This document is made available through the declassification efforts
and research of John Greenewald, Jr., creator of:

The Black Vault

The Black Vault is the largest online Freedom of Information Act (FOIA) document clearinghouse in the world. The research efforts here are responsible for the declassification of hundreds of thousands of pages released by the U.S. Government & Military.

Discover the Truth at: **http://www.theblackvault.com**

USAWC STRATEGY RESEARCH PROJECT

SHOULD THE UNITED STATES RATIFY THE KYOTO TREATY?

by

Lieutenant Colonel Adrian C. Poné
United States Air Force

Colonel Lee DeRemer
Project Adviser

This writing assignment is submitted in partial fulfillment of the requirements of the Master of Strategic Studies Degree. The U.S. Army War College is accredited by the Commission on Higher Education of the Middle States Association of Colleges and Schools, 3624 Market Street, Philadelphia, PA 19104, (215) 662-5606. The Commission on Higher Education is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation.
The views expressed in this student academic research paper are those of the author and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the U.S. Government.

U.S. Army War College
CARLISLE BARRACKS, PENNSYLVANIA 17013

ABSTRACT

AUTHOR: Lieutenant Colonel Adrian C. Poné

TITLE: Should the U.S. Ratify the Kyoto Treaty?

FORMAT: Strategy Research Project

DATE: 27 March 2009 WORD COUNT: 5,811 PAGES: 30

KEY TERMS: Global Mean Surface Temperature (GMST), Anthropogenic Global Warming (AGWA), Carbon Dioxide (CO2), Greenhouse Gas (GHG)

CLASSIFICATION: Unclassified

Global warming is a serious issue but also a contentious one; perhaps the fate of the planet hinges on man's ability to limit anthropogenic greenhouse gases such as carbon dioxide (CO2), which to some, is causing an alarming rise in the earth's temperature, with potentially catastrophic results. And yet to others, the global warming issue is a non-issue, the so-called global warming alarmism is really no cause for concern, and the investment in reducing CO2 is not worth the benefit. At the center of the debate is the Kyoto protocol, an international treaty which mandates reduction in CO2 emissions, primarily from industrial nations to pre-1990 levels. To date, the U.S. has not ratified Kyoto while over almost all the world's countries, have. This paper will examine Kyoto and the impact of signing it. In doing so, this paper will discuss global warming, is it real, and is man causing it? This paper will explore many of the issues surrounding the global warming debate, the ramifications of ratifying Kyoto and the costs and benefits of adopting a "greener" society.

SHOULD THE U.S. RATIFY THE KYOTO TREATY?

Global warming is a major world issue and potentially threatens the lives of millions of people, perhaps the existence of our planet. Since the end of the industrial age, the global mean surface temperature (GMST) has risen, as have the amount of greenhouse gases (GHG) in the atmosphere, and many scientists conclude the increased amount of GHG, caused by man, is setting off a runaway catastrophic temperature increase. As a result, international treaties such as the Kyoto protocol were created to cap nations' GHG emissions so as to prevent global warming which might trigger rising seas, extreme weather changes, drought, famine and war. And yet, there are many scientists who disagree with the notion of anthropogenic global warming (AGW); they assert the science is not settled, the earth's temperature has changed over millions of years and any attempts to reduce GHG, specifically Carbon Dioxide (CO2), will prove extremely costly, yield minimum results, while depriving millions of much-needed power.

The idea of global warming is an old one and the foundations go back to at least 1896 when Swedish scientist Svante Arrhenius calculated on a theoretical basis that an increase in CO2 might result in an increase in global temperature. However, the idea did not become a major issue until the 1980s.[1] Since then, the global warming issue has become more prominent, and in the late 1980s, most countries joined an international treaty -- the United Nations Framework Convention on Climate Change (UNFCCC) -- to begin to consider what could be done to reduce global warming and to cope with whatever temperature increases they thought were inevitable. More recently,

a number of nations approved an addition to the treaty: the Kyoto protocol, which has more powerful and legally binding measures.[2]

The Kyoto protocol is designed to limit CO2 emissions which according to some, is causing catastrophic global warming. The protocol was formed in February 2005 and as of 16 October 2008, 182 countries have deposited instruments of ratification, accession, approval or acceptance of the protocol. But the United States of America has refused to sign up to Kyoto.[3] Now a new American president, Barrack Obama, is in office, amidst an intense debate about the Kyoto protocol and certainly global warming, not only in America but around the world.

The purpose of this paper is to answer the question: what should be the U.S. policy on climate change and should the U.S. ratify Kyoto? In doing so, the paper will first discuss the context of the global warming issue and second, examine the Kyoto protocol, highlighting its history and some other details. Third, the paper will examine global warming, does it exist and is it a serious problem or just a passing temperature cycle? Fourth, the paper will analyze any global warming factors, specifically, is it caused by mankind? Fifth, the paper will discuss what can be done about global warming, specifically what are the pros and cons of the U.S. signing the Kyoto? Finally, the paper will provide a recommendation on whether or not the U.S. should ratify Kyoto and what policy the U.S. should take on global warming.

Global Warming Context

The issue of global warming is practically drawn up on battlefield lines; unfortunately the global warming science has been politicized. On the one side we have some like author, Thomas L. Friedman and Former U.S. Vice President, Al Gore.

