Victoria Climate Change Summit Paper Submission

Adrian Whitehead

for the "Target 300" campaign

Philip Sutton, "There is too much greenhouse gas in the air NOW! There is absolutely no advantage in having any more in the air, NOW! Our private targets should be to have no future emissions into the atmosphere. That's what we really need.**"**

Melbourne Social Forum, conference, March 2007

Human induced climate change is the result of the greenhouse gases, such as CO2 and methane, that we have released into our atmosphere. These gases are heating up our planet. Much of the drought, fires, floods, coral bleaching and severe storms we have seen over the last decade and a half are due in large measure to human induced climate change.

If we want to return our climate to the relatively stable conditions we have experienced in the past and reduce the negative impacts of climate change, we will need to reduce concentrations of atmospheric greenhouse gases close to pre-industrial levels. This means reducing our greenhouse gas emissions to as close to zero as possible and sequestering atmospheric carbon as fast as possible. Stabilising our greenhouse gas concentrations at any level higher than close to pre-industrial will result in an increasingly hostile world for humans to live in and potentially trigger additional massive temperature rises which will threaten billions of people with displacement, hardship, disease and death.

However climate change is not the only critical environmental and resource use emergency we face. The Dutch government through their Sustainable Technology Development Program identified a number of sustainability issues that become critical by 2050 which include depletion of fossil fuels, depletion of metals, soil loss, heavy metal deposition and has concluded that globally we need to improve our eco-efficiency of most human activities by a factor of 20 to 50 if we are to become sustainable and globally socially equitable (1). This means a reduction in material and energy inputs and pollution outputs by 95-98% and to achieve this we must develop along three lines of innovation in the short, medium and long terms.

The bottom line is we have entered a climate and sustainability emergency that will require a global systemic change and cooperative effort on a massive scale if we are to come through it.

1. Weaver etal, 2000, "Sustainable Technological Development", Greenleaf Publishing, Sheffield UK

What is the Science telling us?

James Hansen, NASA "We're at a point where it really is a crisis. Because the danger is, we are close to passing tipping points. We're close to the point where the rest of the Arctic sea ice will disappear quite rapidly. And we're very close to the point where the West Antarctic ice sheet and the Greenland ice sheet could be unstable and begin to disintegrate out of our control."

Zero Emission Network "Target Zero" conference, Melbourne, June 2007

James Hansen is director of the NASA Goddard Institute for Space Studies and Adjunct Professor at the Columbia University Earth Institute has released papers that show climate changes is much worse than is suggested by the IPCC reports. For example he showed that sea level rise could be as much as 4m by the end of the century rather the below 1m maximum proposed by the IPCC.

His most recent work has been released as a draft paper at Columbia University and is titled "Target Atmospheric CO2: Where Should Humanity Aim?" (1). This paper has numerous critical findings including that we already have an additional 2 degrees warming built into the system not 0.6 degrees as commonly reported and that 450 ppm CO2 is enough to trigger a 60-80m sea level rise.

Assessment of Target CO_2

Phenomenon	Target CO_2 (ppm)
1. Arctic Sea Ice	300-325
2. Ice Sheets/Sea Level	300-350
3. Shifting Climatic Zones	300-350
4. Alpine Water Supplies	300-350
5. Avoid Ocean Acidification	300-350

→ Initial Target CO_2 = 350* ppm

*assumes CH_4, O_3, Black Soot decrease

However the most important information to come out of his work is identifying at what level of greenhouse gases are "safe" in the atmosphere. This information is summarised in a table form a presentation Hansen gave in January this year at the Royal College of Physicians, London (2).

This table shows that several critical systems pass their tipping points somewhere between 300 and 350 ppm CO2 and in the case of North Pole Summer Ice between 300 and 325 ppm CO2. As we must have North Pole Summer Ice to have a "safe" climate system we can concluded that "safe" levels of CO2 in the atmosphere lie somewhere between 300 and 325 ppm CO2. Unfortunately we are not sure exactly where this safe level lies between 300-325 ppm CO2 so we must set the "safe" target / goal for CO2 concentrations is 300 ppm or below.

"Safe" Climate = 300 ppm CO2 or below

Understanding this we can see how ridiculous all the proposals to stabilise our Greenhouse gases at levels higher than today.

