentalists, Congress, and the American people. This outreach effort will culminate with a Presidential Conference on Climate Change in early October, the purpose of which is to help inform our climate change policy.
- When we go to Kyoto, it will be with a strong position that reflects the best interests of the environment, the economy, and the American people. The U.S. will not sign an agreement that fails to serve each of these interests.

has stuck to his conviction

cite

The P & his actions here

Just to be fair

CLAIM THAT THE POLICY IS ALREADY DECIDED

CHARGE: *The Administration has already locked in a policy on climate change without consulting Congress, industry, or the American people.*

FACT: Not true.

- The Clinton Administration *has not* decided on any specific policy related to levels of emissions reductions.
- The Clinton Administration *has* proposed a broad framework to guide the international negotiations aimed at reaching a new agreement to reduce emissions after the year 2000. *(cite)*
- This framework was developed after extensive consultations with industry, the environmental community, and other stakeholders. It reflects the compelling scientific evidence that climate change is a serious and growing problem, the fact that international actions to date have not been fully successful, and the need to achieve emissions reductions as cost-effectively as possible.
- The Administration is currently undertaking a major effort to develop specific policies on levels and timetables of emissions reductions and on mechanisms for achieving them. Throughout this process, the President and others in the Administration are actively soliciting the views of a wide range of outside groups.
- The goal of this effort is to develop a sensible, comprehensive U.S. position that protects the environment, ensures continued economic prosperity, and is in the overall best interests of the American people. The President has committed to developing such a position in time for the climate change negotiations in Kyoto this December.

CLAIM ON LOSS OF SOVEREIGNTY

CHARGE: *By signing an international treaty mandating reductions in greenhouse gases, the U.S. is ceding authority over domestic policy to the United Nations.*

FACT: ~~There is no truth to this assertion, whatsoever.~~

- Any climate change treaty that the U.S. would agree to would be implemented at the national level. While certain other nations have called for internationally standardized policies and measures to reduce emissions, the United States has made clear that such proposals are out of the question.
- The U.S. approach is to allow each country to take advantage of its own economic circumstances to fashion a response to climate change.
- While arguing that nations must accept binding emissions limits that are internationally agreed, the U.S. is pursuing policies that ensure maximum domestic flexibility in reaching such limits, including through the trading of emissions.
- And the President has made clear that any binding limits that are agreed to must not only produce needed environmental benefits but also must provide for continued economic growth. [cite]
- ✓ Any treaty that is signed would also, of course, require the advice and consent of the U.S. Senate.

This claim is a red herring.

CLAIM THAT THE PRESIDENT IS NOT SERIOUS

CHARGE: *The Administration's recent overtures on climate change reflect an attempt to make the President appear engaged, even though he hasn't done much on this issue.*

FACT: **The Clinton Administration has a strong record in confronting climate change.**

- In 1993, President Clinton developed the **Climate Change Action Plan (CCAP)** with the goal of returning total U.S. greenhouse gas emissions to their 1990 levels by 2000. Although lower-than-expected fuel prices and higher-than-expected economic growth and electricity demand have caused CCAP to fall short of its goal, its programs will result in a reduction of 76 million metric tons of carbon equivalent. (Source: U.S. Climate Action Report, 1997)
- Through almost 50 initiatives with a wide range of industry sectors, this effort has demonstrated that government and the private sector can work together successfully to cut emissions.
- Had the Congress not substantially cut funding for these programs (about 40% in recent years), they would have brought the U.S. closer to the objective of lowering emissions to 1990 levels by the year 2000.
- Additional initiatives, including the **Partnership for a New Generation of Vehicles** and the **Million Solar Roofs**, demonstrate the President's commitment to developing the technologies that will ultimately be needed to solve the climate change problem.

How hard did
Adm fight?

CLAIM ON THE EUROPEAN UNION POSITION

CHARGE: *The European Union has proposed an emissions target of 15 percent below 1990 levels by 2010. If they can make those kinds of cuts, why can't the U.S.?*

FACT: **The U.S. believes that the EU position is unrealistic and unnecessarily stringent. We will not support binding targets that cannot be achieved or that would impose undue costs on the economy.**

- The EU target represents a target for the block as a whole, not for each country. While some nations within the EU are to reduce their emissions, others will actually increase theirs. The ultimate goal is to have a total reduction of 15 percent below 1990 levels.
- Despite this "bubble" concept, the EU has not supported the proposals put forward by the U.S. to allow other nations to trade emissions, nor have they endorsed the concept of joint implementation.
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unrealistic*
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- The EU has been virtually silent on the issue of developing country commitments.
- The U.S. will not propose a target that we believe to be unrealistic or overly stringent. The Administration is carefully considering what level of cuts we would find acceptable. Furthermore, the U.S. will not sign an agreement that prescribes internationally mandated policies and measures for reducing emissions. We believe strongly that those decisions must be left to individual governments which should be given the widest range of options possible for attaining cuts cost-effectively. Lastly, the U.S. will not consider an agreement that exempts developing countries. This is neither environmentally nor economically justifiable.

Global Climate Change:

Fact Sheets & Charges and Responses

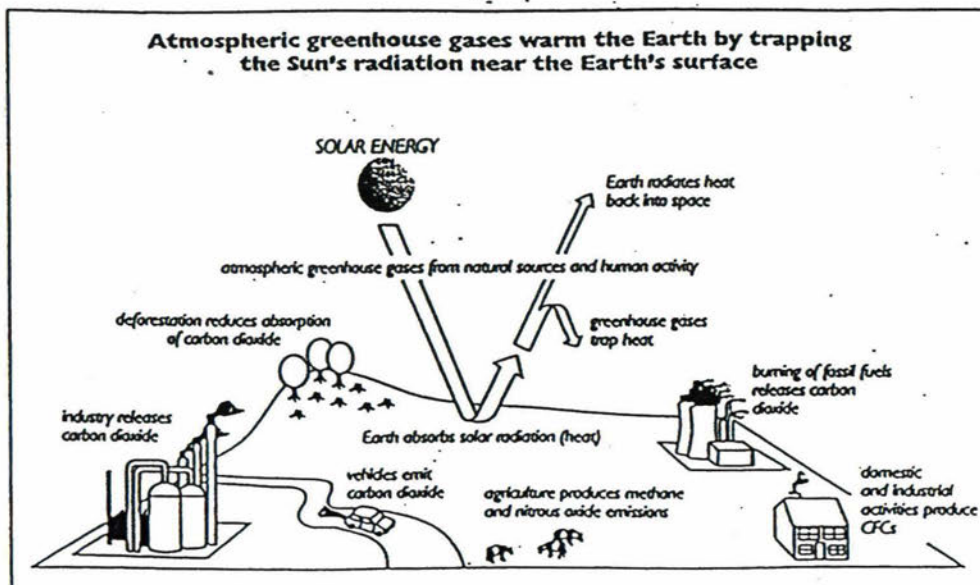
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Climate Change Fact Sheets

1. What we know about the science
2. The U.S. position on climate change
3. Climate change timeline
4. Climate change: who's saying what
 - ◆ IPCC Second Assessment Report, Summary for Policymakers
 - ◆ Scientists' Statement on Global Climatic Disruption
 - ◆ Ecologists' Statement on the Consequences of Rapid Climate Change
 - ◆ Economists' Statement on Climate Change
 - ◆ UNEP Insurance Initiative, Position Paper on Climate Change

WHAT WE KNOW ABOUT THE SCIENCE

- ◇ Scientists have long understood that greenhouse gases (principally water vapor, carbon dioxide, methane, and nitrous oxide) in nature keep the Earth's temperature an estimated 60 degrees F warmer than it would otherwise be – sustaining life as we know it.
- ◇ Human activities are dramatically increasing the build-up of these gases in the atmosphere. Since the beginning of the Industrial Revolution, CO₂ concentrations have increased 30 percent, methane levels have doubled, and nitrous oxide concentrations are up by 15 percent.
- ◇ Since 1900, average global temperature has increased 0.5 - 1.0 degree F. Eleven of the warmest years on record have occurred since 1979, with 1995 being the warmest ever. Sea level has risen 4-10 inches. (Source: IPCC, 1995) Total precipitation in the U.S. is up 6 percent, while extreme precipitation events (> 2 inches a day) have increased 20 percent. (Source: NOAA)
- ◇ The natural variability of the climate system makes it difficult to separate the contribution of human activity to these changes. Nevertheless, the international scientific consensus as reflected by the Intergovernmental Panel on Climate Change (which includes the work of more than 2,000 scientists from more than 60 countries) is that, "the balance of evidence suggests a discernible human influence on global climate."
- ◇ Current projections show that absent controls on carbon dioxide emissions, atmospheric concentrations of this greenhouse gas will more than double from today's levels (to 750 parts per million) by 2100. This is predicted to warm the planet an additional 2.0 - 6.5 degrees F – a faster rate of warming than any observed in the past 10,000 years. (Source: IPCC, 1995)
- ◇ While many uncertainties remain in our understanding of the complexities of the climate system, it is clear that warming of this magnitude will have serious consequences. Sea level rise; greater intensity and frequency of floods and droughts; human health problems; shifts in agricultural patterns; and the disappearance of many natural ecosystems are among the predicted effects. (Source: IPCC, 1995)