In his book *Hot, Flat, and Crowded*, Friedman makes the point that global warming, rapid population growth and the rise of middle classes around the world, has caused our planet to be dangerously unstable. Friedman suggests that how America responds in addressing global warming, will determine the quality of life on earth in the twenty-first century.[4] In addition, Friedman says the U.S. should take the lead in solving the problem of global warming. Indeed, mankind-caused global warming in the opinion of many is a crisis, a point made by Gore who said the "climate crisis is a global strategic conflict." Gore goes on to say that solving the climate crisis requires a global transition to a low carbon economy.[5] Opponents of global warming such as Senator James Inhofe from Oklahoma, former Chairman of Environment & Public Works Committee, see it differently: *"Global Warming -- just that term evokes many members in this chamber, the media, Hollywood elites and our pop culture to nod their heads and fret about an impending climate disaster. As the senator who has spent more time speaking about the facts regarding global warming, I want to address some of the recent media coverage of global warming and Hollywood's involvement in the issue. And of course I will also discuss former Vice President Al Gore's movie "An Inconvenient Truth."*[6] Clearly, the global warming issue is extremely contentious, perhaps even drawn on political lines.

Kyoto History

Kyoto goes back to the late 1980s. Responding to concerns that human activities are increasing concentrations of GHG, such as CO2 and Methane that supposedly cause global warming, most of world nations signed the UNFCCC treaty in 1992 and the U.S., under President Bill Clinton, was one of the first nations to sign the

treaty. However, the UNFCCC treaty was voluntary; nations were to measure, report and limit GHG on their own. It is important to reemphasize that the Kyoto protocol is not voluntary. Kyoto is an amendment to the UNFCCC, an international treaty intended to bring countries together to reduce global warming. The Kyoto protocol provisions are legally binding on the ratifying nations and stronger than those of the UNFCCC.

The Kyoto protocol was negotiated in Kyoto, Japan, in December 1997. From December 1 through 11, 1997, more than 160 nations met in Kyoto, Japan, to negotiate binding limitations on greenhouse gases for the developed nations, pursuant to the objectives of the UNFCCC. The outcome of the meeting was the Kyoto protocol, in which the developed nations agreed to limit their GHG emissions, relative to the levels emitted in 1990. At the time, the United States agreed to reduce emissions from 1990 levels by seven percent during the period 2008 to 2012[7]--however, this agreement was not required by law. It is important to note that the protocol does not mandate any reductions for developing countries.[8]

Kyoto was opened for signature on March 16, 1998 and closed a year later and although the U.S. signed the protocol on 12 November 1998, the Clinton administration did not submit it to the U.S. Senate for consent, for the simple reason that meaningful participation by developing countries in binding commitments to limit GHG, had not been met. But more significantly, Kyoto was not submitted for Senate ratification as Congress would not have voted for it. After George W. Bush became U.S. President, a different perspective on Kyoto emerged, and in March 2001, the Bush administration rejected it. Although the U.S. did continue to attend the annual Conference of the Parties (COP) to the UNFCCC, it did not enter into Kyoto protocol negotiations.[9]

Clearly, the U.S. had problems with the treaty, most notably the fact that developing countries, specifically China and India, were and are not legally bound to cap their GHG emissions.[10] Despite this, in 2002, President Bush announced a U.S. policy for climate change that would rely on domestic, voluntary actions to reduce "greenhouse gas intensity" (ratio of emissions to economic output) of the U.S. economy by 18 percent over the next ten years.[11]

As time passed, Kyoto continued to expand as other countries entered the treaty. Under terms of the agreement, Kyoto would not take effect until 90 days after it was ratified by at least 55 countries involved in the UNFCCC. Another condition was that ratifying countries had to represent at least 55 percent of the world's total carbon dioxide emissions for 1990. The first condition was met on May 23, 2002, when Iceland became the 55th country to ratify Kyoto. When Russia ratified the agreement in November 2004, the second condition was satisfied, and Kyoto entered into force on February 16, 2005.[12] Now, the U.S. is the sole developed country that has not ratified Kyoto. As a result, some in the world feel the U.S. is arrogantly ignoring an international mandate in dealing with a global climate change problem. At this time it is important to examine the details of Kyoto.

As stated earlier, Kyoto is designed to reduce GHG, these gases include: CO2, methane (CH4), nitrous oxide (N2O), hydro-fluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF6). However, the most prominent and pervasive in human economic activity is CO2, produced when wood or fossil fuels—oil, coal, and gas—are burned.[13] The goal of the Kyoto protocol is to reduce worldwide greenhouse gas emissions to 5.2 percent below 1990 levels between 2008 and 2012. Compared to

the emissions levels that would occur by 2010 without the Kyoto protocol, however, this target actually represents a 29 percent cut.[14] No doubt, though, that the controversy is inherent because of uncertainties about the likelihood and magnitude of possible future climate change, the consequences for human well-being and the costs and benefits of dealing with the issue.[15] The bottom line is that there is still doubt whether GHG is causing global warming.

Some scientists believe GMST will rise 1.4 degrees centigrade by the year 2100, the rise caused by higher GHG. They claim the GHG accumulations were/are caused by 150 years of industrialization as well as overpopulation, deforestation, transportation and factory emissions. Other scientists dispute this. Regardless, the mechanism Kyoto would use to cap GHG is to place emissions reduction targets for developing nations. To meet their objectives, most ratifying nations would have to combine several strategies such as placing restrictions on their biggest polluters, manage transportation to slow or reduce emissions from automobile, and make better use of renewable energy sources—such as solar-power, wind-power, and biodiesel—in place of fossil fuels.[16]

One of the key reasons Kyoto is not palatable for some in the U.S. is the fact that countries such as India and China, are not required to cap their GHG emissions. Another issue with Kyoto is the notion that only developed countries have caused increases in GHG. This is reflective in the UNFCCC text, *recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity; Kyoto places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."*[17]

Is the World Warming?

