

SS590 Individual Project (302472)

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International responsibilities on climate change from a moral and ethical perspective.

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1. Introduction

Climate change is the greatest moral challenge of our generation. **Kevin Rudd**

This paper was born out of the observation that at community and popular media level the ethical and moral issues related to the impacts of *climate change* (IPCC 2007) are being drowned out by the weight of financial considerations fostered by the conventional neoliberal fiscal growth paradigm of the western world. Scientific evidence indicates there is urgent need for action on climate change. The two constituencies most under threat also have the weakest voices, they are the world's poor and future generations. As a civilised society humanity is required to confront the profound questions of morality and social justice that climate change presents. For example, can profits of polluting industries be put before the rights of future generations, or the developed world's right to cheap air-conditioning before a third world's right to basic food and water?

Climate change highlights the interdependence between all nations and species on this planet sharing as we do, the same *atmospheric common* (Agarwal and Narain 2002). As a wealthy industrialised nation, Australia inherits certain key responsibilities for abating emissions associated with global warming. With 91% of Australian's considering the right to a 'fair go' high on their list of priorities (Gough 2006) there is a cultural imperative to treat other stakeholders with respect and fairness when discharging those responsibilities.

This paper explores issues of robustness of climate change science in the face of media overexposure for the views of climate change deniers and it is asserted that politicians, policy makers and climate change negotiators must base their work on the body of science supporting anthropogenic global warming. Consideration is given to equitable system of carbon accounting, responsibility for historic emissions, per capita responsibility compared to national responsibility and the cause and effect of carbon emissions. These factors are applied to international climate change negotiations to demonstrate society can work together to develop solutions for climate change.

Climate change is a *wicked problem* (Briggs 2007), but not an intractable one, despite all the challenges remedial actions are essential and will become more urgent with the passage of time. Such actions must protect the most vulnerable and underrepresented at the international negotiations level, that is, the poor and future generations. Trade practices, international negotiations and vectors for success used by wealthy Western nations are challenged, revealing the need for new systems, frameworks and paradigms to guide the global community through the challenges presented by climate change.

Issues related to climate change lack some of the characteristics of a *paradigm moral problem* as the damage done by the Western world's emissions on the poorest of the planet and those not yet born are not intentionally inflicted (Jamieson 2007). However, this lack of intention does not reduce the impact one iota, the harm is just as real. Failing to act to reduce emissions in the knowledge of the harm they cause carries the same moral weight as inflicting intentional harm.

Kevin Rudd was right, '*Climate change is the greatest moral challenge of our generation*'; (van Onselen 2010). A corollary to which is that we must start treating it as such and in so doing wealthy nations be required to forego some economic growth and embrace reduced standards of living, in return for a potentially enhanced quality of life for themselves and for future generations.

2. Fact or Fiction.

The 11 Warmest Years On Record Have All Been In The Last 13 Years. **Science Daily.**

The science in the IPPC (IPCC 2007) report is unequivocal, yet media coverage is shifting to favour the counter arguments of climate change denialism put by the so called '*Climate Sceptics*' (Pearson 2010). As a democratic free society people in Australia have every right to hold whatever views they wish regarding climate change, however, it must also be contested policy makers have a duty of care which obliges them to accept the science of the *IPCC 2007* report over opinions of commentators when discharging their duties as decision makers. The logic for this will be presented in this paper.

In Australia a foremost commentator on climate change denial is Professor Plimer, whose professional field is geology. Professor Plimer has been primary author of only two peer reviewed papers since 1994, both in his field and he has worked all his life in the mining sector. He also holds three directorships with mining companies, facts which may explain his pro-mining stance (ABC 2009). His latest book '*Heaven and Earth*' (Plimer 2009) was reviewed by Professor Michael Ashley (University of New South Wales, department of Physics), who declared it a conspiracy theory, at one point saying "*It is hard to understate the depth of scientific ignorance that the inclusion of this information demonstrates*" (Ashley 2009). In the UK Lord Monkton receives similar wide press coverage. He is reported in the Sydney Morning Herald (SMH 2010) as stating that after the Berlin Wall fell Communists needed a Trojan Horse to centralise power and hence invented climate change. During Monkton's recent visit to Australia, politician and self proclaimed climate denier Barnaby Joyce said Monkton is on the fringe and does not help their cause (SMH 2010). The *IPCC 2007* report is based on peer reviewed work done by hundreds of scientists in their fields of physics and climate science; work of this calibre ought not be undermined by people with vested interests or mere eccentrics. Scepticism is a cornerstone of scientific integrity, any expert in the field of climate science with evidence contrary to the IPCC report has a responsibility to publish such information, this however has yet to occur. The *Australian Sceptics* say the likes of Plimer and Monkton are not sceptics and should not claim that status for themselves (Segev 2010). Segev continues to say that from a sceptical point of view the science of climate change is overwhelming.

