

QUNO Climate Change Status update: Findings from the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report

DRAFT

Climate change is a natural phenomenon. What is unnatural is the unprecedented rate of increased greenhouse gas (GHG) emissions due to human activities (anthropogenic causes) rather than natural factors. Increased GHG levels lead to global temperature rises. GHG emissions caused by human activities include the burning of fossil fuels, land use change including deforestation, livestock (fermentation), use of chlorofluorocarbons, and other agricultural practices.

The Intergovernmental Panel on Climate Change (IPCC) recently released its 5th Assessment Report (AR5, available at www.ipcc.ch). The AR5 consists of three Working Group Reports, and involved several thousand experts serving as authors and reviewers. It concluded that warming of the climate system is unequivocal, that since the 1950s many of the observed changes are unprecedented over decades to millennia, and that human activity has been the dominant cause of warming since the 1950s.

Specifically, the Earth's surface warmed approximately 0.85°C since 1880, around ten times faster than past documented warming rates in which the Earth warmed 5°C over 5,000 years. GHG emissions have risen more quickly since 2010 than ever before, at nearly double the rate in the previous decade¹. CO₂ concentrations are 40% higher than in pre-industrial times, and the global community has already used up two-thirds of a 'carbon budget' to keep global temperatures at or below a 2 °C global mean temperature rise relative to pre-industrial levels². In sum, dangerous climate change depends on total GHG emissions, and the degree to which climate change will become dangerous depends on the GHG emissions and global human efforts to curtail current rates of emissions.

The Representative Concentration Pathways (RCPs) are pathways for climate modelling and research, developed in 2009 to guide policymakers. Their advantage over previous scenarios includes a 'risk management' approach (mitigation and adaptation actions combined), and flexibility over unknown factors (future population, economic and technology developments). The RCP scenarios detail increases in global surface temperature change relative to 1850-1900, and include RCP 2.6, RCP 4.5, RCP 6 and RCP 8.5 ('business as usual').

In drawing together data, the IPCC considered not only scientific but also technological, environmental, economic and social aspects of mitigation of climate change. The AR5 explores risks through various pathways - known as RCPs (see text box) - which range from urgent and sustained action (RCP 2.6, unlikely to exceed global temperature rises above 2 °C) to 'business as usual' (likely resulting in an increase of 2.6°C to 4.8°C by 2081- 2100 compared to 1986-2005 temperatures). There is still a small window of time to decrease GHG emissions

¹ *Climate Change 2014: Mitigation of Climate Change*, Summary for Policymakers, Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report, p.5

² *Climate Change 2013: The Physical Science Basis*, Summary for Policymakers of the Working Group I, Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report, p. 27.

sufficiently to ensure against dangerous anthropogenic climate change. However, global GHG emissions are currently above RCP 8.5 calculations³.

To avoid global mean rises beyond 2 °C, the AR5 states that GHG emissions must be lowered substantially (from 40% to 70% of 2010 levels), and to near zero by 2100. Increases in CO₂ emissions resulting from fossil fuel combustion (76% of the major anthropogenic GHG) are primarily driven by economic and population growth; global efforts would need to include ‘major institutional and technical change’ to ensure climate stabilization⁴. Climate change is already causing profound and primarily negative impacts on humans and ecosystems in every continent on Earth; the AR5 identifies vulnerable populations, ecosystems and industries, and details likely impacts on many areas including food security and human security. It also outlines current and possible future sea level rises, stating that the Arctic ice has been decreasing on an average of 3.8% since 1979 (the calculations do not include the most updated data on the West Antarctic ice sheet per decade, which has acute implications on future sea-level rise calculations).

The AR5 encourages intensified adaptation but stresses that climate resilience is ‘fundamentally’ related to mitigation of GHG emissions. It reminds us that a global effort is essential, suggests options for solutions, and recognises increasing global awareness of the challenges before us. It stresses that mitigating GHG emissions would be relatively inexpensive in comparison to the social and economic costs of delaying mitigation action.

Climate change due to human activities is not an isolated phenomenon. It is one of three planetary processes, including biodiversity loss and nitrogen flow, whose boundaries are close to, or have already been, crossed due to human influence. Crossing a planetary boundary can lead to ‘irreversible damage to the environment and risk human societies’⁵. Other planetary processes experiencing stress due to human activities include ocean acidification, ozone depletion, phosphorous cycles, freshwater use, agricultural land use, atmospheric aerosol load, and chemical pollution.

Urgent action needs personal and political will. The decisions we make over the next few years, at international, national and community levels, will directly influence the extent of global warming, in turn, the ability of future generations to thrive on this planet. We are the problem and the solution.

³ Glen P. Peters, Robbie M. Andrew, Tom Boden, Josep G. Canadell, Philippe Ciais, Corinne Le Quéré, Gregg Marland, Michael R. Raupach and Charlie Wilson (collaboration of the Global Carbon Project) in *Nature Climate Change*, online publication, 2 December 2012, p.2

⁴ Further reading - “CO₂ emissions have increased by an average of 3.1% per year since 2000, and estimates for CO₂ emissions in 2012 were expected to be 58% higher than emissions in 1990”, see Glen P. Peters, Robbie M. Andrew, Tom Boden, Josep G. Canadell, Philippe Ciais, Corinne Le Quéré, Gregg Marland, Michael R. Raupach and Charlie Wilson (collaboration of the Global Carbon Project) in *Nature Climate Change*, online publication, 2 December 2012, p.1

⁵ Stockholm Resilience Center, <http://www.stockholmresilience.org/21/research/research-programmes/planetary-boundaries.html> , accessed 26 March, 2014.