

Global warming—heated debates

Whether one is for or against the proposed Kyoto Protocol on climate change, the engineering implications of it are far-reaching. It is necessary to understand these implications in order to create meaningful standards to guide future engineering practice. What follows are two views on the accord by speakers at an upcoming panel discussion to be held by PEO's Brampton Chapter on November 21, 2003.

by Peter Smith, P.Eng.

Kyoto: Yes

That our atmosphere insulates the Earth's surface from the cold of space has been known for centuries. That the concentration of carbon dioxide (CO₂) in the atmosphere is a major factor in preventing the Earth from radiating heat into space has also been known for almost 150 years, and the mathematics of global warming has been greatly refined since Arrhenius first published his paper in 1895. In addition, scientists have been warning us of the increasing levels of greenhouse gases (GHGs) in our atmosphere for the last 40 years or more. So why are we still debating the issue?

Although there are still a few scientists who argue that the increasing atmospheric concentrations of GHGs do not pose a risk, the overwhelming weight of scientific evidence suggests that we are starting to see significant changes in global weather patterns. In 2001, the Intergovernmental Panel on Climate Change reported: "an increasing body of observations gives a collective picture of a warming world," with "new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities."

Despite the complexities of global weather and the multitude of variables that impact it, analysis of minute quantities of the ancient atmosphere trapped in the Antarctic ice reveals a strong overriding correlation between atmospheric CO₂ (the most significant of the GHGs) concentrations and average temperatures (Figure 1). The message is clear: We may not yet understand all the mechanisms, but we are rapidly changing our environment and we do not have

the luxury of waiting until we fully understand all the details before we start taking action. The atmospheric concentration of CO₂ is already one-third higher than the pre-industrial level (280 ppmv), the rate of increase is accelerating, and scientists have warned us that we cannot permit the level to go higher than double the pre-industrial level.

Although scientific and political discussion of the problem had been going on for decades, certain economic and political interests prevented any binding international agreement being reached until 1997

when the Kyoto Protocol was finally reached in Japan. It was a huge challenge for the negotiators, who had to balance widely different interests and concerns between developed and developing nations. An admittedly imperfect political solution to a scientific problem, Kyoto is only the first step in what will have to be a series of such agreements over the next 50 years or more. In this first step, the industrialized nations are required to reduce average emissions below their 1990 levels by 2008-2012. In addition, as they develop new technologies, they are required to share them with the devel-

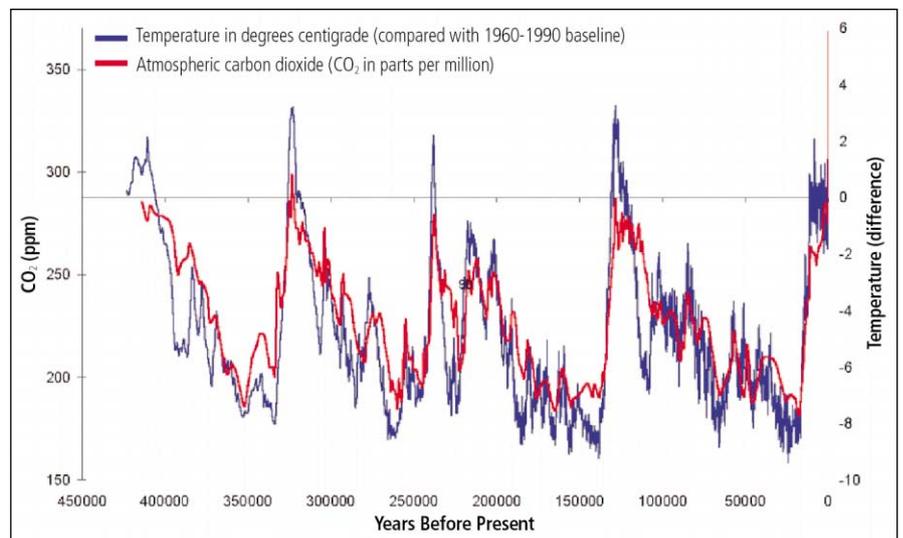


Figure 1. Correlation of average global temperature calculated from the relative abundance of oxygen isotopes and carbon dioxide concentrations taken from samples of ancient atmosphere trapped in the Antarctic ice.

oping world so that those nations can avoid large increases in emissions as standards of living improve.

Despite its shortcomings, it is probably the best that can be achieved at this time. If it is successful, it will create an atmosphere of trust and global cooperation that will act as a sound basis for the next stage in the process, which will have to involve many more countries and deeper reductions.