The mere issue of global warming is a hot debate at the time of this writing, although some like Gore believe the global warming "debate is over."[18] It is without question that Earth has gone through several temperature variations. In fact during the past 20,000 years, climate has changed from the extreme of a glacial interval to an interglacial one.[19] The central question, though, is whether Earth is now approaching a warming crisis? There are many on both sides of the issue.

The global warming believers, sometimes called anthropogenic global warming alarmists, use their research data to suggest Earth is dramatically heating and that we are headed for disaster. In fact, one noted scientist, Dr. James E. Hansen, head of the NASA Goddard Institute for Space Studies said in his February 2009 testimony to the U.S. Congress, "We have a planet in peril."[20] The global warming believers point to so-called dramatic global changes—over the past 100 years, and particularly since the 1980s, there has been worldwide and dramatic shrinking of glaciers. Some experts say that most glaciers in the European Alps have been shrinking noticeably since the middle of the nineteenth century[21] and according to them this shrinking is closely related to global warming.[22] They also point to the polar caps which they say are melting at dramatic rate. Other scientists, such as MIT meteorological professor, Dr. Richard S. Lindzen, have a different and much less menacing point of view, "the increase in global mean temperature over the past century is about one degree Fahrenheit which is smaller than the normal inter-annual variability for smaller regions like North America and Europe, which is to say that temperature is always changing."[23] In a Wall Street Journal commentary, Lindzen goes on to say that he is quite confident the GMST has risen .5 degrees centigrade in the last 100 years. Furthermore, he writes, *the climate is*

always changing…thirty years ago we were concerned with global cooling.[24] Clearly, the science has shown that Earth's temperature has always changed over time.

It is a fact that GMST have fluctuated over time, however when viewed in historical context as in the chart below[25], this rise is small and not cause for alarm.

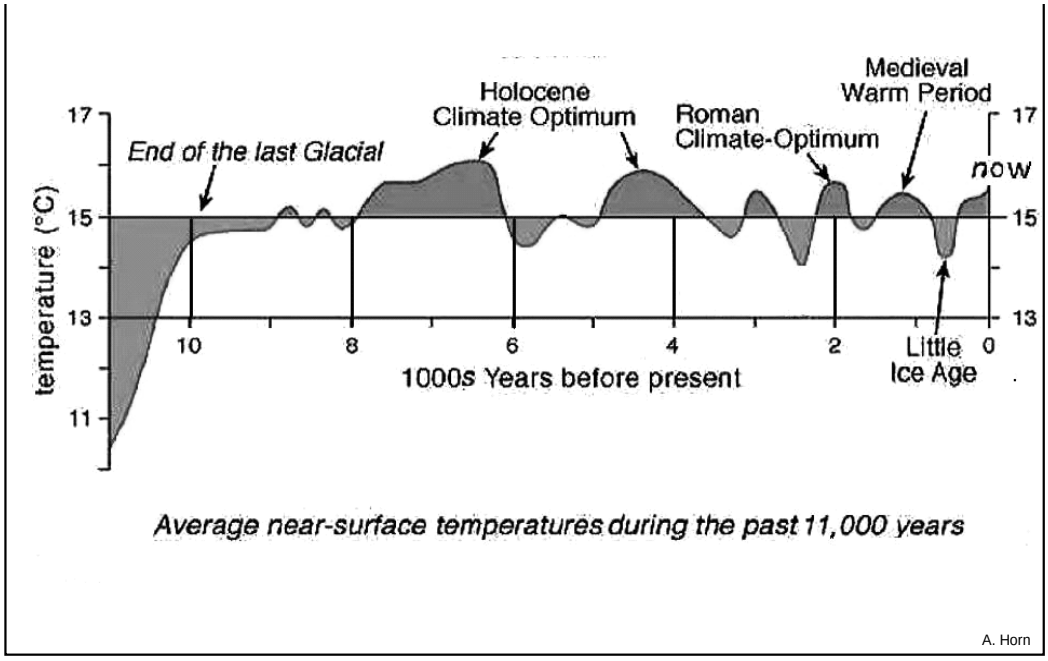


Figure 1.

It is no dispute, though, that Earth is warmer than a century ago and today, scientists are using all types of analysis--satellites, tree cores, and ice packs, etc.--to measure current and past climate conditions. Take for example research conducted by Glaciologist Jorgen Peder Steffensen. By drilling over three kilometers down through the Greenland icepack, Steffensen has been able to precisely map temperatures going back over 10,000 years. Steffensen's data shows that from 4,000 years ago to 2,000 years ago, the GMST decreased over 2.5 degrees Centigrade and that 1000 years ago temperature rose again, called the medieval warming period, and then dropped again.

Only recently, in 1875, the temperatures rose again after a nearly 10,000 year low, this low temperature point is known as the "little ice age."[26]

Although both sides agree the GMST has increased recently, there is disagreement in how much. For example, the 2007 United Nations Intergovernmental Panel on Climate Change (IPCC) report claimed that in the last 100 years the globe warmed .74 degree Centigrade.[27] Others state the temperature increases have been more extreme, Al Gore claims an almost one degree Centigrade global temperature rise in the last 100 years.[28] This one degree centigrade figure is disputed by many on the opposing side, like self-proclaimed global warming skeptic Dr. Robert C. Balling, Jr. who writes, "Linear rise in planetary temperature, 1890-1990, was 0.45 degree C, not almost 1 degree C claimed by Gore."[29] Indeed, several in the scientific community believe in the last few years there has been no rise, no trend in temperature.[30] Regardless of the amount of temperature change, there has been a warming trend in the last 100 years. However, in the global historical context, there have been warmer and colder periods, and the current temperature rise is not cause for alarm.[31] This belief is held by many scientists such as Dr. Nathan Paldar, Professor of Dynamical Meterology at the Hebrew University of Jerusalem, "First, temperature changes, as well as rates of temperature changes of magnitudes similar to that reported by IPCC to have occurred since the Industrial revolution--about .8C in 150 years or even .4C in the last 35 years--have occurred in Earth's climatic history. There's nothing special about the recent rise!"[32] What follows next, though, is the obvious question: is global warming caused by mankind, specifically GHG emissions, and if so, what are the consequences?

