GREENPEACE Briefing

How much climate change can we bear?

The stated goal of the United Nations Framework Convention on Climate Change (1992) is to avoid 'dangerous climate change'. We are at present already committed to a warming of 1.2-1.3ºC of global average temperature above pre-industrial levels from the greenhouse gases (GHGs) that have been emitted into the atmosphere through human activities. Considering this inevitable degree of warming, the goal of climate change policy should be keeping the global average temperature rise that can still be expected to ***below*** 2ºC.[1] While this is certainly dangerous to the millions of people who will be affected, it is probably the best we can do.

Two degrees Centigrade global average warming – what will that mean for the planet?

- Threatens many tens of millions of people with increased risk of hunger, hundreds of millions with increased malaria risk, millions with increased flooding and billions with increased risk of water shortage.[2] [3] Damages fall largely on the poorest and developing countries, particularly in sub-Saharan Africa, South Asia, and parts of SE Asia and Latin America.

- Risks melting of major ice sheets with commitments to many metres of sea level rise over several centuries, particularly the Greenland ice sheet (seven metres), and the West Antarctic Ice Sheet (WAIS) (5-7 metres). Greenland melting is accelerating and rapid melting acceleration of the glaciers from a large sector of the WAIS is now observed to be occurring and may presage the dynamic collapse of this component of the ice sheet. Ensuing sea level rise threatens large populations everywhere and particularly low lying areas in developing countries such as Bangladesh, South China, and low-lying island states everywhere, not to mention 'the low countries' (Belgium, the Netherlands, NW Germany), and southeast UK.

- Threatens damage to major ecosystems from the Arctic and Antarctic to the tropics. Loss of forests and species will affect the lives of all with economic costs falling disproportionately on the poor and developing countries.

Scientific knowledge is increasing constantly and improving our understanding of the likely changes that will come from rising global temperatures and the assessment keeps getting worse. Some of the most important new reports and findings of the last twelve months include:

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1 http://www.climatenetwork.org/docs/CAN-adequacy30102002.pdf
2 Hare, B (2003) "Assessment of Knowledge on Impacts of Climate Change – Contribution to the Specification of Art. 2 of the UNFCCC: Impacts on Ecosystems, Food Production, Water and Socioeconomic System", http://www.wbgu.de/wbgu_sn2003_ex01.pdf
3 See M Parry, N Arnell, T McMichael, R Nicholls, P Martens, S Kovats, M Livermore, C Rosenzweig, A Iglesias and G Fischer, Millions at Risk: Defining Critical Climate Change Threats and Targets, Global Environmental Change 11.3 (2001): 1-3.

A multi-year international study published in *Nature*[4] predicts that mid-range climate change scenarios will doom a million species to extinction by mid-century;

The Arctic Climate Impacts Assessment[5], commissioned by the Arctic Council, confirmed that the Arctic is warming much faster than the rest of the globe. At least half of the summer sea ice will disappear by the end of this century, along with significant melting of the Greenland ice sheet, with devastating consequences for seals, bears, local communities, and with global consequences including (but not limited to) sea level rise;

A study of the European heat wave in the summer of 2003, published in December 2004[6], concluded that there was a clear global warming fingerprint on the killer heat wave, and that by mid-century, such a summer would be cooler than average;

Finally, scientists at the US National Center for Atmospheric Research concluded that the amount of the earth's surface suffering from drought has doubled in the last thirty years, and that at least half of this is as a result of increased temperatures rather than changes in precipitation[7]

Keep warming below 2ºC – What CAN be avoided?

- Limit damages to coral reefs
- Limit risk of major ecological damages globally
- Limiting both rate and extent of sea level rise over many centuries
- Limit risk of Greenland ice sheet collapse
- Limit West Antarctic Ice Sheet instability risk
- Limit risk to millions affected by hunger, water scarcity and disease, which seems to accelerate with higher temperature, taking into account future economic growth and increased wealth

How to Get There?

It is still technologically, economically and scientifically possible to limit global temperature rise to less than 2ºC above pre-industrial levels, but time is not on our side. We are within a decade or two of closing off those options with known technological means.

Estimates of the 'sensitivity' of the climate to increases in GHGs are expressed in terms of the temperature response of the climate system to a doubling of pre-industrial levels of greenhouse gases in the atmosphere, expressed in carbon dioxide equivalence in parts-per-million (ppm). Pre-industrial levels of carbon dioxide were about 270 million ppm. Today we are at about 379 ppm. The midline estimate of the response to the climate of a doubling of GHG concentrations to 550 ppm has been a

4 Thomas, et. al, "Extinction risk from climate change", NATURE |VOL 427 | 8 JANUARY 2004 pp. 146 - 148
5 See http://www.acia.uaf.edu/
6 Stott, et. al., "Human contribution to the European heatwave of 2003", NATURE |VOL 432 | 2 DECEMBER 2004 pp. 610-614

7 Dai et. al, "A Global Dataset of Palmer Drought Severity Index for 1870–2002: Relationship with Soil Moisture and Effects of Surface Warming", American Meteorological Society, Vol 5, December 2004, pp. 1117- 1130

2.5ºC increase. Accordingly, science has said that our best guess is that the climate sensitivity is 2.5ºC.

However, recent studies have revealed that the climate sensitivity is more likely to be in fact closer to 3.2ºC, **which means that the response from the climate to the anticipated rise in GHGs will be even more dramatic than previously thought. We have to act even faster and take more dramatic action if we are to avoid the damage associated with a 2ºC global average temperature rise**. This means that for now we have to aim for stabilizing GHGs in the atmosphere at a level below 400 ppm and then seek to bring them down as rapidly as possible if we are to have a reasonable chance of keeping global temperature rise below 2ºC.

To meet these goals dramatic reductions in greenhouse gas emissions are needed, and they are needed soon. From a moral, legal and practical perspective, the initial burden of emissions reductions has to fall on industrialized countries. Domestic reductions of at least 30% on 1990 levels (the 'baseline' year for the Kyoto Protocol) by 2020 from industrialized countries are required, with a target of at least 80% reductions by mid-century.

Globally, we need to bring total emissions back to 1990 levels by about 2020 and then reduce them by 50% by mid-century. This means that rapidly industrializing economies like China, India, Mexico, Brazil, South Africa, Indonesia, Malaysia and others need to start reducing their emissions soon.

The consequences of delay in the process of reducing emissions means that we will face a dire global emergency in the 2020s which will require rates of emissions reductions which in the past have only been associated with massive economic collapse, i.e., with the collapse of the Soviet Union. We must not be forced to choose between economic catastrophe and climate catastrophe…the most likely outcome in that case would be both, and we have a good chance of avoiding this if we ACT NOW.