Climate Change:
Why we need to take action Now

Climate Change is Real and Happening now!

It is undeniable, humans have caused the concentration of atmospheric carbon dioxide (CO_2) to be the highest in known history (at least the past 800,000 years). The scientific community has come to a consensus that humans are substantially modifying the earth's climate and since the beginning of the Industrial Revolution the average global temperature has risen 0.8°C. Scientists attribute most of this temperature rise to human activities which release greenhouse gases into the atmosphere, such as the burning of fossil fuels (e.g. coal and oil). In response to these changes, the ultimate objective of the United Nations Framework Convention on Climate Change is to stabilize greenhouse gas concentrations to ***avoid dangerous anthropogenic interference*** with the climate system. Numerous independent analyses indicate that we must limit climate change to ***less than 2ºC*** above pre-industrial temperatures to avoid dangerous impacts to nature, humans, and the global economy.

Why Stay Well Below 2ºC Warming?

Average global warming of 2°C will result in dangerous and irreversible effects, which rapidly worsen above 2°C warming (see reverse for details). The latest research on greenhouse gas emissions suggests that while the window of opportunity of staying below 2°C is closing very fast, it is still possible. However, there are voices in the political and scientific community, especially in the UK, who are talking about a 2 to 3°C future in a rather relaxed and inconsequential manner. It is being presented that it does not matter if global average temperature rises by 2 or 3°C. This dangerous course of action is being conducted in a quiet manner so that few in the public or the media might notice the possible change in positioning.

This paper seeks to identify the massive difference between 2 and 3°C and ensure that there is a societal discussion about the different levels of risk such a change would mean for the UK and the world. It cannot be allowed that a change of such proportions occurs without adequate public attention to the matter and a clear understanding of the implications of such a "slip" from 2 to 3°C rise.

Staying Below 2°C is Still Possible

We have an limited opportunity to stay below a 2°C warming. However, the probability of staying below 2°C is *likely* only for stabilisation around 400 ppm CO_2 equivalence or below (see Figure 1). Allowing concentrations to climb above a stabilisation of this level would mean an *unlikely* ability to stay below 2°C (see Figure 1) and irreversible consequences.

How?

To keep the global average temperature increase below 2°C, the energy system needs to be altered substantially; we need a ***new energy paradigm***.

A 2°C energy future is realistic. The technology exists to dramatically increase the efficiency of our societies, produce energy with zero-to-low CO_2 and drive innovation. The challenge rather is a political one whereby decision-making structures must be put in place in order to drive such change. It is not acceptable to dismiss 2°C without having attempted to change the politics so that we can avoid the associated impacts. Vast resources and decision-making structures have been put into place to deal with military conflicts which may have less likelihood of occurring than the impacts from climate change. The UK government and scientific community should focus its efforts on delivering this kind of change, rather than slipping into a world where devastating impacts would be the result.

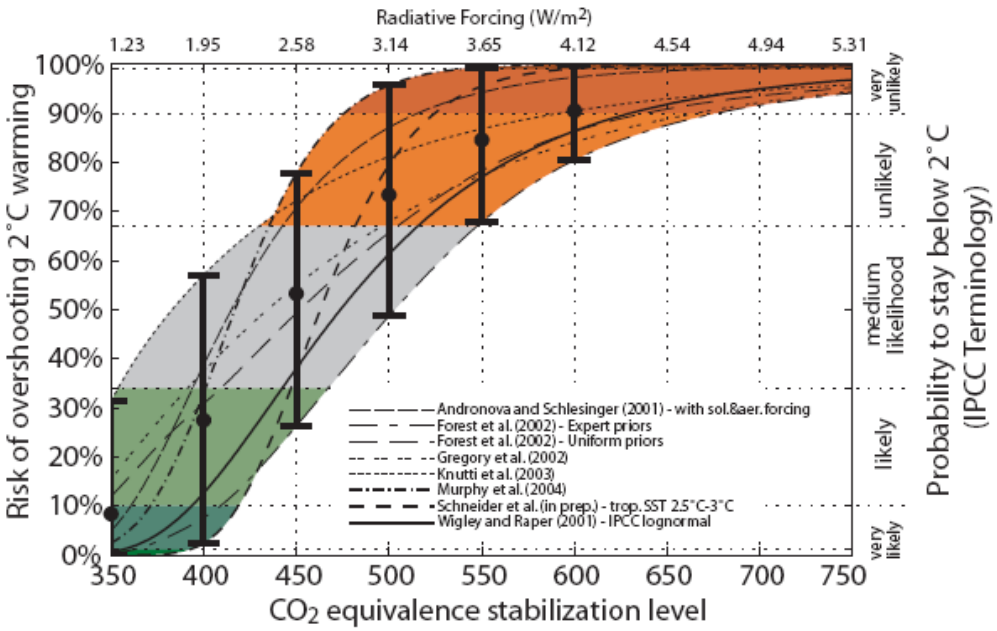

Figure 1. Risks of overshooting 2 degrees C global mean warming for different CO2 equivalent stabilisation levels. Adapted Meinshausen 2006.