THE U.S. POSITION ON CLIMATE CHANGE

- significant* *need ref. to RND*
- ◇ The Clinton Administration is convinced that further steps are required to address climate change and supports efforts to reach a comprehensive and cost-effective international treaty this December at the Third Conference of the Parties to the Framework Convention on Climate Change in Kyoto, Japan.
 - ◇ This view is based on two key points. First, the scientific evidence indicates that human actions are changing the climate system, and that unless greenhouse gas emissions are reduced, such changes threaten unacceptable impacts on the United States and the world. Second, international efforts to date have not proved effective in dealing with the problem.
 - ◇ The U.S. has proposed a three-part framework for a more effective international agreement:
 1. **Binding emissions targets for developed nations.** Almost all developed countries, including the United States, will fall short of the non-binding aim in the current Climate Convention, which calls on nations to reduce emissions to 1990 levels by 2000. Shifting to a medium-term, binding, realistic, and achievable target should spur greater commitment and action by countries to limit greenhouse gas emissions.
 2. **Flexibility to achieve cost-effective reductions.** The U.S. proposal calls for emissions trading and joint implementation. As it makes no environmental difference where emissions reductions are achieved, these proposals aim to allow the greatest reductions to be gained at the least cost. The U.S. has also called for multi-year emissions targets and the possibility of banking and borrowing emissions from one period to the next. *need to specify what all C&D. require*
 3. **Participation of developing countries.** Based on the principle of "common but differentiated responsibilities" contained in the Climate Convention (signed by President Bush and ratified by the Senate), the U.S. has proposed a comprehensive package of elements on developing country commitments. In the near term, all would be required to take specific actions to mitigate their emissions and report on their activities, while the more advanced economies would adopt binding targets (though these targets would be necessarily less stringent than those of developed nations). Lastly, the U.S. has stipulated that every developing country agree to negotiate binding targets by 2005. *OK? revise*
 - ◇ In putting forward this framework, the U.S. has rejected proposals by some for what we believe to be unrealistic near-term cuts in emissions. These include a proposal from the Association of Small Island States for a 20 percent reduction below 1990 levels by 2005 and a proposal from the European Union for a 15 percent reduction below 1990 levels by 2010.
 - ◇ The Administration expects to have specific proposals for emissions cuts, as well as other initiatives, as appropriate, to present in time for the Kyoto Conference.

CLIMATE CHANGE TIMELINE

- 1896 -- Arrhenius, a Swedish chemist, first advances the notion that CO₂ emissions from the burning of coal would enhance the greenhouse effect and warm the planet.
- 1967 -- The first reliable computer model predicts an increase of 4 degrees F in global average temperature when CO₂ concentrations double from pre-industrial times.
- 1987 -- Analysis of an Antarctic ice core reveals an extremely close correlation between CO₂ concentrations and temperature going back over 100,000 years.
- 1988 -- The Intergovernmental Panel on Climate Change (IPCC) is formed to bring together the world's best climate scientists to assess, and advise the world's governments on, the state of technical and scientific knowledge on climate change.
- 1992 -- 155 nations sign the UN Framework Convention on Climate Change (FCCC) which calls on developed nations to reduce emissions to 1990 levels by 2000 and which recognizes the "common but differentiated responsibilities" of all Parties.
 - The U.S. Senate ratifies the Convention later in the year.
- 1995 -- The Berlin Mandate is adopted at the First Conference of the Parties to the FCCC.
 - The IPCC releases its Second Assessment Report concluding that the "balance of evidence suggests a discernible human influence on global climate."
 - The year 1995 is determined to be the hottest ever recorded.
- 1996 -- The Geneva Declaration, affirming the latest science and calling on developed countries to accept binding emissions limits, is adopted at the Second Conference of the Parties to the FCCC.
- 1997 -- The U.S. submits its framework proposal for a new international agreement, emphasizing binding limits, flexibility, and global participation.
 - Over 2,000 economists, including 6 Nobel Laureates, conclude that climate change is a serious problem justifying preventive steps and state that, "Sound economic analysis shows that there are policy options that would slow climate change without harming American living standards, and these measures may in fact improve U.S. productivity in the longer run."
 - ✓ -- The nations of the world gather in Kyoto for the Third Conference of the Parties to the FCCC in hopes of reaching a new agreement on post-2000 emissions reductions.

CLIMATE CHANGE: WHO'S SAYING WHAT

"The balance of evidence suggests a discernible human influence on global climate."

-- Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers, 1995.

"Our familiarity with the scale, severity, and costs to human welfare of the disruptions that the climatic changes threaten leads us to introduce this note of urgency and to call for early domestic action to reduce U.S. emissions via the most cost-effective means." -- Scientists' Statement on Global Climatic Disruption, June 1997.

"We are performing a global experiment on our natural ecosystems for which we have little information to guide us. While plant and animal communities may be able to eventually adapt to a stable climate system that is warmer than the existing one, many species may not be able to survive a rapid transition to that new climate. The prudent course would be to limit climate change to the lowest rates feasible given current atmospheric accumulations of greenhouse gases." -- Ecologists' Statement on the Consequences of Rapid Climatic Change, May 1997.

"As economists, we believe that global climate change carries with it significant environmental, economic, social, and geopolitical risks, and that preventive steps are justified. Economic studies have found that there are many potential policies to reduce greenhouse-gas emissions for which the total benefits outweigh the total costs. For the United States, in particular, sound economic analysis shows that there are policy options that would slow climate change without harming American living standards, and these measures may in fact improve U.S. productivity in the longer run." -- Economists' Statement on Climate Change, January 1997.

"Based on the current status of climate research and on their experience as insurers and reinsurers, the member companies of the UNEP-Insurance Industry Initiative conclude that ... Man made climate change will lead to shifts in atmospheric and ocean circulation patterns. This will probably increase the likelihood of extreme weather events in certain areas. Such effects carry the risk of dramatically increased property damage, with serious implications for property insurers and reinsurers... We are convinced that in dealing with climate change risks, it is important to recognize the precautionary principle, in that it is not possible to quantify anticipated economic and social impacts of climate change fully before taking action. Research is needed to reduce uncertainty but cannot eliminate it entirely... We insist that in accordance with the precautionary principle, the negotiations for the Framework Convention on Climate Change must achieve early, substantial reductions in greenhouse gas emissions."

-- UNEP Insurance Initiative, Statement of Environmental Commitment by the Insurance Industry, Position Paper on Climate Change, July 1996.

Summary for Policymakers

Considerable progress has been made in the understanding of climate change¹ science since 1990 and new data and analyses have become available.

Greenhouse gas concentrations have continued to increase

Increases in greenhouse gas concentrations since pre-industrial times (i.e., since about 1750) have led to a positive *radiative forcing*² of climate, tending to warm the surface and to produce other changes of climate.

- The atmospheric concentrations of greenhouse gases, *inter alia* carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) have grown significantly: by about 30%, 145% and 15% respectively (values for 1992). These trends can be attributed largely to human activities, mostly fossil fuel use, land-use change and agriculture.
- The growth rates of CO₂, CH₄ and N₂O concentrations were low during the early 1990s. While this apparently natural variation is not yet fully explained, recent data indicate that the growth rates are currently comparable to those averaged over the 1980s.
- The direct radiative forcing of the long-lived greenhouse gases (2.45 Wm⁻²) is due primarily to increases in the concentrations of CO₂ (1.56 Wm⁻²), CH₄ (0.47 Wm⁻²) and N₂O (0.14 Wm⁻²) (values for 1992).
- Many greenhouse gases remain in the atmosphere for a long time (for CO₂ and N₂O, many decades to centuries), hence they affect radiative forcing on long time-scales.
- The direct radiative forcing due to the CFCs and HCFCs combined is 0.25 Wm⁻². However, their *net* radiative forcing is reduced by about 0.1 Wm⁻² because they have caused stratospheric ozone depletion which gives rise to a negative radiative forcing.
- Growth in the concentration of CFCs, but not HCFCs, has slowed to about zero. The concentrations of both CFCs and HCFCs, and their consequent ozone depletion, are expected to decrease substantially by 2050 through implementation of the Montreal Protocol and its Adjustments and Amendments.
- At present some long-lived greenhouse gases (particularly HFCs (a CFC substitute), PFCs and SF₆) contribute little to radiative forcing but their projected growth could contribute several per cent to radiative forcing during the 21st century.
- If carbon dioxide emissions were maintained at near current (1994) levels, they would lead to a nearly constant rate of increase in atmospheric concentrations for at least two centuries, reaching about 500 ppmv (approaching twice the pre-industrial concentration of 280 ppmv) by the end of the 21st century.

¹ Climate change in IPCC Working Group I usage refers to any change in climate over time whether due to natural variability or as a result of human activity. This differs from the usage in the Framework Convention on Climate Change where climate change refers to a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

² A simple measure of the importance of a potential climate change mechanism. Radiative forcing is the balance of the Earth-atmosphere system (in watts per square metre (Wm⁻²)).