James Hansen suggests we have only decades to return to a "safe" level of greenhouse gases or we will run the risk of passing points of "no return" for a number of critical global warming positive feedback mechanisms.

James has proposed in interim target of 350 ppm CO2 and the closure of the coal industry, the later of which he mentions in a recent letter to Kevin Rudd.

> *"Prime Minister Rudd, we cannot avert our eyes from the basic fossil fuel facts, or the consequences for life on our planet of ignoring these fossil fuel facts. If we continue to build coal-fired power plants without carbon capture, we will lock in future climate disasters associated with passing climate tipping points. We must solve the coal problem now."*
> *James Hansen letter to Kevin Rudd 27 March 2008*

Unfortunately people have already begun to misinterpret Hansen's call for an ***interim target*** and are confusing this with a "safe" target. 350 ppm CO2 is as much of a death sentence for the planet as 400, 450, 550 etc.

1. http://www.columbia.edu/~jeh1/2008/TargetCO2_20080407.pdf
2. http://www.columbia.edu/~jeh1/RoyalCollPhyscns_Jan08.pdf

2 degrees 2 degrees to much

As we understand more about the science behind climate change the more serious the situation looks. On a weekly basis we hear worsening news. For quite a number of years many climate scientists have argued that we can, most likely, avoid dangerous climate change if temperatures do not exceed 2ºC above pre-industrial. This argument was based on the scientific rule-of-thumb that things would probably be safe if we didn't go beyond the normal spread of temperatures that the earth has lived through over the last million years – and the earth had only ever been 2ºC warmer than pre-industrial through all that time. But more recent scientific evidence is showing us that this set of assumptions is unfortunately wrong.

Firstly, for the vast majority of the last million years we didn't have a vulnerable population of 6 billion non-nomadic humans to support. Secondly, the earth was a wilderness area for virtually all of this time so other species had a much better chance to survive. Also the natural systems had never been loaded with the current level of greenhouse gases or the level of land clearance or the level of air pollution and hence their ability to respond is a beneficial way is reduced.

What we are finding is that in many cases damaging impacts are occurring at lower temperatures than you would expect from earth's history and the changes are happening a lot faster that climate models have been predicting. It is now clear that we are losing all of the Arctic summer ice that was critical for keeping the earth cool and that this will all melt with 'only' 0.8ºC warming. What is even more concerning is that we had probably set in train the loss of the Arctic summer ice once the temperature started to rise over ***0.5ºC***. We now know that a 2ºC warming is not safe but is a death sentence.

60-80% a Death Sentence for much of the planet

60% of 1990 levels by 2050 is far too little too late and implies we have significant amounts of time to take moderate action. The 60% goal will see us go over 3˚C. 80% of 1990 levels by 2050 will result in a 2˚C temperature rise if only adopted by the rich world. This goal is often said to be based on the work of Meinshausen who calls for a global reduction of 80% by 2050 to hold us below a peak of 2 ˚C and then argues that after 2050 further reductions in emissions should occur to allow the atmospheric CO2 level to stabilise at 400 ppm. Given that Australia is one of the highest produces of CO2 per head both historically and currently, our share of meeting the Meinshousen target would be a 95% reduction of 1990 levels. However this goal is still aiming for too high a temperature (2˚C) and worse still there is even an unacceptable chance (26% minimum based on old science) that the temperature will exceed 2ºC.

Risk and Climate Change

Adrian Whitehead, "You really need to ask yourself only one question. Do you believe climate change has already come too far? If the answer is yes then it is all the reason you need to argue for zero emissions."

Discussion with lead youth climate campaigners, UNFCCC conference, Bali, December 2007

One of the areas tackled very poorly around assessing our response to climate change is the issue of risk. Risk is a value based assessment which combines the likelihood or probability of a given outcome with the consequences of that outcome. We use risk analysis in many aspects of our daily lives. Normally we usually only accept very low probabilities for activities that have very serious consequences such as death or injury. For example people in Canada who undertake activities such as cycling or riding a school bus accept a risk level of only a 1 in 100,000 (0.00001% percent) chance of dying per year.