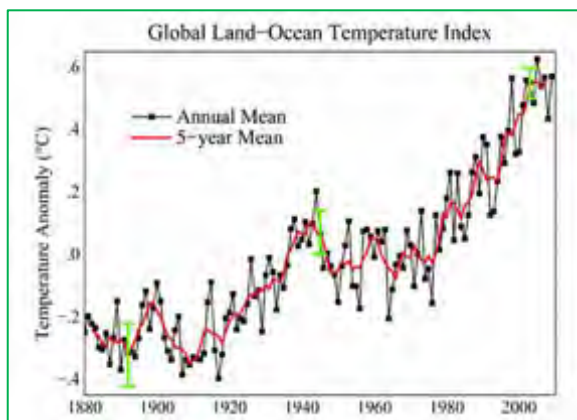


Fig 1. Ocean & Land Temperature increases 1880 to 2010
Courtesy of NASA.

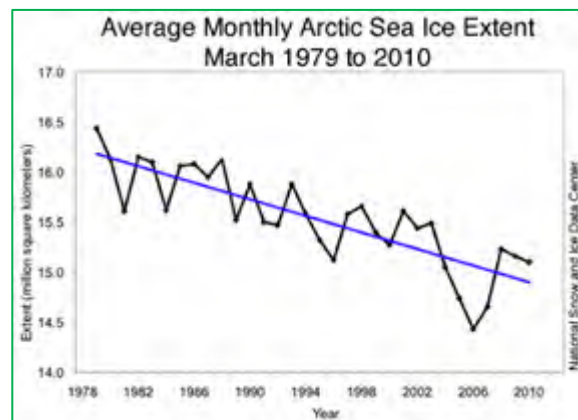


Fig 2. Declining Arctic Sea Ice 1979 to 2010. Courtesy of
National Snow and Ice Data Centre

NASA's research into ocean and land temperatures demonstrates Global warming as a phenomenon is unequivocal (Fig 1). The Copenhagen Diagnosis presents "an *unambiguous picture of the ongoing warming of the climate system.*" (Allison et al 2009). The cause of that warming is also well

documented, there is a greater than 90% probability it is the result of greenhouse gasses emitted by industrialised nations (IPCC 2007).

Not only is the scientific evidence compelling there is also graphic physical evidence of the effects of global warming. Arctic ice melting accelerated in the late 1990s; estimates of combined annual melting rose from 100 sq km per year from 1980 to 89 to 320 sq km in 1997 and 540 sq km in 1998 (WWF 2010). The *National Snow and Ice Data Centre* report Arctic sea ice is declining at an average of 2.6% per decade from 1979 to 2010. (Fig 2) (NSIDC 2010). While water from melting sea ice does not increase sea level it does change ocean temperatures and importantly ocean currents especially the *North Atlantic Drift* (Pearce 2009) with the potential to significantly impact on weather patterns. Any loss of ice also reduces the global albedo effect consequently increasing warming (Nova 2010). The albedo effect refers to the reflectivity of the earth, as it increases more radiant heat is reflected back into space. Ice is very reflective and has a high albedo effect, but dark ocean are not and absorb the sun's heat (Fig 3).



Fig 3. Shows the reflective nature of sea ice as compared to the dark ocean. Photo courtesy of NOVA



Fig 4. Himalayan Glacier. Photo courtesy of Flickr

right amount of seasonal water from glacial melts into the northern plains and Krishna River Basin to support its agriculture (Branagh-McConachy 2010).