- A range of carbon cycle models indicates that stabilisation of atmospheric CO₂ concentrations at 450, 650 or 1000 ppmv could be achieved only if global anthropogenic CO₂ emissions drop to 1990 levels by, respectively, approximately 40, 140 or 240 years from now, and drop substantially below 1990 levels subsequently.
- Any eventual stabilised concentration is governed more by the accumulated anthropogenic CO₂ emissions from now until the time of stabilisation, than by the way those emissions change over the period. This means that, for a given stabilised concentration value, higher emissions in early decades require lower emissions later on. Among the range of stabilisation cases studied, for stabilisation at 450, 650 or 1000 ppmv accumulated anthropogenic emissions over the period 1991 to 2100 are 630 GtC¹, 1030 GtC, and 1410 GtC respectively ($\pm$ approximately 15% in each case). For comparison the corresponding accumulated emissions for IPCC IS92 emission scenarios range from 770 to 2190 GtC.
- Stabilisation of CH₄ and N₂O concentrations at today's levels would involve reductions in anthropogenic emissions of 8% and more than 50% respectively.
- There is evidence that tropospheric ozone concentrations in the Northern Hemisphere have increased since pre-industrial times because of human activity and that this has resulted in a positive radiative forcing. This forcing is not yet well characterised, but it is estimated to be about 0.4 Wm⁻² (15% of that from the long-lived greenhouse gases). However the observations of the most recent decade show that the upward trend has slowed significantly or stopped.

Anthropogenic aerosols tend to produce negative radiative forcings

- Tropospheric aerosols (microscopic airborne particles) resulting from combustion of fossil fuels, biomass burning and other sources have led to a negative direct forcing of about 0.5 Wm⁻², as a global average, and possibly also to a negative indirect forcing of a similar magnitude. While the negative forcing is focused in particular regions and subcontinental areas, it can have continental to hemispheric scale effects on climate patterns.
- Locally, the aerosol forcing can be large enough to more than offset the positive forcing due to greenhouse gases.
- In contrast to the long-lived greenhouse gases, anthropogenic aerosols are very short-lived in the atmosphere, hence their radiative forcing adjusts rapidly to increases or decreases in emissions.

Climate has changed over the past century

At any one location year-to-year variations in weather can be large, but analyses of meteorological and other data over large areas and over periods of decades or more have provided evidence for some important systematic changes.

- Global mean surface air temperature has increased by between about 0.3 and 0.6°C since the late 19th century; the additional data available since 1990 and the re-analyses since then have not significantly changed this range of estimated increase.
- Recent years have been among the warmest since 1860, i.e., in the period of instrumental record, despite the cooling effect of the 1991 Mt. Pinatubo volcanic eruption.

- Night-time temperatures over land have generally increased more than daytime temperatures.
- Regional changes are also evident. For example, the recent warming has been greatest over the mid-latitude continents in winter and spring, with a few areas of cooling, such as the North Atlantic Ocean. Precipitation has increased over land in high latitudes of the Northern Hemisphere, especially during the cold season.
- Global sea level has risen by between 10 and 25 cm over the past 100 years and much of the rise may be related to the increase in global mean temperature.
- There are inadequate data to determine whether consistent global changes in climate variability or weather extremes have occurred over the 20th century. On regional scales there is clear evidence of changes in some extremes and climate variability indicators (e.g., fewer frosts in several widespread areas; an increase in the proportion of rainfall from extreme events over the contiguous states of the USA). Some of these changes have been toward greater variability; some have been toward lower variability.
- The 1990 to mid-1995 persistent warm-phase of the El Niño-Southern Oscillation (which causes droughts and floods in many areas) was unusual in the context of the last 120 years.

The balance of evidence suggests a discernible human influence on global climate

Any human-induced effect on climate will be superimposed on the background "noise" of natural climate variability, which results both from internal fluctuations and from external causes such as solar variability or volcanic eruptions. Detection and attribution studies attempt to distinguish between anthropogenic and natural influences. "Detection of change" is the process of demonstrating that an observed change in climate is highly unusual in a statistical sense, but does not provide a reason for the change. "Attribution" is the process of establishing cause and effect relations, including the testing of competing hypotheses.

Since the 1990 IPCC Report, considerable progress has been made in attempts to distinguish between natural and anthropogenic influences on climate. This progress has been achieved by including effects of sulphate aerosols in addition to greenhouse gases, thus leading to more realistic estimates of human-induced radiative forcing. These have then been used in climate models to provide more complete simulations of the human-induced climate-change "signal". In addition, new simulations with coupled atmosphere-ocean models have provided important information about decade to century time-scale natural internal climate variability. A further major area of progress is the shift of focus from studies of global-mean changes to comparisons of modelled and observed spatial and temporal patterns of climate change.

The most important results related to the issues of detection and attribution are:

- The limited available evidence from proxy climate indicators suggests that the 20th century global mean temperature is at least as warm as any other century since at least 1400 AD. Data prior to 1400 are too sparse to allow the reliable estimation of global mean temperature.
- Assessments of the statistical significance of the observed global mean surface air temperature trend over the last century have used a variety of new estimates of natural internal and externally forced variability. These are derived from instrumental data, palaeodata, simple and complex climate models, and statistical models fitted to observations. Most of these studies have detected a significant change and show that the observed warming trend is unlikely to be entirely natural in origin.

- More convincing recent evidence for the attribution of a human effect on climate is emerging from pattern-based studies, in which the modelled climate response to combined forcing by greenhouse gases and anthropogenic sulphate aerosols is compared with observed geographical, seasonal and vertical patterns of atmospheric temperature change. These studies show that such pattern correspondences increase with time, as one would expect as an anthropogenic signal increases in strength. Furthermore, the probability is very low that these correspondences could occur by chance as a result of natural internal variability only. The vertical patterns of change are also inconsistent with those expected for solar and volcanic forcing.
- 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. These include the magnitude and patterns of long-term natural variability and the time-evolving pattern of forcing by, and response to, changes in concentrations of greenhouse gases and aerosols, and land surface changes. Nevertheless, the balance of evidence suggests that there is a discernible human influence on global climate.

Climate is expected to continue to change in the future

The IPCC has developed a range of scenarios, IS92a-f, of future greenhouse gas and aerosol precursor emissions based on assumptions concerning population and economic growth, land-use, technological changes, energy availability and fuel mix during the period 1990 to 2100. Through understanding of the global carbon cycle and of atmospheric chemistry, these emissions can be used to project atmospheric concentrations of greenhouse gases and aerosols and the perturbation of natural radiative forcing. Climate models can then be used to develop projections of future climate.

- The increasing realism of simulations of current and past climate by coupled atmosphere-ocean climate models has increased our confidence in their use for projection of future climate change. Important uncertainties remain, but these have been taken into account in the full range of projections of global mean temperature and sea level change.
- For the mid-range IPCC emission scenario, IS92a, assuming the "best estimate" value of climate sensitivity¹ and including the effects of future increases in aerosol, models project an increase in global mean surface air temperature relative to 1990 of about 2°C by 2100. This estimate is approximately one third lower than the "best estimate" in 1990. This is due primarily to lower emission scenarios (particularly for CO₂ and the CFCs), the inclusion of the cooling effect of sulphate aerosols, and improvements in the treatment of the carbon cycle. Combining the lowest IPCC emission scenario (IS92c) with a "low" value of climate sensitivity and including the effects of future changes in aerosol concentrations leads to a projected increase of about 1°C by 2100. The corresponding projection for the highest IPCC scenario (IS92e) combined with a "high" value of climate sensitivity gives a warming of about 3.5°C. In all cases the average rate of warming would probably be greater than any seen in the last 10,000 years, but the actual annual to decadal changes would include considerable natural variability. Regional temperature changes could differ substantially from the global mean value. Because of the thermal inertia of the oceans, only 50-90% of the eventual equilibrium temperature change would have been realised by 2100 and temperature would continue to increase beyond 2100, even if concentrations of greenhouse gases were stabilised by that time.