However with climate change some seem comfortable exposing the whole earth and its' human and non human populations to high probabilities of catastrophic climatic events. For example in 2005 we reached 455 ppm CO2-e (carbon equivalent) which according to the UK Hadley Center, a world leading climate science institute, gives us a probability of 80% chance of going over 2˚C, a 20% chance of going over 3˚C, and 1% chance of going over 5˚C, even if we managed to stabilise our greenhouse gas levels as this point. Despite this some governments, environmental groups and individuals are proposing to stabilise our greenhouse gas levels near to 455 ppm CO2-e (carbon equivalent) or much higher.

Is it worth the risk?

Impacts Today - droughts, fires, floods, coral bleaching, severe storms, killer heat weaves, spreading diseases, species extinction - *today's costs are already too high.*

Future Impacts - major agricultural system collapse, millions of climate refugees, drowning of island nations and coastal areas, economic collapse - *this must be avoided.*

Feed Back Loops - natural systems effected by global warming are releasing greenhouse gases, adding to the problem of global warming at ever increasing rates- *this must be reversed.*

Run away Climate Change - critical levels of global warming trigger a further large temperature rise, threatening the survival of humans and natural ecosystems - *this must be avoided at any cost.*

Avoiding catastrophic climate change and the role of the lag effect

The current global temperature has already increased by 0.8º on average. Scientists suggest that we are already committed to an extra 0.6º rise due to the thermal inertia of our oceans. The oceans have reduced the immediate effects of the greenhouse gases we have already released, but they are still slowly heating up, resulting in a lag effect in climate change.

Paul Brown, correspondent for the UK Guardian, looks at the issue of the lag effect in his new book 'Global Warning: The Last Chance for Change. *"Best estimates are that there is a 25-to-30 year time lag between greenhouse gases being released into the atmosphere and their full heat-trapping potential taking effect. That wipes out any feeling of comfort. It means that most of the increase of 0.8°C seen so far is not caused by current levels of carbon dioxide but by those already in the atmosphere up to the end of the 1970s."*

However recent work by James Hansen has concluded the we already have 2º temperature rise built into the system rather than the commonly quoted 0.6º. The reason for this new calculation is that previously we have failed to taken into account "slow surface albedo feedback" (1). All of this suggests we have the slimmest of margins to avoid a catastrophic temperature rise.

1. Hasen et al *Target Atmospheric CO2: Where Should Humanity Aim?* 2008

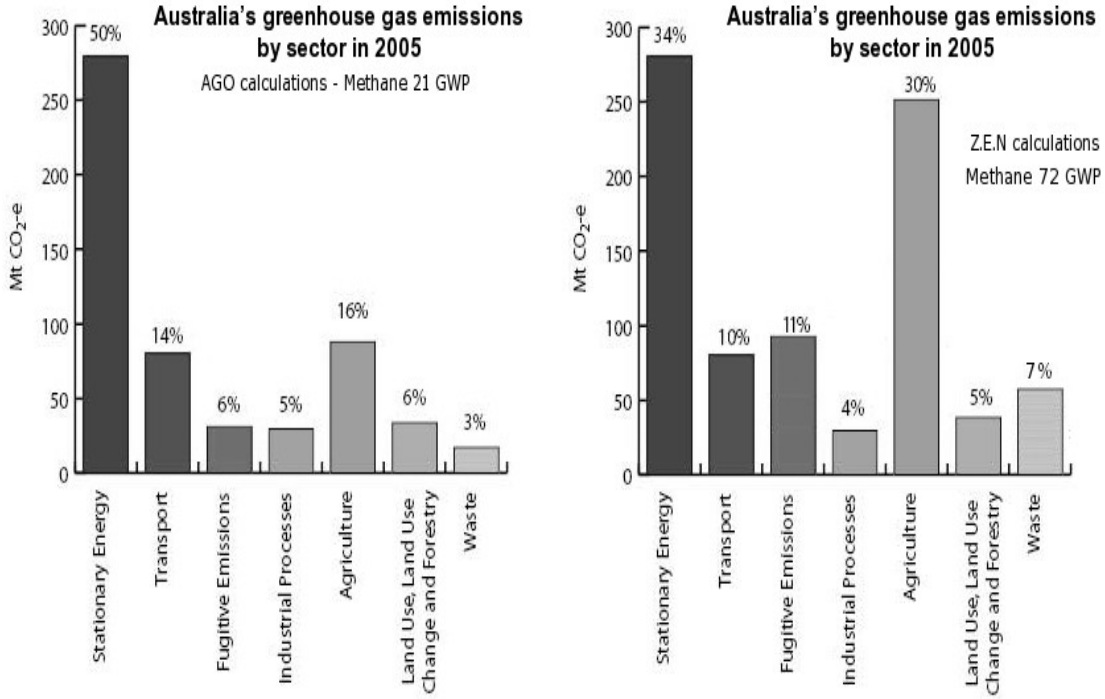
Tipping points and avoiding cataclysmic climate change

