Climate Change Position Paper

Erland Howden, May 2008

We are in the throes of a deep and fundamental crisis. Climate change is the greatest environmental threat, challenge and opportunity ever to face humanity. The global community has just a few short years to choose between mass global extinction, starvation, displacement and very possibly an end to our own species' viability on the planet, or a bright new future based on conservation, global cooperation, equity and justice for every citizen and species and an essential ecological sustainability. In the future of the 22nd century, there will be no rewards for half-measures; only a radical re-imagining of our society, economies, institutions, energy and production systems will deliver a safe future for the delicate and diverse life on Earth.

Scientific Context

Since the beginning of the industrial revolution, global average surface temperatures have risen by 0.76ºC. This global warming has increased to a current rate of 0.2ºC per decade and the Intergovernmental Panel on Climate Change (IPCC) now states that this warming is almost unequivocally due to anthropogenic greenhouse gas emissions.

Two hundred years ago, when temperatures were 0.76ºC cooler than they are today, the atmospheric concentration of carbon dioxide CO_2 (CO_2) was 280 parts-per-million by volume (ppmv); today, atmospheric CO_2 is at 383ppmv or 455ppmv CO_2 equivalent for all greenhouse gases. Measurements from ice cores around the globe show that present concentrations of CO_2 are higher than at any other time during human history.[1] The IPCC states that these concentrations will cause approximately a further 1ºC of warming by 2100 even if atmospheric greenhouse gases stayed constant at year 2000 levels[2], taking the global average surface temperature to around 1.8ºC above pre-industrial levels. At this level of warming, there is indisputable scientific evidence that severe and in some cases irreversible impacts will take place, such as flora and fauna extinction, crop failure, more frequent and intense extreme weather events and wide-spread habitat loss – indeed, many of these impacts are already being experienced at the current global temperatures. Scientific studies suggest that sustained global temperatures more than 1.8ºC above pre-industrial levels are likely to trigger sudden, catastrophic shifts in the climate system, or "tipping points".

The threat of tipping points is already demonstrating that the projections which formed the basis of the IPCC 2007 Assessment Report have been outstripped by events unfolding in the real world. The disappearance of Arctic Summer sea ice, 90 years ahead of IPCC projections,[3] demonstrates the dire situation we face:

"Climate for the period of human record has depended on the [Arctic] ice being there."
Waleed Abdalati, Chief Ice Scientist, NASA Goddard Space Flight Center

"Worst-case scenarios about sea-ice loss are coming true: the Arctic Ocean could be ice-free in summertime as soon as 2010."
Louis Fortier, Scientific Director of Canadian research network ArcticNet

[1] IPCC (2007) 'Climate Change 2007: Synthesis Report'
[2] IPCC (2007) 'Climate Change 2007: Synthesis Report'
[3] IPCC (2007) 'Climate Change 2007: The Physical Science Basis', Working Group I to the Fourth Assessment Report of the IPCC. This report states that summer sea-ice is projected to disappear toward the end of the 21st century.

The Pew Centre on Global Climate Change summarises the new climate science[4]:

The loss of Arctic sea ice is not the only aspect of climate change that has been underestimated by projections. Recent observations indicate that climate models have underestimated ice loss from the Greenland and Antarctic ice sheets (Shepherd & Wingham, 2007), ice loss from mountain glaciers (Meier et al., 2007), the rate of global sea level rise (Rahmstorf et al., 2007), change in global precipitation (Wentz et al., 2007; Zhang et al., 2007), and response of northern forests to warming (Soja et al., 2007). All of these changes were predicted before they were detected, but they are occurring sooner or more rapidly than expected (Engelhaupt, 2007). Although there are probably multiple reasons for underestimating climate change and ecosystem responses to it, inadequately treated positive feedbacks (amplifying factors within the climate system itself) are probably involved (Pittock, 2006).

The unexpectedly rapid change in Arctic sea ice and other climate processes suggests that the climate reacts more strongly to a given amount of global warming than scientists have calculated. As a result, risks from future climate change are likely greater than scientists have generally believed, and existing climate change projections might best be viewed as the minimum changes that humanity should expect.

Global Emissions Reductions

The IPCC has identified emissions pathways for developed (Annex I) countries based on limiting global warming between 2.0 and 2.4ºC and the principle enshrined in the United Nations Framework Convention on Climate Change of "common but differentiated responsibilities and respective capabilities"[5], as demonstrated in the following table.