Is Global Warming Caused by Man?

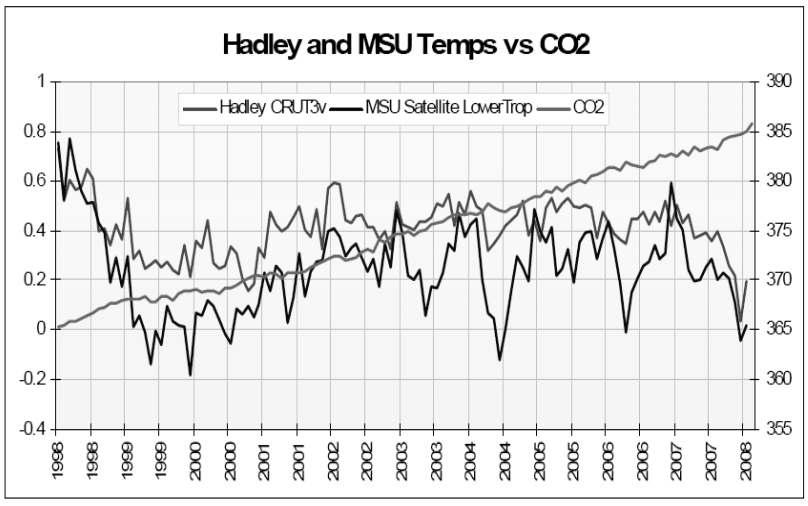
As stated earlier, the GMST has risen, perhaps .45 to maybe even one degree Centigrade in the last 100 years, although in the last decade the GMST has actually decreased slightly, and all told this total temperature rise is probably not cause for alarm. And yet, if GHG has caused this rise, will the temperatures rise faster and what will be the consequences? Indeed, here there might be cause for alarm. But first, an analysis of whether human GHG is causing global warming is necessary.

The experts from both sides have come out with their opinions. In his testimony to a Senate committee, Director of NASA's Goddard Institute for Space Studies, James Hansen, observed the 1980s was warmer than at any time in the history of measured observations, which he attributed with "a high degree of confidence" to the greenhouse effect rather than chance fluctuation in temperatures.[33] Others, such as numerous scientists from the United Nations Environment Programme believe the temperatures are rising and that natural variability influences climate--but most of the recent warming is very likely due to increased greenhouse gas emissions.[34]

Scientists in the sceptics' camp do not agree with the assessment that mankind GHGs are causing global warming. Some contest the AGW theory claiming the recent GMST rise is due to the sun, such as Dr. David Wojick, "In point of fact, the hypothesis that solar variability and not human activity is warming the oceans goes a long way to explain the puzzling idea that Earth's surface may be warming while the atmosphere is not. The GHG hypothesis does not do this."[35] Others had this to say, "Al Gore maintained that CO2 is driving temperature change now, and he neatly implied that the geological records showed that CO2 has always driven temperature changes. In fact, records show that CO2 lags behind big temperature changes by around 800 years - but

on a geological time scale, this lag is so small that you don't see it unless you look close."[36] But the consequences of doing nothing are severe; the AGW camp says the key is to slow the pace of warming and to limit its extent as far as possible without incurring unsupportable costs.[37]

Although few will deny there has been a GMST rise in the last century, the fact that it can be attributed to rising GHG is perhaps impossible to answer. Although there is agreement between the proponents and skeptics concerning CO2 levels: CO2 has risen from 310 Parts per Million (PPM) in 1900 to about 370 PPM at present, there is disagreement on a direct linkage to increased CO2 causing global warming.[38] Global warming believers point to correlations between temperature and CO2, while skeptics say CO2 increase follows temperature rise, not the other way around. The skeptics state that GMST has decreased despite rising CO2, as illustrated in the chart below.[39]



http://icecap.us/images/uploads/Correlation_Last_Decade.pdf

Figure 2.

Clearly, the science behind AGW is hotly disputed, and there is unquestionably significant doubt of whether there is a problem, and if there is, the causes of it. The

science of global warming is relatively simple, the reason the Earth has recently heated, is not. However, what risk are we willing to accept to discount catastrophic anthropogenic global warming?

Global Warming Consequences

As claimed by the AGW camp, Gore claims that the real danger from global warming is not that the temperature will go up a few degrees, it is that the whole global climate system is likely to be thrown out of whack.[40] According to the global warming camp, even a small rise in global temperatures will cause the polar caps to melt, triggering a large rise in oceans, which will swamp cities like New York, Miami and Amsterdam. The consequences will be dire and to the global warmers, the world must act now. According to Gore, "The planet has a fever. If your baby has a fever, you go to the doctor."[41]

And yet the skeptics have fired back, for example, they have criticized Al Gore's briefing on global warming, a single slide in his presentation, constructed by climatologist Dr. Michael Mann, which shows the GMST over time, rapidly rising in the last couple of years, the graph resembles a hockey stick.[42] The skeptics claim Mann's hockey stick graph ignores the Medieval Warming period and they make the point that Earth's recent warming is just another cycle. In addition to the "hockey stick" graph the skeptics criticize the 2007 IPCC report, which shows atmospheric CO2 levels over the last 10,000 years. Similar to Mann's temperature graph, the CO2 chart resembles the shape of a "hockey stick" in which the skeptics say the pre-1958 CO2 levels were falsely represented by researchers arbitrarily changing the age of the samples.[43] For every point made by the global warming proponents, there is a counter-point made by

the skeptics. Clearly the global warming debate is confusing, difficult to understand, and the arguments go back and forth.