In addition to polar ice there are large amounts of glacier ice (Fig 4). Unfortunately Himalayan glacier melt has been the centre of some controversy since the breakdown of the peer review process allowed an unsubstantiated claim on rates of melt to be included in the 2007 IPCC report. However, Himalayan glaciers "*are indeed receding and the rate is cause for great concern.*" (Ramesh 2010). Himalayan glacier melt is of concern for several reasons; as well as the loss in albedo, runoff water directly impacts on sea level rise and the food-bowl of India relies on the

Further evidences of climate change are extreme weather events. The intensity of Hurricane *Katrina* in 2005 was attributed to changes in ocean surface temperature in the Gulf of Mexico (NASA 2005), the European heatwave of August 2003 was their hottest August on record and was responsible for 35,000 heat related deaths (Bhattacharya 2003), whilst in Australia the intensity of the Victorian bushfires of 2009 was attributed to unprecedented hot and dry conditions backed by hot dry winds (CSIRO 2009).

Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Severe
Almost certain	M	II	II	Γ	Γ
Likely	M	M	H	H	E
Possible	L	M	M	H	E
Unlikely	L	M	M	M	II
Rare	L	L	M	M	H

Fig 5. Basic risk Matrix.

Given the overwhelming strength of evidence supporting the phenomenon of global warming causing climate change policy makers have an obligation to exercise responsible and ethical decision making on related matters. Advocating a 'do nothing' approach to global warming in their civic endeavours is contrary to expert scientific advice, in doing so they carry a moral responsibility for any adverse consequence of that decision. A risk analysis matrix (see left) on this issue demonstrates the risk of not acting to

address climate change is *Extreme* as the likelihood is almost certain and the consequences severe (Fig 5). Such matrix are used across Australian industry, an employee who engages in an action that is in the extreme sector faces instant dismissal and possible court action for endangering the life or wellbeing of their work colleagues, something that should be in the mind of our policy makers when they go against scientific evidence. Alternatively, should the science be flawed and measures are taken to address global warming needlessly, the matrix places the risk at *Low*, as the likelihood is rare and consequences minor. Motives for elected officials discharging their duties in ways that create unacceptable risks are to be questioned.

For the purposes of this paper, the compelling logic of the need to act on anthropogenic climate change and to keep global temperature increases to <2° Celsius (IPCC 2007) is accepted, however it is acknowledged that adverse effects of climate change will not be consistent across the globe, some peoples are more vulnerable due to geographic location, topography and socio economic factors. In fact the nations who stand to bear the brunt of climate change disasters are not the nations primarily responsible for anthropogenic atmospheric CO₂e (CDIAC 2009).

It is also acknowledged that there is much work still to do on climate and sea level predictions as the full complexities of the global climate vectors are not yet fully understood, but we do not have the luxury of being able to wait until there is full understanding before deciding to act. There is already sufficient knowledge to predict the inevitability of dynamic changes and *feedback loops* which if triggered will be devastating and irreversible (IPCC 2007). The carbon sinks that absorb both anthropogenic and natural CO₂e are decreasing in efficiency faster than IPCC 2007 predicted, with runaway global warming these sinks could start to emit CO₂e (Allison et al 2009).

The longer the delays in real action on climate change, the harder it will be to bring it under control.

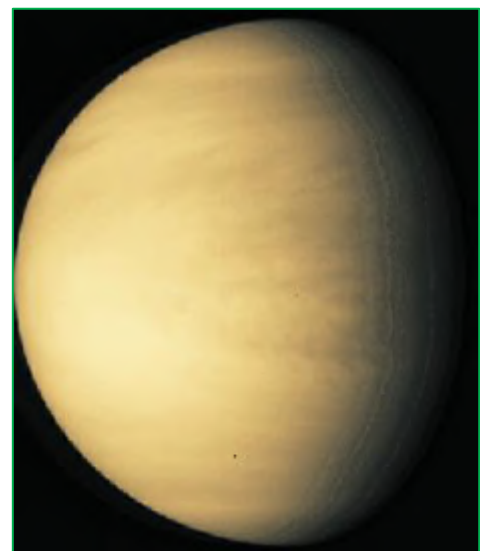


Fig 6. Planet Venus. Photo courtesy of NASA / Magellan mission. Copyright Calvin Hamilton.

Let us take a lesson from Venus (Fig 6), Earth's sister planet, Venus started out very similar to Earth, but now has an atmosphere made up of 96% CO₂ causing runaway global warming resulting in a surface temperature of 470°C (Allison et al 2009).