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	2°C Climate Impacts	3°C Climate Impacts
Human Health	•**90-200 million more people at risk of malaria** and other vector- and water- borne diseases with increased rates of diarrheal disease and malnutrition in low-income countries[2]	•**300+ million more people at risk to malaria** globally[6,7] •**5-6 billion more people at risk to dengue** and human health is threatened due to water stress and flooding especially in Africa and south Asia[5]
Agriculture	•**Increased hunger** in places such as sub-Saharan Africa and south Asia due to a decline in agricultural production •**Increased disparities and increased conflicts**[2] due to the effects of water scarcity and less predictable harvests	•**50-120 million more people at risk of hunger**, agriculture will be negatively impacted, and food prices will increase globally[2]
Water	•**662 million to 3 billion more people at risk of water shortage**[4] •**Global water shortages** and increased soil moisture stress, resulting in greater intensification of land use and desertification[2]	•**3.1-3.5 billion additional persons at risk** of water shortages with potential migration because of drought, leading to socioeconomic and political instability[2,3,4] •**High risk of drought** for southern Europe, West Africa, Central America, the Middle East, and parts of North America, Amazonia, and China
Ice & Glaciers	•**60% loss of summer sea ice** in the Arctic[2] •**Complete and irreversible melting of the Greenland ice** with 1.5°C warming[4] •**25% or more decrease** of the Antarctic sea-ice volume and continued retreating sea ice for about 2 degrees of latitude[2]	•**Near complete loss of summer sea ice** in the Arctic[2] •**Complete loss of the Greenland ice sheet** and the **Antarctic ice shelves** with a 3°C warming over several centuries[2]
Ecosystems	•**95% loss of most coral** by mid-century with adverse impacts to subsistence and commercial fishing, and coastal protection[2] and economic loss (at Australia's Great Barrier Reef alone is estimated to be **AU$4.3 billion/** per year[8] and reefs worldwide are expected to see similar effects). •**43% risk of change** in global forest to nonforest systems, expansion of forests into the Arctic and semiarid savannas •Risk of **permanent shift of terrestrial carbon sinks to carbon sources** in key tropical areas such as the Amazon and in Arctic areas that are permafrost dominated[3,4] •**Substantial damage and disruption to arctic** and montane ecosystems, and a major proportion of the tundra and about **half of boreal forest area may disappear**[3] •**80% loss** of South African Karoo, **50% loss** of Kakadu (Australia) and the Sundarbans (Bangladesh) wetlands[4] •**~25% of species loss** from current range[1]	•**Little hope of recovery and annual bleaching** of the remaining coral[3] •**88% risk of change** in global forest to nonforest systems, risks of forest losses in parts of Eurasia, Amazonia, and Canada, potential loss of forests in parts of the southern boreal zone, eastern China, Central America, Amazonia, and the Gulf Coast of the U.S.[3] •Much higher risk of **permanent shift of terrestrial carbon sinks to carbon sources** and **irreversible damage to the Amazon forest** leading to its collapse[3] •**50% loss of wetlands** in Mediterranean, Baltic, and several migratory bird habitats in the U.S.[4] •**Massive loss and potential extinction** of ice-dependent species including polar bears and many species in Mexico and South Africa •**~33% of species loss** from current range[1]
Sea-Level Rise	•**25-50 million people at risk due to sea-level rise** and coastal flooding, costing nations 100's of billions of dollars[2]	•**180 million people at risk of coastal flooding** due to sea-level rise and water stress, causing hundreds of thousands to have to migrate to other regions or countries[2]
Extreme Weather	•**Increase in the frequency and intensity of floods**, droughts, storms, heatwaves, tropical cyclones, hurricanes, and other extreme events, driving economic costs up and likely decrease development opportunities[2]	•**Massive increases in the frequency and intensity of fire, drought, storms, and heat waves** •**Socio-economic losses** from global damages range from **3-5%** of GDP for developing countries and a global average of **1-2%** for 2.5-3°C warming[4]

[1]Thomas *et al*. 2004. Extinction risk from climate change. Nature 427:145-148. [2]IPCC. 2001. Climate Change 2001: The Scientific Basis. Cambridge University Press, Cambridge [3]Scholze *et al*. 2006. A climate-change risk analysis for world ecosystems. PNAS 103(35): 13116-13120. [4]Hare, W. 2003. Assessment of Knowledge on Impacts of Climate Change. Potsdam Institute for Climate Impact Research. Potsdam, Germany [5] Hales et al. 2002. Potential effect of population and climate changes on global distribution of dengue fever: an empirical model. [6]Graßl *et al*. 2003. Climate Protection Strategies for the 21st Century: Kyoto and beyond. German Advisory Council on Global Change Special Report, Berlin. [8] WWF. 2004. Great Barrier Reef 2050. WWF-Australia.

For More information

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