¹ In IPCC reports, climate sensitivity usually refers to the long term (equilibrium) change in global mean surface temperature following a doubling of atmospheric equivalent CO₂ concentration. More generally, it refers to the equilibrium change in surface air temperature following a unit change in radiative forcing

- Average sea level is expected to rise as a result of thermal expansion of the oceans and melting of glaciers and ice-sheets. For the IS92a scenario, assuming the "best estimate" values of climate sensitivity and of ice melt sensitivity to warming, and including the effects of future changes in aerosol, models project an increase in sea level of about 50 cm from the present to 2100. This estimate is approximately 25% lower than the "best estimate" in 1990 due to the lower temperature projection, but also reflecting improvements in the climate and ice melt models. Combining the lowest emission scenario (IS92c) with the "low" climate and ice melt sensitivities and including aerosol effects gives a projected sea level rise of about 15 cm from the present to 2100. The corresponding projection for the highest emission scenario (IS92e) combined with "high" climate and ice-melt sensitivities gives a sea level rise of about 95 cm from the present to 2100. Sea level would continue to rise at a similar rate in future centuries beyond 2100, even if concentrations of greenhouse gases were stabilised by that time, and would continue to do so even beyond the time of stabilisation of global mean temperature. Regional sea level changes may differ from the global mean value owing to land movement and ocean current changes.
- Confidence is higher in the hemispheric-to-continental scale projections of coupled atmosphere-ocean climate models than in the regional projections, where confidence remains low. There is more confidence in temperature projections than hydrological changes.
- All model simulations, whether they were forced with increased concentrations of greenhouse gases and aerosols or with increased concentrations of greenhouse gases alone, show the following features: greater surface warming of the land than of the sea in winter; a maximum surface warming in high northern latitudes in winter, little surface warming over the Arctic in summer; an enhanced global mean hydrological cycle, and increased precipitation and soil moisture in high latitudes in winter. All these changes are associated with identifiable physical mechanisms.
- In addition, most simulations show a reduction in the strength of the North Atlantic thermohaline circulation and a widespread reduction in diurnal range of temperature. These features too can be explained in terms of identifiable physical mechanisms.
- The direct and indirect effects of anthropogenic aerosols have an important effect on the projections. Generally, the magnitudes of the temperature and precipitation changes are smaller when aerosol effects are represented, especially in northern mid-latitudes. Note that the cooling effect of aerosols is not a simple offset to the warming effect of greenhouse gases, but significantly affects some of the continental scale patterns of climate change, most noticeably in the summer hemisphere. For example, models that consider only the effects of greenhouse gases generally project an increase in precipitation and soil moisture in the Asian summer monsoon region, whereas models that include, in addition, some of the effects of aerosols suggest that monsoon precipitation may decrease. The spatial and temporal distribution of aerosols greatly influence regional projections, which are therefore more uncertain.
- A general warming is expected to lead to an increase in the occurrence of extremely hot days and a decrease in the occurrence of extremely cold days.
- Warmer temperatures will lead to a more vigorous hydrological cycle; this translates into prospects for more severe droughts and/or floods in some places and less severe droughts and/or floods in other places. Several models indicate an increase in precipitation intensity, suggesting a possibility for more extreme rainfall events. Knowledge is currently insufficient to say whether there will be any changes in the occurrence or geographical distribution of extreme events, e.g., tropical cyclones.

- Sustained rapid climate change could shift the competitive balance among species and even lead to forest dieback, altering the terrestrial uptake and release of carbon. The magnitude is uncertain, but could be between zero and 200 GtC over the next one to two centuries, depending on the rate of climate change.

There are still many uncertainties

Many factors currently limit our ability to project and detect future climate change. In particular, to reduce uncertainties further work is needed on the following priority topics:

- estimation of future emissions and biogeochemical cycling (including sources and sinks) of greenhouse gases, aerosols and aerosol precursors and projections of future concentrations and radiative properties;
- representation of climate processes in models, especially feedbacks associated with clouds, oceans, sea ice and vegetation, in order to improve projections of rates and regional patterns of climate change;
- systematic collection of long-term instrumental and proxy observations of climate system variables (e.g., solar output, atmospheric energy balance components, hydrological cycles, ocean characteristics and ecosystem changes) for the purposes of model testing, assessment of temporal and regional variability and for detection and attribution studies.

Future unexpected, large and rapid climate system changes (as have occurred in the past) are, by their nature, difficult to predict. This implies that future climate changes may also involve "surprises". In particular these arise from the non-linear nature of the climate system. When rapidly forced, non-linear systems are especially subject to unexpected behaviour. Progress can be made by investigating non-linear processes and sub-components of the climatic system. Examples of such non-linear behaviour include rapid circulation changes in the North Atlantic and feedbacks associated with terrestrial ecosystem changes.

Global Climatic Disruption

SCIENTISTS' STATEMENT ON GLOBAL CLIMATIC DISRUPTION

June 1997

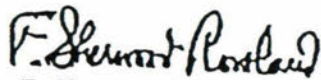
We are scientists who are familiar with the causes and effects of climatic change as summarized recently by the Intergovernmental Panel on Climate Change (IPCC). We endorse those reports and observe that the further accumulation of greenhouse gases commits the earth irreversibly to further global climatic change and consequent ecological, economic and social disruption. The risks associated with such changes justify preventive action through reductions in emissions of greenhouse gases. In ratifying the Framework Convention on Climate Change, the United States agreed in principle to reduce its emissions. It is time for the United States, as the largest emitter of greenhouse gases, to fulfill this commitment and demonstrate leadership in a global effort.

Human-induced global climatic change is under way. The IPCC concluded that global mean surface air temperature has increased by between about 0.5 and 1.1 degrees Fahrenheit in the last 100 years and anticipates a further continuing rise of 1.8 to 6.3 degrees Fahrenheit during the next century. Sea-level has risen on average 4-10 inches during the past 100 years and is expected to rise another 6 inches to 3 feet by 2100. Global warming from the increase in heat-trapping gases in the atmosphere causes an amplified hydrological cycle resulting in increased precipitation and flooding in some regions and more severe aridity in other areas. The IPCC concluded that "The balance of evidence suggests a discernible human influence on global climate." The warming is expected to expand the geographical ranges of malaria and dengue fever and to open large new areas to other human diseases and plant and animal pests. Effects of the disruption of climate are sufficiently complicated that it is appropriate to assume there will be effects not now anticipated.

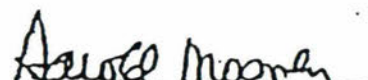
Our familiarity with the scale, severity, and costs to human welfare of the disruptions that the climatic changes threaten leads us to introduce this note of urgency and to call for early domestic action to reduce U.S. emissions via the most cost-effective means. We encourage other nations to join in similar actions with the purpose of producing a substantial and progressive global reduction in greenhouse gas emissions beginning immediately. We call attention to the fact that there are financial as well as environmental advantages to reducing emissions. More than 2000 economists recently observed that there are many potential policies to reduce greenhouse-gas emissions for which total benefits outweigh the total costs.

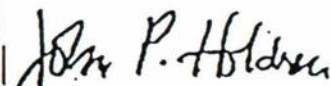
The Framework Convention on Climate Change, ratified by the United States and more than 165 other nations, calls for stabilization of greenhouse gas concentrations in the atmosphere at levels that will protect human interests and nature. The Parties to the Convention will meet in December, 1997, in Kyoto, Japan to prepare a protocol implementing the convention. We urge that the United States enter that meeting with a clear national plan to limit emissions, and a recommendation as to how the U.S. will assist other nations in significant steps toward achieving the joint purpose of stabilization.

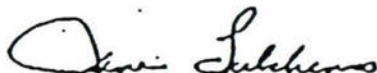
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May 21, 1997

President Bill Clinton
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Dear President Clinton:

Ecologists' Statement on the Consequences of Rapid Climatic Change

Climate change driven by emissions of greenhouse gases is projected to occur at a very rapid rate, significantly faster, on a sustained global basis, than rates of climatic change during the past 10,000 years (1). Rapid climate change coupled with pollution, habitat fragmentation and habitat loss may lead to the decline and disappearance of many plant and animal communities that might otherwise survive a future climate that is relatively stable but warmer.

We believe that this situation constitutes a dangerous anthropogenic interference with the climate system, one that may not "allow ecosystems to adapt naturally to climate change" as is called for in the Framework Convention on Climate Change (1992). Accordingly, we believe that the prudent course would be to limit climate change to the lowest rates feasible given emissions that have already occurred. These correspond to global rates of warming of no more than 1 degree C per century.

Much of the current debate over limiting global climate change has focused on targets for stabilization of greenhouse gas concentrations many decades in the future. However from an ecological standpoint, it is the *rapid rate* as well as the total magnitude of climate change projected to occur that is pertinent to the future well-being of plant and animal communities and to the continuous availability of goods and services they provide to our society. Global mean temperature could increase by as much as 1-3.5 degrees C (2-6 degrees F), over the next 100 years. At higher latitudes, which include large portions of the United States, temperature increases could be much greater.

Rapid climate change is more dangerous to plant and animal communities than gradual climate change even if the total amount of change that eventually occurs is exactly the same.

During rapid climate change, disturbances like fires, floods, erosion, droughts, storms, pests and pathogen outbreaks may increase with adverse effects on ecosystem functions as important as water supply, soil fertility and carbon sequestration. After disturbance, aggressive, 'weedy' species, including exotics that outcompete native vegetation, may come to dominate these areas. In some US temperate forests, rapid climate change could lead to widespread tree mortality, wildfires and replacement of the forests by grasslands. Species that are long-lived, rare, or endangered will be severely disadvantaged.