3. Carbon accounting and the atmospheric common

In a commons, individuals typically gain much more from their use of the resource than they suffer from the degradation their use causes; thus one can increase one's own well-being by over consuming and harming the other users. Furthermore, restricting one's own use does not ensure protection against the harms caused by others' use of the resource. In these ways, a common resource establishes a moral community. To protect the resource and to protect themselves, the parties must grant each other the right to a fair share, and accept enforcement of a mutually agreed limit. Paul Baer

Developed nations are running up a huge ecological debt, a debt that is not being repaid. If a 'business as usual' approach continues, the debt will compound considerably before being inherited by future generations. The Bolivian ambassador to the UN, Angelika Navarro, told COP 15 at Copenhagen "We think that 20% of the population have created a crisis for humanity. They have a historic responsibility for more than two thirds of emissions and more than 90% of the increase in temperature. We think there is a climate debt they owe to all humanity and to Mother Earth." (Grey & Mason 2009 {1}). Those same wealthy developed nations have been very successful in controlling the debate and negotiations on climate change to downplay this historic debt.

In determining a methodology for allocating responsibility for anthropogenic atmospheric CO₂e and hence an equitable approach for apportioning reduction targets, some form of carbon accounting seems necessary. This in itself is contentious, as globalised accounting based on growth economy

stimulated carbon emissions to fuel that growth, hence exacerbating the Climate change problem. (Schumacher 1973). It is possible for carbon market systems to be open to investor manipulation, motivated by profit rather than reduction of global temperatures. Manipulation of international carbon trading could result in a form of *Carbon Colonisation* whereby rich countries abdicate their carbon responsibilities to third world poorer countries through trading credits or by locating high polluting industries in poorer countries. The concept of becoming a 'Carbon Haven' is now being tested by South Africa, where they tempt multinational high emitters to locate there by offering cheap coal fired electricity (Weston 2010).



Fig 7. Examples of Geoengineering. Courtesy of noliesradio.

carry a high degree of risk, they can be seen as a possible cost effective way for developed nations to control the global temperature when compared to the costs of mitigation (Fig 7). Large scale Geo-engineering may allow polluting nations to continue a business as usual approach for a short period, none of them offer a reduction in atmospheric CO₂e, so do not address the causes of global warming, ultimately they will negatively impact on the same constituents who are worst affected now, the poor of the world and future generations. If there are insufficient checks and balances in carbon accounting systems Geo-engineering technologies may be adopted as a cost effective alternative to CO₂e reduction. (Thomas 2009).

Implicit in any carbon accounting system is a method of determining a country's CO₂e quota. The first global carbon emissions scheme was introduced at Kyoto in 1997 and focussed on countries responsible for existing and large emissions, referred to in Kyoto as Annex 1 countries. This approach targeted the source of the problem and was the logical action at that time; however the USA and Australia both refused to adopt their allotted targets, stating they would adversely impact on their country's economy and lifestyle. When the Kyoto commitments expire in 2012 a new system for carbon accounting, fully supported by the global community, needs to be in place. This new system is required to be proactive, not reactive as Kyoto was because to renew a system based on a country's emissions on a specific date (1996), as with the Kyoto commitments will lock in an emissions hierarchy, with current high emitters maintaining their high emissions status, a nexus that would be hard to break, consequently reinforcing the old world order. Understandably emerging nations like China oppose this concept in favour of a more equitable system (China 2009).

An alternatively egalitarian option is to consider the concept of an '*atmospheric common*' that all people have equal rights to use (Shah 2009). This considers the atmosphere as a resource common to all which can only absorb a finite quantity of anthropogenic CO₂e (Fig 8). All on the planet are given equal rights to utilise that resource. The *atmospheric common* concept is linked to a per capita emissions target as discussed in part 5 of this paper.



Fig 8. The atmosphere can only absorb limited amounts of CO₂ and is common to all. Photographer anon.

Time is of the essence for this issue; a credible robust carbon accounting system must be in place before the Kyoto commitments expire in 2012. As 2012 approaches the increased pressure for a solution will make fair and meaningful negotiations ever harder to achieve. There must come a point when negotiators shift from protecting their country's financial interests to pursuing

resolutions embracing equitable inter-global and intergenerational access to an atmospheric common. Such a commitment must be universally binding and include checks and balances to guard against reduction targets being hijacked by the financial markets or the unintentional introduction of climate colonialism.

