A Greenhouse for the Arctic

Module 12 - Akshayuk Pass Expedition

GREENHOUSE FOR THE ARCTIC

According to Billy Etooangat, our friend at Parks Canada in Pangnirtung, the elders in his community report that when they were young they could see glaciers flowing down the mountain valleys to the north of Pangnirtung. These glaciers have melted so quickly that today they are no longer visible from the village, further anecdotal evidence of the advent of global warming. The world is becoming a greenhouse for the Arctic.

During the course of this expedition we have learned that the Arctic is particularly sensitive to the changes wrought by climate change. We have also learned that the world climate has never been stable, but has been subject to significant fluctuations. Only a short time ago in geological terms - a mere 20,000 years- the Laurentide Ice Sheet, the main feature of the most recent North American Ice Age, began to recede for good, allowing for the return of plants and animals to the Arctic land so long held beneath the ice. During other periods in the earth's history the world's climate has been substantially warmer than it is today, and the lands that form the Arctic were home to more tropical vegetation and animals. Thus climate change is nothing new. Why then if there have been significant past cycles of warm and cold climates are there such dire warnings being raised about the effects of the current trend toward global warming?

THE DANGER OF GLOBAL WARMING

The real concern is not necessarily the degree of warming that the world is predicted to experience in the next century, but the speed with which the temperature change is occurring. Whereas past episodes of global warming have occurred slowly, current measurements indicate that if trends continue, the world climate is about to experience a very rapid increase in temperature. To put this in perspective, studies of the last great spike in global temperature called the Paleocene-Eocene Thermal Maximum demonstrate that

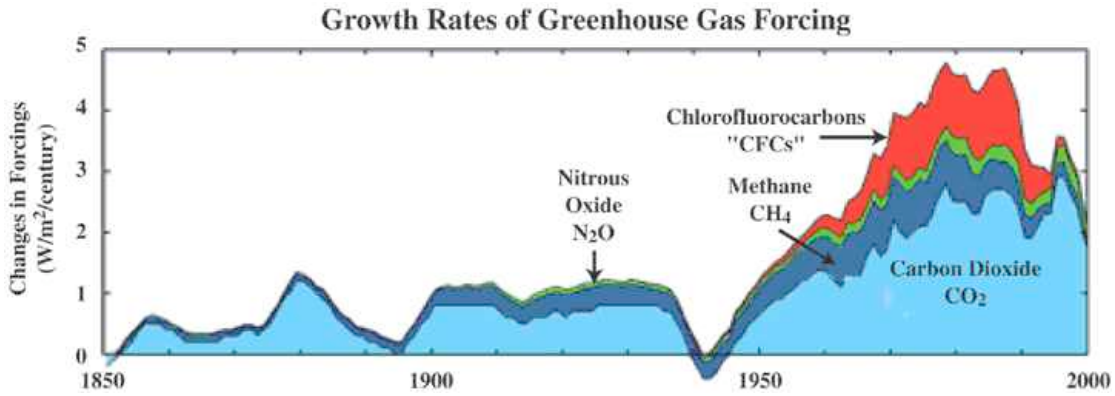

Figure 1: Growth rates of greenhouse gases:1850 – 2000 (courtesy of NASA).

it was caused by the release of greenhouse gases that occurred over a period of 10,000 years. If current trends hold, mankind will release a similar amount of greenhouse gas over a period of 300 years. In other words the climate is warming 33 times faster than it did during this last thermal maximum (see: thermal maximum).

When temperatures change gradually animal and plants, and the ecosystems they are part of, have an opportunity to adapt to changing environmental conditions. If, however, the climate changes suddenly then many plants and animals will not have time to adapt, resulting in mass extinctions and ecological destruction. If indeed the world climate will warm as quickly as scientists are currently predicting then this is expected to cause wholesale disruptions to ecosystems worldwide. The changes that Melissa McKinney is observing in polar bear dietary habits (see module 7) in relation to the loss of sea ice are akin to the proverbial canary in the coal mine.

Action Against Global Warming

How then do we slow or stop the progression of global warming? We do so by producing fewer greenhouse gasses, or by removing them from the atmosphere. Greenhouse gasses are air molecules that have the capacity to retain heat. The more greenhouses gasses there are in the atmosphere the hotter the world becomes.

Did You Know?

Rock bands like the Rolling Stones, Coldplay, and the Dave Matthews Band have offset the emissions associated with their concerts and albums

There are many greenhouse gasses, but the most common are water vapor, carbon dioxide and methane (see: greenhouse gases).Some greenhouse gases are produced naturally, and some are produced by the activities of mankind. Carbon dioxide (CO_2) is the main greenhouse gas that humans are responsible for emitting and atmospheric levels of CO_2 has risen dramatically since the invention of the internal combustion engine, and the burning of fossil fuels began a little over 150 years ago.Therefore the way to stop or control global warming is to either:

1. Decrease the amount of greenhouse gasses being created
   and / or
2. Remove excess greenhouse gases from the atmosphere

In order to decrease the creation of greenhouse gases we need to develop ways to decrease our dependence on energy created by burning fossil fuels (oil, gas, coal, etc), or develop sources of energy production that do not create greenhouse gases (wind, hydroelectric, nuclear). The removal of greenhouse gases from the atmosphere involves finding techniques to capture and remove various types of greenhouse gases so that they can no longer cause an increase in atmospheric temperature.