In an increasingly developed world, there are fewer and fewer areas available in which native trees and plants can grow. Cities, highways, agricultural fields and other human activities limit available habitat and create barriers to the migration of plants and animals. In fact, many natural areas now can be considered 'islands' in a sea of developed land. Protected areas like national parks and forests were established with current climates in mind. Rapid climate shifts may reduce appropriate native habitats within protected areas while development outside the boundaries of the protected areas would make much of the neighboring new habitat unavailable and limit corridors for species to migrate to suitable new habitats. It would be difficult to imagine, for example, how the imperiled species of Everglades National Park, such as the Cape Sable Sparrow and American Crocodile, could migrate north into the urban and agricultural landscapes of coastal and central Florida and successfully re-establish themselves. Overall, climate change, in combination with existing anthropogenic habitat disruption and loss, could lead to steep declines in worldwide biodiversity.

Furthermore, conditions for plant and animal communities are considerably less hospitable now than prior to the industrial revolution. In many cases, plant and animal populations are less healthy and ecosystems less resilient to further disturbance due to environmental stress from human-made pollutants and habitat degradation. These stresses may reduce significantly an individual's or ecosystem's ability to cope successfully with climate change.

Climate change may also result in rapid sea level rise. Rapid sea level rise causes beach erosion and threatens coastal marshes and mangrove forests. While many of these coastal natural areas have kept pace with historic rates of sea level rise, faster rates may lead to inundation of marshes and mangroves more rapidly than new wetlands can form. Onshore human development will further hamper new establishment of coastal natural areas. Loss of habitat for a substantial number of species of birds, fish, shellfish, microorganisms and animals could result. Marshes and mangroves also protect shorelines from storms and high tides and act as filters for pollutants such as sewage and other

effluents. Their loss would lead to increased erosion and degradation of onshore human development.

It is difficult to quantify precisely the response of a particular species or group of species to climate change. Because there are only sparse records of this type of rapid climate change available, we have little to guide our estimations. Scientists do know the following. Climate determines the distributions of many species. Significant climate change has in the past and will in the future require many species to shift their ranges. Species vary in their ability and opportunities to adapt or migrate. The rate of projected change is enough to threaten seriously the survival of many species. Pollution and human alteration of the landscape have reduced considerably the ability of plant and animal communities to adjust to rapid climate change. Ecosystems will experience a rate of sustained climate change that is unusually rapid and, for many areas, unprecedented during the past 10,000 years. The more rapid that rate, the more vulnerable to damage ecosystems will be.

We are performing a global experiment on our natural ecosystems for which we have little information to guide us. While plant and animal communities may be able to eventually adapt to a stable climate system that is warmer than the existing one, many species may not be able to survive a rapid transition to that new climate. The prudent course would be to limit climate change to the lowest rates feasible given current atmospheric accumulations of greenhouse gases. These correspond to global rates of warming of no more than 1 degree C per century.

(1) *Climate Change 1995 - Impacts, Adaptations and Mitigation of Climate Change: Scientific-Technical Analyses*. Contribution of Working Group II to the Second Assessment Report of the Intergovernmental Panel on Climate Change. Editors R.T. Watson, M.C. Zinyowera, R.H. Moss. Cambridge University Press, p. 21.

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ECONOMISTS' STATEMENT ON CLIMATE CHANGE

*Endorsed by Over 2000 Economists
including six Nobel Laureates*

I. The review conducted by a distinguished international panel of scientists under the auspices of the Intergovernmental Panel on Climate Change has determined that "the balance of evidence suggests a discernible human influence on global climate." As economists, we believe that global climate change carries with it significant environmental, economic, social, and geopolitical risks, and that preventive steps are justified.

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

III. The most efficient approach to slowing climate change is through market-based policies. In order for the world to achieve its climatic objectives at minimum cost, a cooperative approach among nations is required—such as an international emissions trading agreement. The United States and other nations can most efficiently implement their climate policies through market mechanisms, such as carbon taxes or the auction of emissions permits. The revenues generated from such policies can effectively be used to reduce the deficit or to lower existing taxes.

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Statement of Environmental Commitment by the Insurance Industry

Preamble

The insurance industry recognizes that economic development needs to be compatible with human welfare and a healthy environment. To ignore this is to risk increasing social, environmental and financial costs. Our Industry plays an important role in managing and reducing environmental risk, in conjunction with governments, individuals and organizations. We are committed to work together to address key issues such as pollution reduction, the efficient use of resources, and climate change. We endeavour to identify realistic, sustainable solutions.

1. General Principles of Sustainable Development

1.1 We regard sustainable development, defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs, as a fundamental aspect of sound business management.

1.2 We believe that sustainable development is best achieved by allowing markets to work within an appropriate framework of cost efficient regulations and economic instruments. Government has a leadership role in establishing and enforcing long term priorities and values.

1.3 We regard a strong, proactive insurance industry as an important contributor to sustainable development, through its interaction with other economic sectors and consumers.

1.4 We believe that the existing skills and techniques of our industry in understanding uncertainty, identifying and quantifying risk, and responding to risk, are core strengths in managing environmental problems.

1.5 We recognize the precautionary principle, in that it is not possible to quantify some concerns sufficiently, nor indeed to reconcile all impacts in purely financial terms. Research is needed to reduce uncertainty but cannot eliminate it entirely.

2. Environmental Management

2.1 We will reinforce the attention given to environmental risks in our core activities. These activities include risk management, loss prevention, product design, claims handling and asset management.

2.2 We are committed to manage internal operations and physical assets under our control in a manner that reflects environmental considerations.

2.3 We will periodically review our management practices, to integrate relevant developments of environmental management in our planning, marketing, employee communications and training as well as our other core activities.

2.4 We encourage research in these and related issues. Responses to environmental issues can vary in effectiveness and cost. We encourage research that identifies creative and effective solutions.

2.5 We support insurance products and services that promote sound environmental practice through measures such as loss prevention and contract terms and conditions. While satisfying requirements for security and profitability, we will seek to include environmental considerations in our asset management.

2.6 We will conduct regular internal environmental reviews, and will seek to create measurable environmental goals and standards.

2.7 We shall comply with all applicable local, national and international environmental regulations. Beyond compliance, we will strive to develop and adopt best practices in environmental management. We will support our clients, partners and suppliers to do likewise.

3. Public Awareness and Communications

3.1 Bearing in mind commercial confidence, we are committed to share relevant information with our stakeholders, including clients, intermediaries, shareholders, employees and regulators. By doing so we will improve society's response to environmental challenges.

3.2 Through dialogue with public authorities and other bodies we aim to contribute to the creation of a more effective framework for sustainable development.

3.3 We will work with the United Nations Environment Programme to further the principles and goals of this Statement, and look for UNEP's active support.

3.4 We will encourage other insurance institutions to support this Statement. We are committed to share with them our experiences and knowledge in order to extend best practices.

3.5 We will actively communicate our environmental activities to the public, review the success of this Statement periodically, and we expect all signatories to make real progress.

Steering Committee for the UNEP Insurance Industry Initiative:

General Accident, Perth, United Kingdom.
Gerling-Konzern Globale, Cologne, Germany.
N.P.I., London, United Kingdom.
Swiss Re, Zurich, Switzerland.
Sumitomo Marine & Fire, Tokyo, Japan.
Uni Storebrand, Oslo, Norway.
United Nations Environment Programme, Geneva, Switzerland.

UNEP INSURANCE INITIATIVE
POSITION PAPER ON CLIMATE CHANGE - 9TH JULY 1996

(1) PREAMBLE

1.1 The property insurance industry is the financial sector most likely to be directly affected by climate change, since it is vulnerable to variability in the frequency and severity of extreme weather events. Life insurance and pension fund investment portfolios are also likely to be affected.

1.2 The cost of such events could escalate dramatically as a consequence of the increased greenhouse effect due to human activities. The resultant climate change may alter the frequency and/or severity of extreme weather events and/or their regional distribution. The exact influence is not yet known, due to the limitations of today's understanding of the climate system. It is clear, though, that even small shifts of regional climate zones and/or storm patterns carry the potential of increased property damage, exacerbated by inadequate planning and construction in certain areas.

1.3 The implication of climate change for other lines of insurance cannot be assessed with confidence but cannot be ignored. Changes in human health (e.g. spreading of diseases) may affect the life assurance and pension industries. Returns on long-term investments and capital projects may be affected by mitigation measures that alter the economics of whole industries - for example, shifting from carbon fuels to renewable sources. The economics of selected regions, such as coastal zones and islands, may be disadvantaged.

1.4 Through its experience in managing the risk of natural catastrophes, the insurance sector can help to improve the response to property damage from extreme events by co-operating with the relevant authorities.

1.5 It is anticipated that structural changes in energy-intensive industries in response to measures to control greenhouse gas emissions will result in opportunities and challenges for the investment community, including for example alternative energy, efficiency programmes, and public transit systems. However, without political initiatives, market forces alone may not result in the efficient use of investment potential.

(2) CONCLUSIONS

2.1 Based on the current status of climate research and on their experience as insurers and reinsurers, the member companies of the UNEP-Insurance Industry Initiative conclude that:

2.1.1 Human activity is already affecting climate on a global scale, e.g. through the enhanced greenhouse effect. According to IPCC "the balance of evidence suggests a discernable human influence on global climate"

2.1.2 Man made climate change will lead to shifts in atmospheric and oceanic circulation patterns. This will probably increase the likelihood of extreme weather events in certain areas. Such effects carry the risk of

dramatically increased property damage, with serious implications for property insurers and reinsurers.