4. Responsibility for current levels of atmospheric greenhouse gasses.

Most of the CO₂ that came out of the exhaust of Henry Ford's first Model T is still in the atmosphere. Anon

Current levels of atmospheric CO₂e are a combination of background or natural levels and emissions generated by human activity, predominantly from burning fossil fuels. The natural carbon cycle involves large amounts of carbon emissions and absorption (Fig 9). The crucial aspect is that this system is in balance, with the oceans, soil and vegetation being able to absorb all natural emissions. Problems occur when the system is put out of balance, as in the case with human derived emissions from burning of fossil fuels, land clearing and the production of cement. Burning fossil fuels releases carbon which has been locked away in coal, oil and gas for millions of years, land clearing impedes nature's ability to absorb carbon in trees and the soil, while concrete manufacture uses large amounts of energy and releases CO₂ as the following formula demonstrates [CaCO₃ (limestone) + heat = CaO (cement)+CO₂].

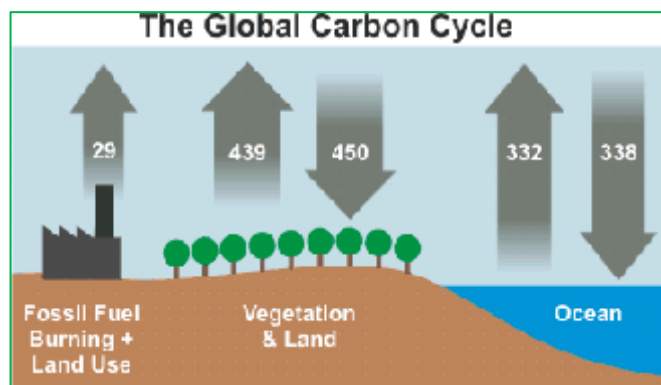


Fig 9. Global carbon cycle. Numbers represent flux of carbon dioxide in gigatonnes Source: Figure 7.3, IPCC AR4.

These combined human emissions are greater than the natural carbon cycle can accommodate resulting in the increased atmospheric CO₂e responsible for climate change. The industrial revolution set in chain events that triggered anthropogenic climate change; therefore industrialised nations are responsible for the current elevated levels of atmospheric CO₂e (Fig 10). In international climate negotiations many developing nations remind industrialised nations of this responsibility and request it to be included in carbon accounting. This has become known as the *Brazilian proposal*, due to Brazil introducing it to the United Nations Framework Convention on Climate Change negotiations prior to the 1997 adoption of the Kyoto Protocol (UNFCCC). This proposal set 1840 as a baseline for calculating a country's responsibility for atmospheric CO₂e. The *Brazilian Proposal* was sent out from Kyoto for scientific analysis, so was not an aspect of the Kyoto protocols, however a principle of *Common but different responsibilities* was (Khalfan 2002). This resulted in responsibility for carbon reduction applying to developed (Annex 1) nations. Many feel this is not equitable and believe linking future emissions to 1990 levels as required under Kyoto was in fact rewarding historically high emitters (Baer et al 2000). Alternatively, it could be argued that the 'Industrial Revolution' benefited all people globally and so emissions generated in developing technologies should be shared equally across peoples irrespective of their technological status.

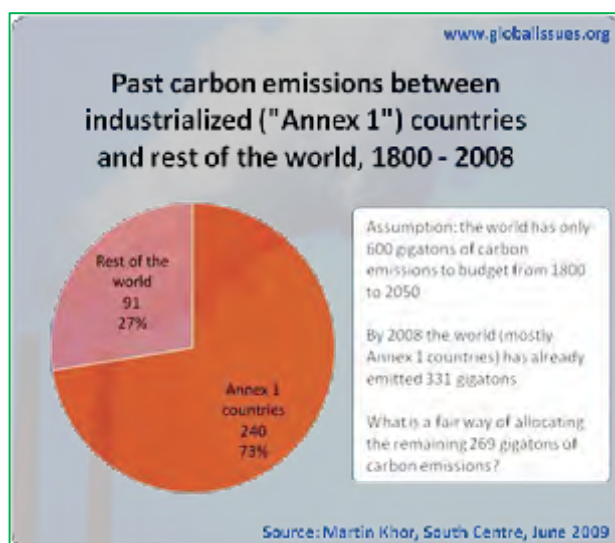


Fig 10. Historic emissions 1800 to 2008. Courtesy of Martin Koher

China has made their position on historic emissions clear in their position paper to

COP15 they state: “Developed countries shall take responsibility for their historical cumulative emissions and current high per capita emissions to change their unsustainable way of life and to substantially reduce their emissions and, at the same time, to provide financial support and transfer technology to developing countries. Developing countries will, in pursuing economic development and poverty eradication, take proactive measures to adapt to and mitigate climate change” (China 2009).

