

# Global Warming: A Non-Politically Correct Viewpoint!

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Global Warming has become a popular subject, but the basic concept has been discussed for at least 100 years. This discussion is primarily about some of the scientific questions that are often overlooked, plus a brief mention of some of the political considerations and the author's conclusions about the subject.

## **Background**

Most of our energy today comes from fuels containing carbon, so carbon dioxide is a major by-product of our civilization. Scientists have known for 150 years or so that CO<sub>2</sub> is a natural constituent of the atmosphere and that it has a major influence on the heat balance of the earth. The earth's average temperature is about 59° F; if there were no CO<sub>2</sub> in the atmosphere, the estimated average is around zero F—a *frozen wasteland*. In such an environment, life as we know it would be drastically different or perhaps would not exist.

The mechanism by which CO<sub>2</sub> affects temperature isn't complicated. The earth receives energy from the sun largely as ultraviolet radiation and radiates energy back into space primarily as infrared radiation. The earth's temperature is determined by the equilibrium between incoming and outgoing energy. The CO<sub>2</sub> in the atmosphere has little or no effect on the incoming UV energy but absorbs some of the outgoing IR energy, so in theory an increase in atmospheric CO<sub>2</sub> could cause an increase in temperature. A few other gases also exhibit the same "greenhouse effect" but, in the interest of brevity, this discussion will be limited to CO<sub>2</sub>.

If that's all we knew about global warming, it would be a simple matter. *Unfortunately, it's not that simple!*

## **CO<sub>2</sub> Increase**

Accurate measurements of atmospheric CO<sub>2</sub> have been made on a remote island of Hawaii since 1958. Indirect methods (ice cores, bottom sediments, etc.) were used to extend the data back to the mid-1800s or so, thus covering most of the CO<sub>2</sub> resulting from the industrial revolution. The increase during that period has been 30 to 35 percent. The contribution of human activities to atmospheric CO<sub>2</sub> levels appears to be beyond question.

## **Temperature Changes**

Until recently, data for worldwide temperature were obtained by averaging values obtained at weather stations. Since 1880, the overall trend has been up, but with two major anomalies:

- The rate of temperature rise has increased since about 1980, which is often cited as proof of a serious degree of global warming.
- A small but significant decrease in temperature occurred between 1940 and about 1980, temporarily reversing the upward trend. Warnings of a new ice age appeared during that period, but recently this anomaly has seldom been mentioned. I haven't seen or heard a plausible explanation but a 40-year incident is too long to dismiss it as "just a random occurrence". If at all possible, we need to understand an incident like that before we embark on major costly programs to try to control global warming.

Worldwide temperature variations have occurred in the past. During the last 1000 years, for example, civilization was influenced by what are called the Medieval Warm Period and the Little Ice Age, each lasting for several hundred years. The recent increase is within the approximate estimated

range during the past 1000 years and larger changes have been estimated during the past 10,000 years. During the warm period, the Vikings crossed the Atlantic and colonized Greenland, but their agricultural society couldn't survive there now. During the Little Ice Age that followed, poor crops were often obtained in northern Europe because of the shorter growing seasons and ice froze on the Thames River at London, reported as the only recorded times in history.

Recently another method has been available to measure worldwide temperature, using satellite technology. Since 1979, the trend line shows a slight decrease, without the recent rapid increase indicated by surface measurements. This difference is another topic that I think needs further study.

### ***Modeling***

Computer modeling has often been used to predict future patterns of global warming. I'm not a modeler but I have heard modelers discuss various problems that no doubt affect the reliability of model predictions: reflection from clouds back into the sky, uncertainty about patterns of ocean mixing, heating and/or cooling effects of clouds, and especially the role of water in the atmosphere. Water absorbs IR energy, as does CO<sub>2</sub>; in fact I have read speculations that the water content of the atmosphere has more to do with temperature than CO<sub>2</sub> (I don't know if that's a widespread view).

The result is that models show widely different results, depending on which version of a model is used and on how input data are selected or estimated. Some modelers claim predictions that are highly accurate, while others believe that models are useful to indicate general patterns of change but not to estimate future temperatures or other quantitative changes. These major uncertainties need to be considered in future planning for any control measures or other major policy decisions.

### ***Other Possible Causes***

Do we know that atmospheric phenomena control the temperature of the earth's atmosphere? An automatic *yes* seems logical, until we read that such factors as minor changes in the earth's orbit or in the tilt of the earth's axis are thought by some to have a significant effect, although no proof has been given. But a more intriguing idea emerges from measurements showing an apparent relationship between earth temperatures and the length of solar cycles related to sunspots. For 250 years, these two variables have gone up and down almost together, although with a time lag.

Obviously, if even a small part of any Global Warming phenomenon is due to solar effects, that would make a major difference in planning for any future actions. Statistical correlation does not prove a cause-and-effect relationship, but 250 years is long enough to warrant further investigation.

### ***Adverse Effects***

Many different effects of global warming have been predicted; some would be beneficial but most would be detrimental or disastrous. Perhaps *Sea Level Rise* has been studied more extensively than most of the others. The presumption is that melting ice from the world's glaciers will add enough water to the oceans to cause sea level to rise significantly. There are many areas where significant sea level rise would cause serious problems, especially major cities that are in a coastal area. Bangladesh is a special case; one estimate indicates that this nation would lose 17% of its land area if sea level rises by one meter.