2.1.3 Potentially there could be large implications for investment activities as society plans for, and adapts to, the new climate regime.

2.2 We are convinced that:

2.2.1 In dealing with climate change risks it is important to recognize the precautionary principle, in that it is not possible to quantify anticipated economic and social impacts of climate change fully before taking action. Research is needed to reduce uncertainty but cannot eliminate it entirely.

2.2.2 In the case of climate change risks, the most efficient precautionary measure is a substantial reduction of greenhouse gas emissions with respect to a 'business as usual' scenario of greenhouse gas emissions.

2.2.3 The problem of climate change can be counteracted only by the joint efforts of governments, political and social institutions, industrial and commercial enterprise [including insurers and reinsurers], and of all individuals. This requires an enhanced level of public discussion and international political agreement.

2.3 We insist that:

2.3.1 In accordance with the precautionary principle, the negotiations for the Framework Convention on Climate Change must achieve early, substantial reductions in greenhouse gas emissions.

2.3.2 The Framework Convention on Climate Change should urgently try to establish what concentration level and rate of increase of greenhouse gases is likely to be "dangerous", through further scientific research.

2.3.3 Mechanisms be created for direct inputs of NGOs [including business NGOs] to the negotiations, and for communicating the issues and decisions to all stakeholders.

2.3.4 The position of the insurance and reinsurance sector be represented when discussing or negotiating possible solutions.

2.3.5 A transparent framework of political, social and economic measures be established to promote sustainable development, taking into account the risks of climate change, and considerations of equity between emerging, transitional and mature economies, and over time.

This paper has been discussed and approved for publication by the members of the UNEP Insurance Industry Initiative as a contribution to the climate change debate. It does not claim to represent a unanimous view of UNEP I.I.I. members, nor does it in any way represent a UNEP position.

Status of the UNEP Statement of Environmental Commitment
by the Insurance Industry

30th October 1996

1. - Aachener Rückversicherungs, Germany
2. - Aachener und Münchener Versicherung, Germany
3. - AEGIS Insurance Company Ltd., South Africa
4. - Bangkok Insurance Public Company Limited, Thailand
5. - Basler Versicherungs-Gesellschaft, Switzerland
6. - Bayerische Beamten Versicherung AG, Germany
7. - CIGNA Insurance Company, Japan
8. - Daiichi Mutual Fire and Marine Insurance Company, Japan
9. - Delvag Luftfahrtversicherungs-AG, Germany
10. - Dominion of Canada General Insurance Company, Canada
11. - Elvia Versicherungen, Switzerland
12. - Employers Reinsurance Corporation, United States of America
13. - Folksam, Sweden
14. - La Fondiaria Assicurazioni S.p.A., Italy
15. - General Accident and Life Assurance Corporation, United Kingdom
16. - Gerling-Konzern, Germany
17. - Grupo Fortuna SA, Argentina
18. - Helvetia Patria Versicherungen, Switzerland
19. - Hyundai Marine and Fire Insurance Co.Ltd., South Korea
20. - Imperio S.A., Portugal
21. - Independent Insurance Company Ltd., United Kingdom
22. - Ironi Trades Insurance Group, United Kingdom
23. - Istituto Nazionale delle Assicurazioni, Italy
24. - Ji Accident & Fire Insurance Co. Ltd., Japan
25. - Landesschadenhilfe Versicherung VaG, Germany
26. - Mannheimer Versicherungen, Germany
27. - MUSINI, Spain
28. - National Corporation of Tanzania Ltd., Tanzania
29. - National Insurance, New Zealand
30. - National Provident Institutions, United Kingdom
31. - NatWest Insurance Services, United Kingdom
32. - Nürnberger Allgemeine Versicherungs, Germany
33. - Overseas Union Insurance Limited, Singapore
34. - QBE Insurance Group Ltd., Australia
35. - Rentenanstalt/ Swiss Life, Switzerland
36. - Rheinland Versicherungen, Germany
37. - Riunione Adriatica di Sicurtà, Italy
38. - R&V Versicherungsgruppe, Germany
39. - Schweizerische Mobiliar, Switzerland
40. - Sibrosso Insurance Co., Russia
41. - Skandia Insurance Company Ltd., Sweden
42. - Sovereign Assurance, New Zealand
43. - Stuttgarter Allgemeine Versicherung, Germany
44. - Stuttgarter Lebensversicherung AG, Germany
45. - Sumitomo Marine & Fire Insurance Co., Japan
46. - Sumitomo Marine & Fire Insurance Co.(Europe)Ltd, United Kingdom
47. - Sumitomo Marine & Pool Insurance, Indonesia

- 48. - Sumitomo Property & Casualty insurance Co.(Hong Kong) Ltd, Hong Kong
- 49. - Swiss-Reinsurance Company, Switzerland
- 50. - Swiss Union General Insurance Company, Switzerland
- 51. - Trygg-Hansa, Sweden
- 52. - Uni Storebrand, Norway
- 53. - Vaudoise Generale Compagnie d'Assurances, Switzerland
- 54. - Vereinte Versicherung AG, Germany
- 55. - Volksfürsorge Holding AG, Germany
- 56. - WASA Försäkring, Sweden
- 57. - Wiener Städtische Allgemeine, Austria
- 58. - Winterthur Versicherungen, Switzerland
- 59. - Württembergische Versicherung AG, Germany
- 60. - Yasuda Fire and Marine Insurance Co.Ltd., Japan
- 61. - Zurich Insurance Company, Switzerland

Climate Change Charges and Responses

A. Science

1. Claim that the climate is not changing
2. Claim that any climate changes are natural
3. Claim on the lack of scientific consensus
4. Claim that the uncertainty is too great to act
5. Claim that the climate models are inaccurate
6. Claim on misinterpretation of the IPCC
7. Claim on the validity of the IPCC
8. Claim on satellite vs. surface temperature readings
9. Claim that climate changes will be positive
10. Claim that we should simply adapt to climate change

or all
Some of these
claims should
be traced to the
industry paid
scientists who
make them...
(or others)

B. Economics

1. Claim on insufficient economic analysis
2. Claim that any response will cost too much
3. Claim that Clinton plans will devastate the economy
4. Claim on American jobs moving overseas
5. Claim on economic impacts on the poor
6. Claim that massive long-term reductions are in store
7. Claim on new taxes
8. Claim that voluntary efforts are sufficient
9. Claim on the Argonne Lab study
10. Claim that emissions trading & JI are not realistic

Source
changes

C. Developing countries

1. Claim that developing countries are exempt
2. Claim that China/India should take equal steps to ours
3. Claim on the meaning of the Byrd Resolution
4. Claim on problems with the Berlin Mandate

need a hit
based on JAT

D. Other

1. Claim that current actions are too little, too late
2. Claim that the policy is already decided
3. Claim on loss of sovereignty
4. Claim that the President is not serious
5. Claim on the European Union position

CLAIM THAT THE CLIMATE IS NOT CHANGING

CHARGE: *The climate has not warmed as many have claimed and as dire global warming theories would predict.*

FACT: **The climate is changing, and the effects can be felt here in the U.S.**

- In this century:
 - ⇒ **Surface temperature** is as warm or warmer than in any century since 1400 AD. (Source: IPCC, 1995)
 - ⇒ **Global average temperature** has risen by almost 1 degree F. (Source: IPCC, 1995)
 - ⇒ **Sea level** has risen 4-10 inches. (Source: IPCC, 1995)
 - ⇒ **Mountain glaciers** around the world are melting. For example, Glacier National Park has lost 70 percent of its glacial area since 1900.
 - ⇒ **In the U.S., total precipitation** has increased by 6 percent, while **intense precipitation events** (over 2 inches in a day) have increased by about 20 percent. (Source: NOAA)
- The last few decades have been the warmest this century. (Source: IPCC, 1995)
- The ten warmest years since 1900 have all occurred since 1980, with 1995 being the warmest year ever on record. (Source: IPCC, 1995)
- From 1981 to 1991, high latitudes (between 45 and 70 degrees North) sustained a longer growing season, and an advance of up to seven days in "greening" in spring and summer. (Source: *Nature*, April 17, 1997)

"So I believe in my own mind and heart that something is happening out there. Something is happening. Something is happening to our climate."

— Senator Robert Byrd, July 25, 1997

*Life correlation over
160,000 years?*

CLAIM THAT ANY CLIMATE CHANGES ARE NATURAL

CHARGE: *Any changes in the Earth's climate reflect natural variability, not human actions.*

FACT: **The scientific evidence is clear and compelling that human activity – notably the increasing use of fossil fuels – is altering the makeup of the atmosphere and is the likely culprit behind observed changes in the last century.**

- 2,600 of the world's leading scientists have endorsed the report of the Intergovernmental Panel on Climate Change (IPCC) which concludes, "the balance of evidence suggests a discernible human influence on climate change."
- Since 1860, roughly the start of the Industrial Revolution, carbon dioxide concentrations in the atmosphere have increased by 30 percent. Without specific policies to reduce the growth of these emissions, it is estimated that carbon dioxide concentrations will double from today's levels by 2100. This would result in the highest levels of CO₂ in the atmosphere in 50 million years. (Source: IPCC, 1995)
- During the same period, concentrations of other greenhouse gases have also risen substantially. Methane levels have more than doubled while nitrous oxide concentrations have increased by 15 percent. (Source: IPCC, 1995)
- The magnitude, timing, and geographic pattern of recent temperature changes are unlike any ever seen in the natural record and track closely with models projecting the effects of human activities. (Source: IPCC, 1995)

What is the IPCC?