The global warming proponents say Earth is getting warmer, alarmingly so. The skeptics say the temperature rise is a mere cycle, normal within the historical context of temperature fluctuations and no cause for concern, indeed to expect global cooling within the decade. Global warming proponents say the rising CO2 levels are causing the global temperatures to rise. The skeptics say CO2 increases occur after temperatures rise. The global warming proponents claim the polar ice packs are melting, the world's glaciers too. The skeptics point to increasing ice pack in Greenland, they say the world's glaciers have been melting for 100 years, despite a cooling period between 1940 and 1970. The global warming proponents claim the melted ice will cause the sea-levels to dramatically rise. Dr. James Hansen writes, *if the world warms by two to three degrees Centigrade, such massive sea level rise is inevitable, and a substantial fraction of the rise would occur within a century. Business-as-usual global warming would almost surely send the planet beyond a tipping point, guaranteeing a disastrous degree of sea level rise*.[44] Hansen goes on to say the collapse of the western Antarctic ice sheet "could yield a sea level rise of five to six meters."[45] The global warming skeptics say even if warming does continue, at most, the seas will rise only a few centimetres. Finally, most global warming proponents claim they have a world-wide consensus. And yet the global warming opponents challenge this, claiming that over 650 dissenting scientists from around the globe challenged man-made global warming claims made by the IPCC and former Vice President Al Gore.[46] Perhaps then, a step back to science is necessary.

The Science

Greenhouse gases in Earth's atmosphere allow the Sun's shortwave length radiation to pass through Earth's surface. Once the radiation is absorbed by Earth and re-emitted as longer wave-length radiation, GHGs trap the heat in the atmosphere, this is called the "greenhouse effect."[47] At this point in the science, the debate begins. Global warming believers state that increased GHG will result in higher global temperatures, triggering more GHG to be released with the melting of northern latitude permafrost, not to mention that projected increase of CO2 associated with economic development (coal-fire factories, automobiles, etc.) They claim the problem will get worse, such as what was written in a 2008 Congressional Research Service report; *Elevated concentrations of GHG in the atmosphere are due mostly to human activities, especially from the use of fossil fuels, clearing of land, and some industrial process. Continued population and economic growth, with dependence on fossil fuels and needs for expanding agricultural lands, are expected to drive GHG emissions and induced climate change over the 21st Century to levels never experienced by human civilizations.*[48] But the skeptics disagree, and with regards to GHG-induced higher temperatures, they point to the fact that the Sun has been hotter, for longer, in the past 50 years than in any similar period in at least the past 11,400 years.[49] The skeptics say there is strong scientific evidence that higher solar activity and lower cosmic ray flux tend to be associated with warmer climate, and vice versa—solar activity is at a 1,000 year high point and cosmic ray flux is at a 1,000 year low point.[50]

The debate over global warming comes down to science; unfortunately the science has been obscured by the political and ideological bickering. Although Arrhenius calculated that CO2 could indeed cause global warming, there is no

irrefutable proof that the increased CO2 values will cause runaway temperature rises. The scientists just don't agree, and unfortunately the science has been politicized. The global warming believers forecast Armageddon unless something is done, the opposition such as Andrei Kapitsa, Russian geographer and Antarctic ice core researcher disagree, "The Kyoto theorists have put the cart before the horse. It is global warming that triggers higher levels of carbon dioxide in the atmosphere, not the other way around."[51]

In this author's perspective, the science beyond the global warming claims is not adequate, more research and open debate is needed. It is true man's population has exploded over the last 50 years to the current level of over 6.8 billion inhabitants, and with this larger population there are greater CO2 emissions today as a result of industrialization and other bi-products of economic activity.[52] However, to suggest that the extra CO2 emissions will cause catastrophic global warming, to this author, is unproven. Indeed, mankind's CO2 released in the atmosphere, six billion tons per year, is miniscule when compared to what nature releases each year, 180 tons.[53] Dr. Robert Balling has this to say, "Over billions of years of earth-atmosphere evolution, fragile systems surely would have been replaced by more robust ones…I firmly believe that the earth-atmosphere system will be able to cope with the human-induced changes, which are actually quite small compared to changes over geological time scales, without throwing the climate system 'out of whack.'"[54] Over the millennia there have been numerous cataclysmic environmental events, Earth has survived. When Mount Pinatubo erupted in 1991 it put 20 Million tons of Sulfur Dioxide into the air, and yet the Earth survived.[55] Indeed, Mount Pinatubo pumped out a tremendous amount of GHGs.

Despite the extreme disagreement over global warming, the author believes there are significant benefits from adopting some of the suggestions aired by the global warming proponents and skeptics, alike.

The majority of this paper so far has discussed global warming: Does it exist and is it caused by humans? If mankind has caused global warming, what can be done about it? In addition, what benefits does the global warming camp propose? Are these suggestions beneficial to the world?

What can be done to Stop Global Warming?

Not surprisingly, this question is subject to debate. Global warming believers suggest that capping GHGs will allow atmospheric gases to eventually dissipate, allowing the long-wave radiation to leave the atmosphere like they should, thus cooling Earth. Although CO2 make take 1000s of years to lower to pre-industrial age levels, the AGW camp believes it is the only way to rectify the problem. The global warmers also believe automobile, coal-burning power plant and other energy sources emissions need to be capped. In addition, the global warmers believe that deforestation needs to stop, as plant-life will actually absorb CO2, a process known as "sinking." It has been suggested that the U.S. Congress may opt to consider land management practices, such as afforestation and conservation tillage, to help absorb carbon.[56] In the movie, "An Inconvenient Truth," Al Gore dramatically highlighted the vanishing Amazon rainforests, suggesting that the lost plant-life was driving up the world CO2 levels. There are several initiatives to reduce CO2, and the global warmers also believe an effective way to reduce CO2 is through carbon capture and storage (CCS).