If we get a 6-8º or more increase in temperature, climate change will result in truly cataclysmic impacts on humanity and the environment - impacts that have been likened to the effect of a nuclear war by the UK International Institute for Strategic Studies. This level of warming could be reached if a critical number of positive feedback loops become active and start a chain reaction of greenhouse gas release, temperature rise and further triggering of positive feedbacks. Some of these positive feedback loops include the melting of the North Pole (which may now be as close as 2010), the thawing of permafrost, the drying and burning of the world's forests, gasification of undersea methane and ocean acidification. The point at which the world passes this critical threshold of greenhouse gas release from positive feedback loops is called the "tipping point". The exact timing of the "tipping point" can only be guessed at, with some scientists such as James Lovelock arguing we have already passed it. Given the uncertainty of the point at which we will pass the global "tipping point", the logical approach is to reduce our atmospheric greenhouse gas levels as quickly as possible,reducing the risk of this event. James Hansen suggests if we can create a cooling effect quickly enough then we may be able to reverse the feedback loops, returning our climate to a more stable and cooler state.

Economics

The 2006 Stern report, written for the British government by Sir Nicholas Stern former Chief Economist for the World Bank, made it very clear that not acting on climate change would result in impacts worse than the combined effects of WWI and WWII and that by spending as little as 1% of our GDP we could avoid a potential 20% reduction on GDP. At the time Stern wasn't even using data that incorporated the now expected 3-4m sea level rise by 2100. If we take a moment and think about the economic losses, let alone the human suffering that would result from a 3-4 meter sea level rise it is easy to see why the cost of not responding to climate change will out weight any cost in acting. To achieve safe CO2 levels we will need to suspend elements of normal economics and focus our economy on implementing the solutions. The closest analogy is the transformation of a number of major economies during WWII in a matter of months. Under a fast transition scenario there will be a massive increase in building (rail, renewables, retrofitting) and manufacturing, employment will be high due to the amount of labor needed to transition our economy to a state of sustainability. In the 1-2 year planning stage carbon taxes, trading, or rationing can start the process of moving from a carbon economy.

Methane a hidden problem



The role of methane in effecting global warming has been underestimated due to the methods of accounting used to calculate relative impacts of different greenhouse gases. Methane only exists in the atmosphere an average of 12 years before it breaks down into carbon dioxide and water vapor, yet the standard account procedures calculate methane's global warming potential (GWP) over a period of 100 years. This seriously under estimates the relative impact of methane on global warming in the short term If we re-calculate Australia's emissions using a 20 year time frame for methane (72 GWP)[1], rather than 100 years (21 GWP)[2] a more accurate picture of the impacts from different sectors on our GHG emissions emerges. For example the relative contribution of agriculture to our GHG emissions changes from 16% to 30% and livestock from 11% to 25%. See: *http://www.zeroemissionnetwork.org.au/facts-and-figures-agriculture* for the full analyses.

1. IPCC Forth Assessment Report, chapter 2, page 212
2. IPCC Guidelines for GHG Reporting

Conclusion

In short, all countries need to achieve zero emissions in the shortest possible time. Massive amounts of CO2 have to be stripped out of the atmosphere to bring levels down to as low as 300 parts per million and possibly lower. The countries with the greatest economic might and largest historical emissions need to shoulder the largest share of the economic cost of these changes. The good news is that the solutions we need to implement are available now, all we need is the political will to implement them.