The Intergovernmental Panel on Climate Change (IPCC) was established by the United Nations Environment Programme and the World Meteorological Association in 1988. It relies upon the work of some 2,000 of the world's leading scientific experts from more than 60 countries.

The IPCC is the authoritative scientific and technical body assessing climate change. It synthesizes information on the scientific and technical literature related to all significant components of the issue, provides the scientific underpinnings for understanding global climate change, and functions as the official advisory body to the world's governments on the state of the science.

CLAIM ON THE LACK OF SCIENTIFIC CONSENSUS

CHARGE: *Proponents of climate change theory have their own scientists. Skeptics have theirs. For the average person, there is no detectable consensus that we have a problem.*

FACT: **The scientific consensus that human induced climate change is occurring is overwhelming. Those who disagree represent a tiny fraction of the scientific community.** } OK ?

- The Intergovernmental Panel on Climate Change (IPCC), the authoritative international scientific body on this subject, has concluded that climate change is occurring, that "the balance of evidence suggests a discernible human influence on global climate," and that as greenhouse gas concentrations increase in the atmosphere additional, largely disruptive, disturbances are likely.
- In reaching its conclusions, the IPCC relied upon the preparation and review of documents by some 2,000 of the world's leading experts on climate change and its consequences from some 60 nations.
- Criticism of the IPCC's work comes from a tiny band of skeptics.
- In many cases, these skeptics are supported by energy industry groups that are opposed to any further action to address climate change.

"There is no debate among any statures scientists of what is happening... The only debate is the rate at which it's happening... Scientists, by nature, are very conservative... They don't want to overstate things. In this debate, the skeptics are atypical of the general scientific community. The irony is that when you find scientists who are adamant on any side, they look very curious within the scientific community. But to the general public, they come across as the most knowledgeable and authoritative of all."

-- Harvard University earth scientist James
McCarthy, The Washington Post, 5/25/97

CLAIM THAT THE UNCERTAINTY IS TOO GREAT TO ACT

CHARGE: *Enormous uncertainty exists about the probable level of future warming, and any meaningful action should wait until the science is better understood.*

FACT: Climate change has been studied perhaps as much as any other environmental problem in history, and, while uncertainties remain, the imperative for action is clear.

- If we continue on a "business as usual" path for the next century, we can expect an additional rise in temperature of between 2.0-6.5 degrees F. This would represent a faster rate of warming than at any time in the last 10,000 years. (Source: IPCC, 1995) According to the IPCC, the impacts are likely to include:

⇒ **Human health** – increased fatalities from heat stress of the kind that killed 465 in Chicago in 1995 and an expansion of the range of diseases like malaria and dengue fever.

⇒ **Extreme weather** – increased frequency and intensity of floods and droughts.

⇒ **Sea level rise** – a "best guess" estimate of 20 inches by 2100 would inundate 7,000 square miles of the United States, threatening in particular Florida and the Gulf Coast.

⇒ **Agricultural impacts** – regional shifts in food productivity, with decreases in food production in many of the world's poorest regions.

⇒ **Natural ecosystems** – the climatic zone for certain forest types will shift faster than many species can migrate. The Northeast, for example, may lose its beech trees and sugar maples.

- Uncertainty is also a two-sided coin. More than 2,000 scientists believe that, "Effects of the disruption of climate are sufficiently complicated that it is appropriate to assume there will be effects not now anticipated." (Source: Scientists Statement on Global Climatic Disruption, June 1997) Considering that CO₂ remains in the atmosphere for long periods, the time to begin taking sensible actions is now.

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

-- John Browne, Group Chief Executive, British Petroleum

maybe talk about business impacts -
eg. major impact on N.E. shopping in
LA - others?

CLAIM THAT THE CLIMATE MODELS ARE INACCURATE

CHARGE: *Climate models cannot be trusted to provide accurate predictions of future climate changes. The climate system is simply too complex. These models are no more useful than the economic models which the Administration admits cannot accurately represent the costs of taking action.*

FACT: **Climate models have proved highly accurate in providing insight into how the Earth's climate system works.**

- Climate models are based on fundamental physical and thermodynamic laws. The processes that determine temperature, winds, and pressure, and their distribution over the planet, are quite well understood and, to a large extent, their global scale influences can be represented in the climate models.
- Climate models are largely self-consistent, responsive to changes in physical and chemical parameters (like the carbon dioxide concentration) and effective in giving indications of how the weather and climate will change as a result of human influences.
- Economic models are fundamentally based on rules derived from observed social and economic behavior, which are generally not universal and may change over time.
- When tested against the historical climate record, the most recent general circulation climate models tend to *underestimate* changes, suggesting that predictions of future changes may be conservative rather than overstated, as charged by many skeptics.
- Still, modeling future climate changes as many as 100 years into the future is highly complex, and uncertainties do exist. In the IPCC estimates of climate change by the year 2100, uncertainties in the scenarios of human activities and uncertainties in the responsiveness of the climatic system to changes in atmospheric concentration contributed about equally to the range of predicted temperature increases.
- The U.S. spends about \$1.8 billion annually on global change research. This effort already has and will continue to vastly improve our understanding of climate change and the tools for predicting future climatic responses.

CLAIM ON MISINTERPRETATION OF THE IPCC

CHARGE: *The level of certainty attributed to the conclusions of the Intergovernmental Panel on Climate Change (IPCC) has been overstated. The IPCC has not in fact determined that humans are influencing the climate system.*

FACT: **In the Summary for Policymakers of the IPCC's Second Assessment Report, the scientists clearly conclude that "the balance of evidence suggests a discernible human influence on global climate."**

- While few things in science are absolutely certain, the IPCC suggests that the sum of evidence makes it virtually impossible to conclude that observed warming over the past century is primarily a natural phenomenon. (Source: IPCC, 1995)
- Even more important, the IPCC report concludes that we are only in the early stages of seeing the effects from human-induced warming. As concentrations of greenhouse gases continue to rise in the next century, the resulting disruption of the climate will become more and more noticeable. (Source: IPCC, 1995)

"It would be unfortunate if the current debate over this ultimately transitory issue [the statistical uncertainties in the detection of anthropogenic climate change] should distract from the far more serious problem of the long-term evolution of global warming once the signal has been unequivocally detected above the background noise."

— Klaus Hasselman, *Science*, 9 May 1997

**
KEY POINT*

CLAIM ON THE VALIDITY OF THE IPCC

CHARGE: *The IPCC is not the authoritative scientific body it has been made out to be. Many of its key conclusions are the work of selective rewriting that has hidden the range of uncertainty that exists within its ranks.*

FACT: **The overall IPCC report is based on the contributions of over 2,000 of the best scientists in the world. Its conclusions, including the statement suggesting a human influence on climate, reflect the consensus view of the expert scientists in each area of study.**

- The IPCC report translates key scientific conclusions and findings into the best available guidance for policymakers. While the report makes it abundantly clear that many detailed uncertainties remain in the scientific understanding of climate change, the main findings are clearly stated and widely agreed to.
- The IPCC report has been unanimously approved by over 100 governments, each of which asked its best scientists to contribute to and review it.
- Allegations that key parts of the IPCC Second Assessment Report were changed at the last minute to hide scientific uncertainties are entirely unfounded. Modifications and editorial changes were made to the final draft to reduce repetition and clarify the agreed views of the scientists concerned.

↓
Source ?

CLAIM ON SATELLITE VS. SURFACE TEMPERATURE READINGS

CHARGE: *While surface measurements may in fact show some recent warming, far more accurate satellite measurements reflect a slight cooling over the same period.*

FACT: **While differences exist, both the satellite and surface records indicate that human activities are having a warming influence.**

- Satellite and surface observations measure different aspects of global temperature, and both techniques are influenced by a range of different factors.
- Surface measurements show a clear warming in both the Northern and Southern Hemispheres over the past century. The consistency of these measurements across wide geographic regions eliminates the possibility of their being influenced by urban heat islands or other localized factors.
- At the higher altitudes where the satellites measure, the wide range of temperature fluctuations and the relatively short record make it difficult to separate the human-induced warming trend from normal climate variability. However, when natural variations are taken into account, an underlying global warming trend in the satellite record that is roughly consistent with model predictions is evident.
- While there are very strong indications of the human influence on climate, continued research efforts are needed to further reduce uncertainties and to detect potential surprises that may emerge.

Weak. Can't we say that satellite record is consistent with global warming-- shows N. Hemis. a bit cooler because of separate effect of air pollution reflecting away sunlight... or whatever. Check with Rasmus. And need sources.