CCS can be accomplished in several ways: cap-and-trade, CO2 tax, and the limiting of CO2 emissions. Cap-and-trade occurs when companies are given CO_2 emissions quotas. If a company exceeds its quota then it has to buy more emissions permits from a company that has not used up its allocation. Hence the permits have a value and can be traded, such as in the European Emissions Trading Scheme. One of the problems with cap-and-trade of course is the cost; companies, particularly utility companies will direct costs to the consumer. In addition to higher utility costs, cap-and-trade will certainly result in higher taxation for the consumer. The flip side to this, of course, is that innovation may spurn improvements in technology, which in the long run will perhaps reduce cost. CO2 taxation puts a value on all CO2 emissions to the atmosphere, making it easier for a company to capture and store it. Finally, limiting CO2 emission from power stations, such as planned but never implemented, clean-coal plants, plants such as FutureGen.[57]

FutureGen was a U.S. government project announced by President Bush in 2003 to build a near zero-emissions coal-fueled power plant to produce hydrogen and electricity while using capture and storage. FutureGen was a public-private partnership to build the world's first near zero-emissions coal-fueled power plant. The 275-megawatt plant was intended to prove the feasibility of producing electricity and hydrogen from coal while capturing and permanently storing carbon dioxide underground. Unfortunately, due to funding constraints, FutureGen was cancelled by the U.S. Department of Energy in January 2008.[58] Other initiatives common in the global warming debate are cleaner and more efficient automobiles, and more accessible and less polluting mass transportation—Americans traveling to Europe will see a sharp

contrast between vehicle size (European cars are much smaller and more fuel efficient) and mass transportation availability.

The global warming skeptics, after first scoffing at the notion, will say that global warming cannot be prevented, if indeed it were a problem. First, they say enforcing the Kyoto protocol would be nearly impossible, countries will report whatever GHG emissions they desire. Secondly, even if the Kyoto protocol emissions caps are adhered to, it will only result in a .4 percent reduction of CO2 levels by 2010.[59] Finally, the skeptics point to computer models, which they say are notoriously inaccurate and would not be able to forecast the correct level of CO2 to reverse any possible global warming.

Recommendations

As with the entire global warming debate, there is much disagreement on future action; however it does seem that some benefits can be realized if a common approach is taken. First, technology to reduce pollution can only benefit the quality of life for humans. Coal-fired plants that burn cleaner will, if nothing else create fresher air to breath. Automobiles that run on battery-power will help reduce dependency on foreign oil. However, the Detroit automakers will have to re-tool their plants and the consumer will have to adjust to smaller vehicles. Yet quiet and efficient automobiles certainly have many benefits. Clearly, there is common ground in this debate. However, at this point, signing Kyoto does not make sense.

Signing the Kyoto Protocol would require the U.S. to reduce GHG levels by 2012, and the U.S has not even started. And although the next COP meeting is scheduled for December 2009, in Norway, where the U.S. President might push for Kyoto ratification,

with respect to the AGW debate, the science is just not settled. In the author's opinion, with the world-wide economic crisis at hand, the high costs of reducing CO2, the increased taxation on the consumer , as well as the doubts in the global warming debate, signing the agreement would be a mistake. Furthermore, since China and India, as developing countries, are under no restrictions to cap their CO2 levels, the Kyoto protocol does not make any sense as the U.S. has to compete with both those countries on the global economic stage. Capping GHG at this stage in order to make a 2012 suspense would require significant investment; the environmental benefit would be outweighed by the financial and economic impact. Furthermore, only 13 of the 15 European Union nations that have signed Kyoto will be able to meet their emissions goals set out in the protocol.

However, the U.S. should take a leading world role in being a good steward of the global environment. A U.S. policy focusing on green technologies that enhance and not harm the environment, while creating economic growth is essential. Already, there are great ideas. One great idea comes from the military, the use of algae to create jet fuel. The Pentagon's Defense Advanced Research Projects Agency (DARPA) program has a team headed by General Atomics that has already cut the cost of algae-based oil from $30 a gallon to about $6 or $7 a gallon, although the price needs to get closer to a dollar to make it competitive. In addition, to meet algae's need for carbon dioxide, the algae farms could be built near power plants, cement kilns, fermentation facilities and coal-to-liquid fuel plants, all of which produce a lot of carbon dioxide. In that way, algae could help reduce U.S. dependence on imported oil and reduce carbon dioxide emissions, if that is, CO2 is a problem.[60]

There are many other initiatives the U.S. can take in improving the environment while strengthening the economy. First, increasing the number of nuclear power plants will reduce coal-fire and oil power plants, reduce pollution, create jobs, and reduce the demand on fossil fuels, specifically foreign oil. Currently, 50 percent of America's electricity comes from coal, only 20 percent from nuclear energy. By contrast, France gets 80 percent of its electricity from nuclear power. Nuclear power if regulated correctly is very safe and reliable, and building more nuclear power plants will create jobs. The U.S. can also take the lead in afforestation and other environmental conservation initiatives. Land conversation in this case is critical, the government should create more natural preserves and parks, and reduce urban sprawl as well as clear-cut buildings. Other initiatives include more efficient heat, cooling and appliances, more energy efficient buildings, better and more fuel efficient mass transportation such as electric rails, and increased use of renewable items. Recycling should be mandatory in this country; there should be a national effort to cut back on plastic cups and bags.