Table 1. Characteristics of greenhouse gas stabilization scenarios

Category	CO_2 equivalent concentration (parts per million CO_2 equivalent)	Global mean temperature increase above pre-industrial at equilibrium using 'best estimate' climate sensitivity[a] (°C)	Change in global CO_2 emissions in 2050 (% of 2000 emissions)	Range of reduction in GDP in 2050 because of mitigation (%)	Allowed emissions by Annex I Parties in 2020 (% change from 1990 emissions)	Allowed emissions by Annex I Parties in 2050 (% change from 1990 emissions)
I	445–490	2.0–2.4	-85 to -50	Decrease of up to 5.5	-25 to -40	-80 to -95
II	490–535	2.4–2.8	-60 to -30			
III	535–590	2.8–3.2	-30 to +5	Slight gain to decrease of 4	-10 to -30	-40 to -90
IV	590–710	3.2–4.0	+10 to +60	Gain of 1 to decrease of 2	0 to -25	-30 to -80
V	710–855	4.0–4.9	+25 to +85			
VI	855–1,130	4.9–6.1	+90 to +140			

Source: IPCC. Fourth Assessment Report (AR4), Contribution of Working Group III . Columns 1–4, table SPM.5; column 5, table SPM.6, columns 6 and 7, box 13.7.

[a] According to the AR4, the best estimate of climate sensitivity is 3 degrees Celsius.

[4] http://www.pewclimate.org/impacts/icecap

[5] UNFCCC, http://unfccc.int/resource/docs/convkp/conveng.pdf

The IPCC targets in the table above have three major flaws:

1. They are based on scientific papers from more than two years ago that do not take into account that observed temperature, sea-level and emissions increases are tracking at the very top of, or above, IPCC projections[6].
2. The lowest emissions scenario assessed does not limit global warming below the critical threshold of 2ºC.
3. The risk profile behind these CO_2 concentrations, identified by Meinshausen, only give about a 50% chance of meeting the temperature target.[7]

National Action: The Australian Response

The world must act with extreme urgency, cooperation and commitment to cut greenhouse gas emissions in line with keeping global warming as far below 2ºC as possible, with the lowest probability of overshooting this temperature. Specifically, we propose that Australia has the following obligations:

1. Urgently work with the international community to identify emissions pathways for developed and developing countries to keep global warming as far below 2ºC as possible, based on the best available science and with the lowest probability of overshooting this temperature.
2. Show international leadership in reaching an agreement to keep global average surface temperature rise to as far below 2ºC as possible, and ultimately return to no more than 0.5ºC above pre-industrial global average surface temperatures[8].
3. Set Australia on the right track, with immediate precautionary targets, in lieu of new emissions pathways, to reduce our domestic greenhouse pollution:
   a. Emissions peak and begin to decline by 2010.
   b. Halve our 1990 emissions by 2020.
   c. Aim for national carbon neutrality by 2040.

Domestic Policy Measures

In order to meet these ambitious targets, Australia needs to rapidly de-couple our quality of life from carbon-intensive energy, conserve and expand our forests and natural environment, change the way we produce and consume and create sustainable and equitable cities, towns and communities.

- ➔ In 2020, we should be sourcing half of our energy needs from renewable sources, through the Mandatory Renewable Energy Target.
- ➔ Australia must legislate ambitious national energy efficiency targets.
- ➔ All direct and indirect subsidies for the fossil-fuel industry must immediately be re-directed to energy efficiency and renewable energy development.
- ➔ An immediate end to all native forest logging, and ambitious targets to increase national forest cover in the medium-term.
- ➔ Extensive new funding for public transport to shift freight to rail and reduce: private car use, urban congestion, demand for short-haul flights, travel times and costs.

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[6] Garnaut Interim Report p. 21-22

[7] M. Meinshausen, 'What does a 2ºC target mean for greenhouse gas concentrations? A brief analysis based on multi-gas emission pathways and several climate sensitivity uncertainty estimates', pp.265 – 280 in Avoiding Dangerous Climate Change, H.J. Schellnhuber et al. (eds.) (2006), Cambridge: Cambridge University Press.

[8] 0.3 to 0.5ºC above pre-industrial temperatures is “tipping point” identified for the disintegration of the Arctic Summer sea ice. *Spratt, D. and Sutton, P (2008) Climate ‘code red’: The case for a sustainability emergency.*