James

CLAIM THAT CLIMATE CHANGES WILL BE POSITIVE

CHARGE: *If man-made climate changes do occur, they are likely on balance to be positive.*

FACT: This is ~~entirely~~ incorrect. The projected impacts of increased climate change are overwhelmingly negative, affecting human health, food security, water resources, coastal areas, and natural ecosystems.

- The impacts of climate change will vary greatly from region to region, and it is difficult today to say with certainty how and when any given region will be affected. Nevertheless, we can make some fairly safe broad predictions.
- Certain regions may experience benefits from climate change. For example, in areas where it is now too cold for agriculture, climate change may lengthen the growing season. Furthermore, increased carbon dioxide concentrations in the atmosphere may stimulate plant growth under certain conditions.
- In most areas, however, the impacts are likely to be highly negative. Consider the United States:
 - ⇒ In the arid West, changing precipitation patterns are likely to result in less snow accumulation at higher elevations. The corresponding reduction in summer runoff could have **disastrous impacts on agriculture and urban water supplies.**
 - ⇒ In the Midwest, increased heat and generally drier conditions could reduce soil moisture, **threatening agricultural production.**
 - ⇒ In the Southeast, rising sea levels could **flood large areas of low-lying coastal wetlands and estuaries**, while further exposing coastal communities to **damage from hurricanes and storm surges.**
 - ⇒ In the Northeast, increasing temperatures are predicted to **alter forest composition**, while changing ocean temperatures could force **shifts in traditional fisheries.**

consistent
with R03, na
chart 7

"Global climatic change is probably the single most important issue facing the world today... If we don't do something about the climatic changes on a global level, we will see some changes that will alter the lifestyle of our children and grandchildren." -- Kaj Ahlmann, President, Employers Reinsurance Corp.

CLAIM THAT WE SHOULD SIMPLY ADAPT TO CLIMATE CHANGE

CHARGE: *The best way of coping with climate change is to adapt to it rather than to promote expensive policies which are unlikely to solve the problem anyway.*

FACT: Some adaptation is inevitable, as even the world's strongest effort cannot avert at least a certain level of human-induced warming. Unchecked global warming, however, has the potential to impose almost ~~unthinkable~~ economic, environmental, and social costs on the United States and the world.

unacceptable

- Societies everywhere depend on the climates they have known for centuries.
 - ⇒ For example, Africa, India, and China depend entirely on the timing of heavy seasonal rains for their agricultural production.
 - ⇒ Cities and communities around the world, particularly in arid regions, need recurring rains to fill reservoirs, rivers, and groundwater aquifers.
- Predicted climate disruptions could threaten these precipitation patterns, with severe consequences for hundreds of millions of people who depend on them.
- Arguably, the most devastating effects of climate change will occur in the developing world where most countries are ill-equipped to take even basic adaptation measures.
- Responding to natural disasters is a hugely expensive undertaking in the United States. In 1996 alone, five weather-related disasters – from drought in the Southern Plains to flooding in the Pacific Northwest – did an estimated \$16 billion worth of damage. (Source: NOAA) These costs are likely to escalate as climate change brings more extreme weather events and sea level rise.
- Over 2,300 economists, including ⁸six Nobel Laureates, have argued that responding to climate change is justified and that sensible measures can be taken that will not negatively affect the U.S. economy and may, over the long run, strengthen it. (Source: 1/97 Economists Statement on Climate Change)

Interdependence point -
quote Holden re how
chaos or disruption in developing
world will hurt us too...

CLAIM ON INSUFFICIENT ECONOMIC ANALYSIS

CHARGE: *The Administration has not done sufficient analysis to understand what a treaty that binds us to specific emissions reductions could mean for the domestic economy.*

FACT: **The Administration has carefully examined a range of economic models and emissions reduction scenarios to look at possible effects on the economy of meaningful actions to address climate change.**

- Our review of the economic literature clearly indicates that there are sensible steps that can be taken to slow climate change without causing damage to the economy. This conclusion has been validated by over 2,300 economists.
(Source: 1/97 Economists Statement on Climate Change)

- The long-term nature and range of variables inherent in economic modeling on climate change make it impossible to reliably estimate the exact costs of tackling the problem. We can come up with a range of economic impacts but not with a precise cost.

- Several broad conclusions are almost universally agreed:

OK? { ⇒ **flexibility matters** – taking advantage of market-based options such as emissions trading and joint implementation can make an enormous difference in lowering the cost of emissions reductions.

⇒ **technology is vital** – the speed at which new technologies can be developed and deployed that improve energy efficiency and increase reliance on renewable energy sources, will play a major role in determining the costs of needed emissions reductions

⇒ **all countries must participate** – developed and developing countries must both be part of the process if environmental gains are to be achieved, if a level playing field is to be created, and if American competitiveness is to be preserved.

- U.S. climate change policy under President Clinton has consistently emphasized these points.
- Before specific emissions reduction policies are chosen, the President has committed to engaging the American people and listening to a wide range of interests to ensure that the most sensible options are selected.

CLAIM THAT ANY RESPONSE WILL COST TOO MUCH

CHARGE: *Any serious effort to confront climate change would inevitably wreak havoc on the American economy.*

FACT: More than 2,300 of the nation's top economists, including ~~six~~ Nobel Laureates, disagree emphatically.

- "For the United States, in particular, sound economic analysis shows that there are policy options that would slow climate change without harming American living standards, and these measures may in fact improve U.S. productivity in the longer run." (Source: 1997 Economists Statement on Climate Change)
- Despite claims to the contrary, taking steps to protect the environment need not jeopardize economic progress. Numerous studies have shown "that there is little to document the view that environmental regulations have had a measurably adverse effect on competitiveness." [Sources: Jaffe, Peterson, Portney, and Stavins, "Environmental Regulation and International Competitiveness: What Does the Evidence Tell Us?" Resources for the Future, Discussion Paper 94-08; Also see Palmer, Oates, and Portney, "Tightening Environmental Standards: The Benefit-Cost of the No-Cost Paradigm?" *Journal of Economic Perspectives* 9 (1995), 119-132; and Daniel Esty, *Greening the GATT* (Institute for International Economics, 1994).]
- The United States has taken the lead in proposing market-oriented policies to ensure that emissions reductions are achieved as efficiently and cost-effectively as possible. These include the trading of emissions and the opportunity to conduct joint projects with other countries to reduce emissions.
- President Clinton has made it clear that he will not propose specific levels of emissions reductions without ensuring that they can be attained consistent with continued economic prosperity.
- Revitalizing the American economy has been, and will continue to be, the President's top priority. His leadership has brought strong growth, low unemployment and inflation, and millions of new jobs. He is demonstrating on this issue, as he has on many others, that economic growth and environmental protection go best when they go hand in hand.

"I have devoted my passion and the best ideas I could come up with to try to get this country in good shape economically and socially. But I do believe it is folly for us to believe that we can go into the next century without a strategy that says we're going to be responsible and we're going to do our part and lead the world on environmental issues... Let's find a way to preserve the environment, to meet our international responsibilities, to meet our responsibilities to our children, and grow the economy at the same time." -- President Clinton

CLAIM THAT CLINTON PLANS WILL DEVASTATE THE ECONOMY

CHARGE: *The Administration's plans on climate change would devastate the U.S. economy. By some estimates, they would increase U.S. unemployment by 0.25 percent and reduce the GDP by 3.3 percent, costing 250,000 American jobs.*

FACT: These are groundless assertions.

- There is no "Clinton plan" yet. The Administration is examining a variety of scenarios and talking to a range of experts to determine how to achieve needed environmental benefits without sacrificing continued economic prosperity.
- Any policy that is chosen will be consistent with the President's commitment to sustaining a healthy and robust economy. Since President Clinton took office, the private sector of the economy has grown at more than twice the rate of the previous four years, business investment has boomed at a rate not seen since the Kennedy Administration, unemployment is as low as it has been in 24 years, and 12.9 million new jobs have been created. (Sources: Bureau of Economic Analysis, Department of Commerce; Bureau of Labor Statistics, Department of Labor)
- More than 2,300 economists believe that taking preventive steps to confront climate change is justified and that it is possible to do so without harming American living standards. In fact, they state that long-term productivity could be improved by such steps. (Source: 1/97 Economists Statement on Climate Change)
- Providing a definitive answer on how much it will cost to slow climate change is virtually impossible. Different economic models come up with different numbers based on different assumptions. Common sense dictates that the cost will depend on several broad factors, including the manner in which a policy is implemented and the speed at which the economy adapts.
- The Clinton Administration is committed to tackling climate change by maximizing efficiency and innovation. That means supporting market-based policies such as emissions trading and joint implementation, and it means making major investments in developing new energy technologies. The President is also resolved that all countries must take meaningful steps to address climate change. Otherwise, it will be impossible to solve the environmental problem and to ensure a level international playing field.
- Tackling climate change will entail costs to particular economic sectors, just as it is likely to create opportunities in others. No matter what specific emissions reduction policies are chosen, the Administration will work to ensure that such costs are minimized.

including
8 Nobels

weak