Wide variations exist among estimates of sea level rise. In one comparison, an increase of 25 feet was predicted in 1980, three feet in 1985 and one foot in 1989.

The distribution of the world's glacier ice is interesting: 90% is in Antarctica, 4% in Greenland, and 6% scattered among all the other glaciers in the world. Since so much is in Antarctica, a lot of research has been conducted there for several decades. Every now and then, large chunks of ice break off to form icebergs in the region known as West Antarctica.

But, since about 1979 or 1980, satellite measurements from space have been used to construct three-dimensional maps. These show that the ice is becoming thicker and temperature has decreased.

Recently, it appears that the formation of new ice over most of the continent has been greater than the loss of ice from West Antarctica. Also, in Greenland, indications are that ice deposits decreased during the first part of the 20<sup>th</sup> century but then showed an increase in the second half. Based on this type of information, it has been estimated that sea level will be about 30 cm. lower in 2050 than it has been in recent years. So now the previous concerns about sea level rise can be replaced by discussions of whether sea level will be rising or falling in the future.

### ***Governmental Activities***

Scientific uncertainty hasn't prevented action by governmental agencies. In the UN, the so-called Intergovernmental Panel on Climate Change, or IPCC, was established many years ago. According to its history and reputation, it has always been motivated by political pressure. Many scientific advisors have spoken out in protest and there have been reports of resignations because of alleged misrepresentation, based on IPCC staff publishing documents indicating an imminent crisis requiring urgent action, whereas many of their scientific advisers were saying that the scientific data do not support such conclusions. (I don't know the facts; I'm just reporting what I have read in numerous sources.)

Much has been written about the Kyoto treaty, originally signed in 1997, which sets forth goals and deadlines to begin reducing CO<sub>2</sub> and other greenhouse gases between 1997 and 2010. With only four years to go, indications are that actual reductions will be less than anticipated, whereas much greater reductions will be necessary if some of the long range goals of IPCC are to be achieved.

To indicate something of the political atmosphere of IPCC, here are three comments attributed to high level individuals, one a former member of the IPCC commission and two who previously represented the US in IPCC activities.

- Referring to global warming: "The data don't show it, but nevertheless we think it is happening." (Scientific objectivity?)
- "We have got to ride the global warming issue. Even if the theory of global warming is wrong, we will be doing the right thing in terms of economic policy and environmental policy."
- "A global warming treaty must be implemented even if there is no scientific evidence to back the greenhouse effect." (Dates unknown, but from a 1998 publication.)

### ***Conclusions***

To this point, some of my personal opinions have probably been evident, but I have reviewed facts that are accepted by many scientists — obviously not 100%. Now, I am going to give you my opinions, in a series of conclusions, and you are free to agree or disagree any way you like.

**First**, the critical issue. Does the available knowledge show beyond a reasonable doubt that human activities are causing a significant increase in worldwide temperatures that will lead to major detrimental effects at some future time?

**First Conclusion.** I have found it difficult to be objective. Much of what has been published appears to have been written to persuade others to accept the beliefs of the author, not to present information objectively. This makes it difficult for me to formulate conclusions.

**Second Conclusion.** In my opinion, the available knowledge does **not** show beyond a reasonable doubt that human activities will cause a future crisis.

**But, Third Conclusion.** Also in my opinion, the available knowledge does not show beyond a reasonable doubt that human activities will **not** cause a future crisis. To me, definite proof is lacking for both sides.

**Fourth Conclusion.** If global warming is a problem, and if human actions can alleviate it, we should concentrate on understanding the problem and developing the technology to alleviate it.

### ***Final Comments***

The Kyoto treaty won't result in much reduction in CO<sub>2</sub> over the next four years. But if major control efforts are needed, and with adequate support and a real desire to do it, the next four to six years could produce enough research to clarify some of the uncertainties, enough development work to provide better technology for several methods of reducing CO<sub>2</sub> emissions, and the completion of enough demonstration projects to make adequate planning and implementation much more effective

and much less costly than they can possibly be at the present time. Progress would also be much more rapid if a fresh start can be made, perhaps around 2010, with a new understanding of the problem and new tools to work with. (In my opinion, the voluntary CO<sub>2</sub> reductions now being made by some companies and others have more value as demonstration projects than for the actual reductions they provide.)

A&WMA still has a few active members who were involved in air quality matters in the early 1970s, when ozone control was the big issue. Many knowledgeable scientists said then that we should understand the underlying science before committing to major control programs. But the Clean Air Act set strict deadlines and EPA said, "control VOC emissions; don't bother with NO<sub>x</sub> — that's not important". It took 25 years and many billions of dollars before it was obvious to everyone that the standard would never be attained with VOC controls alone. We could have saved much of that time and cost if we had learned more about the problem near the beginning, instead of blindly following a path that never showed much chance of success.

In the past five or six years, new knowledge has added new control measures to the Texas SIP, especially controls on NO<sub>x</sub> and HRVOC. Whatever length of time it ultimately takes to attain the standard will be many years beyond the five years originally mandated by the Clean Air Act.

I think the comments then about understanding the underlying science apply today to global warming. I would hate to see another 25 years of partially wasted effort on global warming before we learn enough to do the job right.

Finally, this entire subject can be summarized in a brief statement by Mark Twain: "There is something fascinating about science. One gets such wholesale returns of conjecture out of such a trifling investment of fact."