Finally, a real debate on global warming must take place. Whether or not manmade gases is causing global warming, and to the extent it may cause a catastrophic climate change in the future, must be thoroughly debated, and only scientists can do this. Right now, there are just too many prominent scientists, Dr. Richard Lindzen, Dr. John Christy, and Dr. Larry Gould, just to name a few, that dispute the notion of catastrophic anthropogenic global warming. A real debate, absent from the halls of the Congress, must occur, perhaps on a neutral ground in a University campus, moderated by a neutral player. The debate should be televised to the

American public. The American public will then speak on whether the country needs to reduce GHG to the extent stipulated in the Kyoto Protocol.

In the mean time, through innovation, America can work toward achieving energy independence, and in the process, perhaps reduce GHG. But GHG should not be taxed at least until the science is settled. And right now, in the author's opinion the science behind catastrophic anthropogenic global warming seems weak; certainly the GW debate is "not over." But energy independence is important. If nothing else, the high fuel prices of 2008 emphasized the need to wean the American economy off of foreign oil imports, which at the writing exceeds 70% of America's consumption. Innovation in the form of nuclear, clean-coal, wind, solar and biomass power, electric/hybrid cars and an enhanced electrical power grid, will go a long way to achieving this goal. In the end, perhaps the Kyoto protocol is a good "forcing function" for this innovation, but like everything else, science--the truth, not politics, should decide where we go.

Endnotes

[1] Ben Bolch and Harold Lyons, *Apocalypse Not, Science, Economics and Environmentalism* (Washington DC: Cato Institute, 1993), 71.

[2] "Essential Background, The Convention and the Protocol," *The United Nations Framework Convention on Climate Change (UNFCC)*, http://unfccc.int/essential_background/items/2877.php (accessed March 26, 2009).

[3] "Status of Ratification," *The United Nations Framework Convention on Climate Change (UNFCC),* http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php (accessed March 26, 2009).

[4] Thomas L. Friedman, *Hot, Flat, and Crowded* (New York: Farrar, Straus and Giroux, 2008), 5.

[5] Al Gore, *New thinking on the climate crisis*, TED.COM lecture at Monterey, California on February, 2008, http://video.ted.com/talks/podcast/AlGore_2008_480.mp4 (accessed March 26, 2009).

[6] Senator James Inhofe, *US Senate floor speech*, delivered Washington DC on September 25, 2006, http://epw.senate.gov/speechitem.cfm?party=rep&id=263759 (accessed March 26, 2009).

[7] "Impacts of the Kyoto Protocol on U.S. Energy Markets and Economic Activity," *Energy Information Administration*, http://www.eia.doe.gov/oiaf/kyoto/kyotorpt.html (accessed March 26, 2009).

[8] Josh Carter, "TED Case Studies: The Kyoto Protocol International Agreement, Domestic Implications," June 2002, http://www.american.edu/projects/mandala/TED/kyoto.htm (accessed March 26, 2009).

[9] Susan R. Fletcher, *Global Climate Change: The Kyoto Protocol* (Washington, DC: Congressional Research Service Report for Congress, July 2005), 2.

[10] "List of Non Annex I Parties to the Convention," linked from *The United Nations Framework Convention on Climate Change (UNFCCC)*, http://unfccc.int/parties_and_observers/parties/non_annex_i/items/2833.php (accessed March 26, 2009).

[11] Fletcher, *Global Climate Change: The Kyoto Protocol,* 2.

[12] Larry West, "Should the United States Ratify the Kyoto Protocol?" http://environment.about.com/od/kyotoprotocol/i/kyotoprotocol.htm (accessed March 26, 2009).

[13] "The Kyoto Protocol and the United States," *Encyclopedia of Earth*, http://www.eoearth.org/article/Kyoto_Protocol_and_the_United_States (accessed March 26, 2009).

[14] West, "Should the U.S. Ratify Kyoto?"

[15] Larry Parker and John Blodgett, *Global Climate Change: Three Policy Perspectives*, (Washington DC: Congressional Research Service Report for Congress, November 2008), summary page.

[16] West, "Should the U.S. Ratify Kyoto?"

[17] "The Kyoto Protocol," *The United Nations Framework Convention on Climate Change (UNFCC*C), http://unfccc.int/kyoto_protocol/items/2830.php (accessed March 26, 2009).

[18] Gore, *New thinking on the climate crisis*.

[19] William C. Clark, et al., *The Earth as Transformed by Human Action, Global and Regional Changes in the Biosphere over the Past 300 years* (New York: Cambridge University Press, 1990), 148.

[20] Dr. James. E. Hansen, Testimony to US House of Representatives Committee on Ways and Means, delivered Washington DC on March 26, 2009, http://www.columbia.edu/~jeh1/ (accessed March 26, 2009).

[21] James L. Dyson, *The World of Ice* (New York: Alfred A. Knopf, 1962), 171.

[22] United Nations Environment Programme, *Global Outlook for Snow and Ice, 2008* http://www.unep.org/geo/geo_ice/PDF/GEO_C1_LowRes.pdf (accessed March 26, 2009).

[23] Dr. Richard S. Lindzen, *Testimony to Senate Environment and Public Works Committee*, delivered Washington DC, May 2, 2001, http://www-eaps.mit.edu/faculty/lindzen/Testimony/Senate2001.pdf (accessed March 26, 2009).

[24] Dr. Richard S. Lindzen, "Scientists' Report Doesn't Support the Kyoto Treaty," *Wall Street Journal*, June 11, http://online.wsj.com/article/SB992205567633857892.html (accessed March 26, 2009).

