

# GLOBAL WARMING:

## WHAT IT MEANS FOR CANADA

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Global warming has been much in the news lately, with new scientific evidence appearing to prove beyond a doubt that the planet is getting warmer and human activity is a significant cause. Canada is among over 100 countries trying to slow the warming trend and control the climate change associated with it. Here's a look at some of the facts surrounding this complex issue and what it means for Canada.

Measurements made during the past 100 years show clearly the steady rise in the globe's mean temperature. According to Environment Canada, based on records for the past 51 years, the warmest summer on record in Canada occurred in 1998, when the national temperature average was 2.5°C above normal. By using computer models, scientists have projected that the average temperature of the globe will increase by 1-2°C during the next 100 years.

Changes in climate brought on by global warming are expected to affect ecosystems on a worldwide basis. The faster these changes occur, the greater the risk of damage to the environment. We need to ask ourselves: Are we ready to face rapid changes in local and global climatic conditions? And do we have to do anything to get prepared?

Scientists have predicted that the regional impacts of global warming will be felt by human beings through shortages in food and water, a rise in sea levels, extreme weather conditions around the world, new forms of health problems, etc. In addition:

- ◆ Since local climate is an important factor in the prevalence of particular types of diseases, some infectious diseases local to warm areas may move up to Canada.
- ◆ Extreme temperatures may bring human fatalities, and create more air and water pollution.
- ◆ Extreme weather conditions will result in irregular rainfalls and, hence, unpredictable water flows in rivers.

In some cases, global warming is already affecting the environment. For example, the Athabasca Glacier in the Alberta Rockies is currently shrinking at a significantly faster rate than it was 40 years ago. This glacier provides a critical water supply for western Canada.

Scientists report that the average temperature in the Arctic has risen 1.5°C since 1860. In fact, some computer models predict that the entire canopy of Arctic ice may disappear in 50 years. The melting of Arctic ice controls temperature on a global basis. If (or perhaps when) it disappears, global temperatures are expected to rise very rapidly.

### Coming to grips with the "greenhouse effect"

The temperature of the globe is also controlled by the "greenhouse effect." Here's how it works: Heat received from the sun

is partly reflected and partly retained in the atmosphere due to the existence of four greenhouse gases—water vapour, carbon-dioxide, methane and nitrous oxide. The intensity of the heat received from the sun depends on several factors, including variations in temperature on the sun's surface and the degree of inclination of the earth's axis of rotation. These are out of our control.

But the concentration of some greenhouse gases in the earth's atmosphere can be controlled. For example, the consumption of fossil fuels, which produces carbon dioxide, can be reduced. Agricultural and land development activities, which contribute to the increase of methane and nitrous oxide, can be managed so that the rate at which these gases are released into the atmosphere is controlled.

In December 1997, Canada signed the Kyoto Protocol on Climate Change, entering into a commitment to reduce greenhouse gas emissions by about 6 per cent of its 1990 levels by the year 2012. The estimated actual reduction that will be required is 20 to 25 per cent, based on projections of growth in emissions at current rates to the year 2012. About 150 countries have signed the protocol.

In April 1998, federal and provincial ministers of energy and the environment held a meeting at which they agreed to:

- ◆ develop a national implementation strategy on climate change;
- ◆ establish a credit system to encourage early action to reduce greenhouse gas emissions; and
- ◆ promote voluntary action.

Last year, the federal government also established the National Climate Change Secretariat, which will develop the national implementation strategy. Fourteen groups were formed to address various sectors and special issues related to Canada's domestic and international negotiations. These groups are expected to present papers outlining options to the secretariat in May 1999.

Meanwhile, governments at all levels are setting emissions reduction targets. The federal government has taken steps to reduce emissions in its own operations and to persuade the private sector and the public to initiate emission control activities voluntarily. More than 50 per cent of Canada's major manufacturing industries have filed letters of intent to reduce their emissions with the federal Voluntary Challenge and Registry program. Half of these industry groups have action plans in place to reduce and limit emissions.

The downside to these initiatives is that Canada's energy intensive economy makes it vulnerable to a reduction in energy use

and the need to invest in and maintain emission control systems and/or switch to less polluting sources of energy. Compliance with Kyoto Protocol emission reduction targets may therefore adversely affect our economic competitiveness, create unemployment problems and reduce our ability to improve our standard of life.

### Challenges and opportunities

As professional engineers, we have a duty to protect the health and welfare of the public. To perform this duty, we need to understand the impact of global warming on our health and economy. To reach Canada's emission reduction targets, engineers will have to meet many technical challenges, some of which have yet to be defined. But once understood, these challenges have the potential to create business opportunities.

On May 6, PEO's York Chapter will hold a public forum to:

- ◆ define the term "global warming,"

review its sources and list its impacts on the world and, specifically, on Ontario;

- ◆ list the engineering challenges and potential business opportunities that management of global warming will involve;
- ◆ learn about national and international initiatives that are underway to slow the global warming process; and
- ◆ provide input on measures to be taken by all levels of government and the private sector to prepare the nation for the effects of global warming.

For more information on the public forum on global warming, please contact the author at (905) 737-0904. ◆

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