



What is Climate Change?

Climate change is one of the biggest issues facing the world today. Its effects are far reaching, affecting people and their environments in every part of the world. This information sheet aims to outline the basic science of climate change as well as some of the key actions and policies that aim to deal with both its causes and effects.

Facts and figures

- § If no action is taken to reduce emissions the level of greenhouse gases in the atmosphere could be double those experienced in pre-industrial times by 2035 (HM Treasury 2006).
- § The risks of the worst impacts of climate change can be substantially reduced if greenhouse gas levels in the atmosphere are stabilised at current levels (HM Treasury 2006).
- § At least 279 species of plants and animals are already responding to global warming by moving closer to the poles (Climate Crisis 2007).
- § Although total annual emissions from developing countries are expected to eventually exceed those of developed countries their per capita emissions will remain much lower (PEW Center on Global Climate Change 2007).

The issues

What is climate change?

The *greenhouse effect* is a natural process whereby certain gases (known as *greenhouse gases*) that occur naturally in the atmosphere help to trap heat and keep the Earth at a temperature suitable for life (PEW Center on Global Climate Change 2007). The main greenhouse gases include methane, nitrous oxide and carbon dioxide (IPCC 2007).

Increased use of fossil fuels (i.e. oil and coal) for energy, changed land use and increased agriculture have resulted in a substantial increase in the amount of greenhouse gases, especially carbon dioxide, being released (IPCC 2007).

Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level (IPCC 2007)

This human induced *climate change* is sometimes referred to as *global warming*. A recently released Intergovernmental Panel on Climate Change report reviewed and endorsed by governments and experts around the world states that most of the observed increase in globally averaged temperatures since the mid-20th century is very likely (>90%) due to the increase in human greenhouse gas emissions (IPCC 2007).

This rise in temperature is affecting global weather patterns, resulting in *climate variation* around the world.

Why is climate change a problem?

It is important to remember that what may seem like a small increase in global average temperature can have substantial consequences. For example, the difference between the last ice age and today is only 5°C (HM Treasury 2007).

In 2005, the global average temperature had risen 0.76°C since 1850-1899. The effects of increased temperatures on global weather patterns include more severe droughts, heat waves, floods and storms, changed rainfall patterns and a rise in sea levels as glaciers and ice sheets melt. The severity of these events is dependant on greenhouse gas levels and resulting changes in global temperatures.

The effects of changed weather patterns include (but are not limited to) human populations being displaced from coastal areas due to rising sea levels and from other areas where changed climates affect agriculture and other industries, and where suitability for human inhabitants is altered (PEW Center on Global Climate Change 2007). Shifting climate patterns are also having adverse impacts on plant and animal populations and therefore biodiversity (PEW Center on Global Climate Change 2007, Climate Crisis 2007).

The polar bear is now listed as a vulnerable species by the IUCN mainly due to expected reductions in sea ice (IUCN 2006).

Taking Action

Although climate change is already having effects around the world there are many things that can be done to both minimise and deal with the impact it has in the future. In conjunction with international action through the Kyoto Protocol, action at the national and local level is gaining momentum.

What can be done to address climate change?

Climate change is not just a daunting challenge; it is also an enormous opportunity for innovation. Many tools already exist for addressing climate change such as using alternative energy sources, and new options on the horizon could dramatically reduce worldwide emissions of greenhouse gases.

Although greenhouse gas emissions are primarily associated with the burning of fossil fuels (chiefly, coal, oil and natural gas), they come from many sources. As a result, any effort to reduce the human impact on the climate will need to engage all sectors of society. (PEW Center on Global Climate Change)

International Policy

The *Kyoto Protocol* sets mandatory greenhouse gas emission targets for 35 developed countries (UNFCCC 2007a) and officially came into force in February 2005 (UNFCCC 2007b). Rather than setting targets for developing countries the Protocol assists them in reducing their emissions via *The Clean Development Mechanism* (CDM). In simple terms this awards credits to developed countries that pay for projects that reduce emissions in developing countries. The CDM therefore provides an incentive to assist countries that may not have the resources to carry out emission

reducing projects alone (UNFCCC 2007c).

The Protocol also allows for *emissions trading* which sets up a *carbon market* for countries to buy and sell *carbon credits* (UNFCCC 2007d).

Action around the world

Any international response must be reinforced by action at the local, national and regional level (HM Treasury 2006). Each individual, community, business and government has an important role to play if the world is to be successful in addressing climate change.

Although climate change can seem a daunting problem it is important to remember that much of the adverse impacts can be minimised by changes to the way we live, and through advances in technology. Human innovation and adaptation in the past have seen man on the moon just 66 years after the first sustained flight by a powered aircraft (Wright Brothers Aeroplane Company 2006). Targets for emission reductions are being set for around the same period of time.

What can I do?

For examples of action from around the world and suggestions of how individuals and communities can make a difference see the Clean Up the World "Addressing Climate Change" Information Sheet.

This document was last updated in May 2008.



References

- Climate Crisis, *What is global warming*, viewed 6 May 2008, <http://www.climatecrisis.net/thescience/>
- HM Treasury, 2007, *Stern Review: The Economics of Climate Change*, viewed 6 May 2008, http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm
- IPCC (Intergovernmental Panel on Climate Change), 2007, *Climate Change 2007: The Physical Science Basis – Summary for Policymakers*, 6 May 2008 http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf
- IUCN, *The IUCN Red List of Threatened Species*, viewed 6 May 2008, http://www.iucnredlist.org/info/gallery2006#Ursus_maritimus-Robert_Carolyn_Buchanan
- PEW Center on Global Climate Change, *Climate Change 101 Overview*, viewed 6 May 2008, http://www.pewclimate.org/docUploads/1114_OverviewFinal.pdf
- UNFCCC (United Nations Framework Convention on Climate Change) 2007a, *UNFCCC Executive Secretary calls for speedy and decisive action on climate change*, media release, viewed 6 May 2008, http://UNFCCC.int/files/press/news_room/press_releases_and_advisories/application/pdf/070202press_rel_paris_en.pdf
- UNFCCC (United Nations Framework Convention on Climate Change) 2007b, *A Summary of the Kyoto Protocol*, viewed 6 May 2008, http://UNFCCC.int/kyoto_protocol/background/items/2879.php
- UNFCCC (United Nations Framework Convention on Climate Change) 2007c. *The Clean Development Mechanism*, viewed 6 May 2008, http://UNFCCC.int/kyoto_protocol/background/items/2881.php
- UNFCCC (United Nations Framework Convention on Climate Change) 2007d. *Emissions Trading*, 6 May 2008 http://UNFCCC.int/kyoto_protocol/background/items/2880.php
- Wright Brothers Aeroplane Company, 2006, *The Wright Story*, Updated 28 August 2006, viewed 6 May 2008, <http://www.first-to-fly.com/History/Wright%20Story/wright%20story.htm>