Figure 1: Windmill Farm (photo: Olivier Tetard)

Carbon Offsets

Strategies to decrease the creation, or increase the capture of greenhouse gases have gained popular endorsement in the form of ‘carbon offset’ programs. Carbon offsets are measured in metric tons of CO_2-equivalents (or

'CO2e')and are strategies for reducing greenhouse gas emissions or increasing reuptake. One carbon offset represents the reduction of one metric ton of atmospheric CO2 or the equivalent in other greenhouse gases (see:what you can do).

Most airlines now automatically offer carbon offsets with ever sale of an airline ticket. In fact carbon offsets are available from many companies. If you purchase a carbon offset what are you receiving for your investment, and is there actually a reduction of greenhouse gases occurring? First of all one must understand that the carbon offset market is not regulated, consequently you must be careful where you purchase your offsets.

The Gold Standard

Therefore a means of evaluating the relative merit of carbon offsets is required. The Gold Standard Foundation is a non-profit organization under Swiss law that operates a certification scheme for premium carbon credits. The mandate of the Gold Standard Foundation is to evaluate and register projects that reduce greenhouse gas emissions based on a rigorous set of criteria.The Gold Standard is supported by over fifty non-governmental organizations worldwide and is widely considered the highest standard in the world for carbon offsets (see:Gold Standard).

Purchasing Carbon Offsets

To simplify the purchase of legitimate carbon offsets the following steps should be followed:

√ Calculate your carbon footprint by considering all major emission sources (electricity, fuel, travel). Use a credible carbon calculator to establish the total carbon footprint. The Arctic Energy Alliance provides a useful carbon calculator on their website:

Carbon Calculator

Please note that this carbon calculator provide calculations in Canadian dollars. American carbon calculators are widely available.

√ When you purchase your carbon offsets do so from a credible source that honors the Gold Standard. Ensure that the organization or company from whom you are purchasing you carbon offsets, like The Arctic Energy Alliance, offers only Gold Standard offsets.

The Arctic Energy Alliance is a not-for-profit society that was incorporated in 1997 with a mandate "to help communities, consumers, producers, regulators and policymakers to work together to reduce the costs and environmental impacts of energy and utility services in the Northwest Territories."

Take Action

Although the human population of the circumpolar regions - proportionally to the population of the world - contributes minimally to the emissions driving climate change, the Arc-

tic ecosystem is particularly sensitive to the effects of global warming. Thus as a global phenomenon climate change is a worldwide event that requires the engagement of all nations and all citizens to address. Northerners, as a bellwether of climate change, need to lead the way in taking action against global warming.

Excellent Guide to Purchasing Carbon offsets:

Carbon Offset Guide

i2P purchases carbon credits to offset the carbon footprint of all its expeditions. For the purposes of the Akshayuk Pass Expedition the carbon footprint of their expedition related travel has been calculated with the assistance of Green Nexus. This footprint is being offset by the selection of gold standard carbon offsets.

Video Link:

The Arctic & Global Warming

Canary in the Coal Mine

Exercise

With your class calculate the carbon footprint for a trip you recently took. This trip need not be to a distant place requiring air travel. The trip could have been simply driving to the grocery store three blocks from your house. To calculate your carbon footprint use a carbon calculator such as that found at:

Carbon Calculator

Profile: Andrew Robinson - Executive Director, Arctic Energy Alliance

Even when growing up in Makkovik, a remote community on the northern Labrador coast, Andrew had an interest in energy. This led him to obtain a Bachelor's Degree in mechanical engineering from the University of Waterloo and eventually a Master's Degree in environmental studies (focused on energy in northern communities) from Toronto's York University. Andrew, a registered professional engineer, first joined the AEA team in 2004 to found the Community Energy Planning program.

How the Arctic Energy Alliance became Carbon Neutral:

The Alliance first became interested in going Carbon Neutral in the fall of 2007. With some time and calculation, we discovered that our employees had flown over 78,500 km and driven 12,000 km in just the previous year. This produced roughly 21.8 tonnes of carbon dioxide emissions. Furthermore, the portion of the building our offices occupy produced over 20.8 tonnes of emissions. In total, we were directly responsible for 42.6 tonnes of greenhouse gases being released into the atmosphere.
Using Planetair's calculators, we ascertained that in order to offset these emissions we had to purchase $1,450 worth of Gold Standard Carbon Offsets. And so we did.