[25] Dr. Laurence Gould, "Global Warming Alarmism: Checking the Claims, Exposing the Methods," briefing slides, New York, NY, 2009 International Conference on Climate Change, March 10, 2009.

[26] CBCNewsWorld, "Global Warming - Doomsday Called Off,"Written/directed by Lars Oxfeldt Mortensen, http://www.youtube.com/watch?v=fr5O1HsTVgA&feature=PlayList&p=C012004CB098DE90&index=0 (accessed March 26, 2009).

[27] Intergovernmental Panel on Climate Change (IPCC), "IPCC synthesis report," http://www.ipcc.ch/ipccreports/ar4-syr.htm (accessed March 26, 2009).

[28] Al Gore, *Earth in the Balance, Ecology and the Human Spirit*, (New York: Houghton Mifflin Company, 1992), 96.

[29]Robert C. Balling, Jr., *Environmental Gore*, (San Francisco: Pacific Research Institute for Public Policy, 1994), 113.

[30] Laurence Gould, "An Open Letter to Members of the New England Section of the American Physical Society, Anthropogenic Global Warming Alarmism: A Corruption of Science," *NES APS Newsletter, Spring 2008,* http://uhaweb.hartford.edu/LGOULD/NES%20APS%20Spring%202008%20Newsletter_On%20AGWA%20Claims.pdf (accessed March 26, 2009).

[31] "Temperature Change History," http://www.seed.slb.com/en/scictr/watch/climate_change/change.html (accessed November 20, 2008).

[32] U.S. Senate Committee on Environment and Public Works Minority Home Page, http//:epw.senate.gov/public/index.cfm?FuseAction=Minority.SenateReport (accessed March 26, 2009).

[33] Marvin S. Soroos, *The Endangered Atmosphere, Preserving a Global Commons*, (Columbia: University of South Carolina Press, 1997), 187.

[34] Global Outlook for Ice and Snow, 2007, slide 7/8, linked from power point at "English," http://www.unep.org/geo/geo_ice/ (accessed March 26, 2009).

[35] U.S. Senate Committee on Environment and Public Works Minority Home Page.

[36] Reclaiming Climate Science Home Page, http://www.greenworldtrust.org.uk/Science/Curious.htm (accessed March 26, 2009).

[37] Paul R. Ehrlich and Anne H Ehrlich, *Healing the Planet*, (New York: Addison-Wesley Publishing Company, Inc., 1991), 96.

[38] Balling, *Environmental Gore*, 111.

[39] Gould, "Global Warming Alarmism: Checking the Claims, Exposing the Methods."

[40] Gore, *Earth in the Balance, Ecology and the Human Spirit*, 97.

[41] Al Gore, *Testimony to US Congress*, delivered Washington DC, March 21, 2007 http://www.youtube.com/watch?v=CqUHM2gf5g4&feature=related (accessed March 26, 2009).

[42] *Outside the Beltway Home Page*, http://www.outsidethebeltway.com/archives/y2k_bug_causes_global_cooling/al_gore_hockey_stick_mbh98_graph/?akst_action=share-this (accessed March 26, 2009).

[43] Zbigniew Jaworowski, "CO2: The Greatest Scientific Scandal Of Our Time", *21st Century Science and Technology*, (Summer 2007): 15.

[44] James Hansen, "Climate Catastrophe," 28 July 2007, linked from the NewScientist Home Page, www.newscientist.com (accessed March 26, 2009).

[45] James Hansen, "The urgency of the climate crisis," delivered Washington DC., February 28, 2007, http://www.youtube.com/watch?v=f0hHlxaYNb0 (accessed March 26, 2009).

[46] *U.S. Senate Committee on Environment and Public Works Minority* Home Page.

[47] Jane A. Leggett, *Climate Change: Current Issues and Policy Tools*, (Washington, DC: Congressional Research Service Report for Congress, June 2008), 7.

[48] Ibid., 2.

[49] Lord Monkton of Brenchley, *Errors Covertly Corrected by the IPCC after publication and Uncorrected Errors by Al Gore* (Washington, DC: Center for Science and Public Policy, 2007), 7.

[50] G. Usoskin et al., *Solar activity, cosmic rays, and Earth's temperature: A millennium-scale comparison*, Journal of Geophysical Research, 110 (April 2005).

[51] U.S. Senate Committee on Environment and Public Works Minority Home Page.

[52] "World Population Clock, University of North Carolina," http://www.ibiblio.org/lunarbin/worldpop (accessed March 26, 2009).

[53] Gould, "Global Warming Alarmism: Checking the Claims, Exposing the Methods."

[54] Balling, *Environmental Gore*, 110.

[55] Bijal Trivedi, “Hacking Earth Against Warming, Scientists Favor Fake Volcanoes,” June 5, 2008, *Popular Mechanics*, http://www.popularmechanics.com/science/earth/4267288.html?series=15 (accessed March 26, 2009).

[56] Peter Folger, *The Carbon Cycle: Implications for Climate Change and Congress* (Washington, DC: Congressional Research Service Report for Congress, March 2008), 2.

[57] “Carbon Capture and Storage,” http://en.wikipedia.org/wiki/Carbon_capture_and_storage (accessed March 26, 2009).

[58] “Clean Coal Technology,” http://en.wikipedia.org/wiki/Clean_coal_technology (accessed March 26, 2009).

[59] Bill Hare, “Undermining the Kyoto Protocol: Environmental effectiveness versus Political Expediency?” http://archive.greenpeace.org/climate/politics/reports/riia1.pdf, 5.

[60] William Matthews, “From Algae To JP-8 Pentagon’s DARPA Funds Efforts To Make a Green Jet Fuel,” *Defense News*, January 5, 2009.