The problem for Canada is how to equitably share the reduction between competing industries and groups without impeding their ability to compete with foreign producers (particularly in the United States) that may not be required to make any reductions. The debate is still in progress, and no doubt some parties will end up feeling that they are carrying an unfair burden. But at the end of the day, Canada still has to meet the goal, because the cost of failure is just too high. On average, each Canadian is responsible for about 16 tonnes of CO₂ emissions a year. To meet our Kyoto requirements we need to reduce that to about 12 tonnes. Swedes however, who enjoy a similar lifestyle and climate to us, only emit about 6 tonnes per person. They have achieved that by investing in energy efficiency and renewable sources of energy over the last 30 years or so. As engineers, we already know many of the solutions that have to be implemented. The scientists have identified the problem, the politicians have provided the framework for a solution, now it is up to the engineers to find and implement the solutions.

Peter Smith, P.Eng., is currently the energy manager for a large chemical corporation.

by Ross McKittrick

Kyoto: No

I am familiar with the scientific arguments for global warming. They are impressive from a distance and, like many observers, I used to believe them. The trouble is that on close examination they crumble like sand through one's fingers. Chris Essex, of the Department of Applied Mathematics at the University of Western Ontario, and I spelled out the issues in our book *Taken By Storm: The Troubled Science, Policy and*

Politics of Global Warming, so I won't try to cover them here.

Let me just say that since there is no physical theory of the climate, there is no agreement as to the definition or measurement of climate change. The science right now is like a hockey game with two pucks on the ice. Both sides are scoring lots of points, but no one knows if any of them count.

In our book, we explain how "global warming" seems so believable when the concept is really just a house of cards. This is not a slight against the people who do the work. The science is very hard and the insiders have always maintained that simple answers are not available. Alas, governments went looking for simple answers, and found people willing to peddle them.

Despite impressions to the contrary, Kyoto is not a "clean air treaty." Smoke particles, ground level ozone, carbon monoxide, sulphur dioxide and other such things are controlled by provincial regulations already in place. Ratifying Kyoto won't strengthen these policies, nor will rejecting it weaken them.

Compared to the vast natural carbon cycle, humans add a very small amount of carbon to the air each year through fossil fuel use and deforestation. At the global level, the flux averages just over 1 tonne per person annually. This has not changed since 1970, since global energy markets naturally constrain the aggregate availability of fossil energy. Emissions will peak mid-century at about 11 billion tonnes as the population peaks at about 9 billion. Kyoto will have no discernible effect on this. In its original form it would have cut a tiny sliver off total human emissions.

Now with everyone either out or having secured numerous loopholes, the treaty is an environmental dead letter. Those who run atmospheric carbon dioxide cycle models, with and without Kyoto, can hardly spot the difference.

At this point, only Canada will be required to make significant emission cuts. The United States and Australia dropped out altogether. The Japanese government ratified only after ensuring that there would be no penalties for non-compliance, since it has no plan to comply. Developing countries (including Mexico, China and India) are exempt, and have made clear they won't join

the planned "Kyoto II" treaty either. The collapse of the Soviet system means Russian emissions are well below 1990 levels. German reunification and the shutting down of uneconomic British coal mines meant European Union emissions rose very little after 1990—the treaty's reference year (at Europe's insistence).

The lowest credible cost estimates for this big nothing in Canada are around \$1.5 billion annually. The highest reach over \$70 billion annually. That's not fear-mongering by the big bad oil industry; it's from a federal government report. The profligacy and incompetence of the federal implementation initiatives only serve to confirm the worst-case cost scenarios.

As for Kyoto, some consider it as an "insurance" policy against potential problems. But think about it. Kyoto doesn't prevent the supposed peril, the premium costs more than the expected damages (if any), you would never be able to prove if damages occurred, and there is no compensation anyway. If you think that's a good insurance policy, you need a better broker.

Kyoto proposes a bigger restructuring of the Canadian economy than Free Trade in the 1980s. Before taking that leap of faith we demanded, and received, the exact text of the plan, two inquiries into the adequacy of labour market adjustment policies, numerous detailed, independent economic analyses, briefings from every federal ministry outlining the rule changes and impacts on their sectors, and, finally, a national vote.

The Kyoto process, by contrast, is like a Cheshire Cat: all smile and no substance. The government's planned scientific hearings were cancelled. The "public" hearings were closed to the public, they were held in secret locations with handpicked participants and the media were barred from covering them. There is no plan, no solid cost estimates, no independent analyses, and no vote. It is an unprecedented public policy disaster. ❖

Ross McKittrick is an associate professor of economics at the University of Guelph. For details on the panel discussion, contact Jeremy Cook, P.Eng., at (905) 453-2237 or jeremyc@rogers.com.