Some emissions were generated prior to understanding the damage they were causing; this led to an argument for diminished responsibility due to lack of knowledge or intent to damage the environment (Gosseries). Gosseries's paper '*Historical Emissions and Free-riding*' argues that without definitive knowledge of damage being done nor does an ability of current generations to influence the actions of their predecessor's moral responsibility for historical CO₂e pollution not exist. Gosseries uses a reductionist technique, portraying the world as three people, a present day American, whose responsibility is being considered, a current day Bangladeshi whose land is being destroyed by climate change and a previous generation American whose death was simultaneous with the birth of the present day American. He then argues that while the actions of the first American have adversely affected the current day Bangladeshi, the current day American cannot be held responsible due to an inability to change the circumstances of the past. Australia's former Prime Minister, John Howard used this form of argument when refusing to apologise to current day indigenous persons for the '*Stolen Generation*'. The Stolen Generation refers to people of aboriginal and Torres Strait Island descent forcibly removed from their parents by Government policy between 1909 and 1969. The value of this reductive technique is questionable as it ignores; (i) the true nature of intergenerational change (ii) the fact that affluent lifestyles of industrialised nations is built on their historic emissions and (iii) the principle of 'Polluter Pays' (Preston 2009).

If one subscribes to a belief emissions generated prior to an understanding of the damaging effects of climate change should not be included in any carbon accounting then one needs to nominate a date for this trigger. The *Brazilian proposal's* analysis was done for emissions from 1890, due to availability of data, rather than knowledge of the effects of carbon emissions. As early as 1896 Svante Arrhenius linked global temperature to atmospheric CO₂, in 1938 Guy Stewart Callendar reported that a doubling of atmospheric CO₂ would raise the temperature by 2°C, however, it has to be said he considered this 'not a bad thing' (Fleming 2007). In 1967 Manabe and Wetherald published work confirming Callendar's predicting a 2°C temperature rise associated with doubling atmospheric CO₂ (Manabe & Wetherald 1967). By 1983 Global warming was being debated in USA political circles, Ronald Reagan being accused of playing down the risks (Shanley 1992). The release of the first IPCC report in 1990 put anthropogenic global warming 'in the public domain' and by the 1992 'Earth Summit' in Rio de Janeiro policy makers should have been actively initiating emissions reductions. Despite the knowledge that anthropogenic climate change was occurring emissions increased at an average annual rate of 3.4% between 2000 and 2008, compared with 1% per year in the 1990s (Science Daily 2009). A specific time to attribute responsibility for historical emissions is a moot point in the light of such significant increases after climate change was being debated at an international level. Industrialised nations are still lobbying to maintain their wealth and lifestyles built on carbon emissions, this became intense in the lead up to COP 15 at Copenhagen and was one reason a binding agreement on emission reductions could not be reached. America's offer to ratify Kyoto was dependent on “meaningful participation” by developing nations. This was contradictory to the spirit of Kyoto (Baer et al 2000) and promised to block COP 15 negotiations. The industrialised nation's carbon debt to the rest of the world has not been addressed, in fact it is compounding at an ever increasing rate (IEA 2009).

5. Per capita allocation of CO₂e emissions.

The inevitable conclusion is that it's physically impossible for everyone on Earth to live at the level of material affluence that Australian's live at today. Ian Lowe

As discussed earlier an egalitarian way of distributing carbon pollution rights is the per capita method, India's Prime Minister Manmohan Singh has been advocating this since 2007 (Manorama 2009). Equal per capita rights are based on the simple concept that if the atmosphere can accommodate a finite quantity of emissions while at the same time maintaining global temperature rise to <2° Celsius, then that quantity of emissions should be divided equitably between each person on the planet. Climate modelling is a complicated process, but for the purposes of exploring atmospheric equity we will use the figure of 750 gigatonnes of CO₂e as the maximum safe emission between 2010 and 2050 (Anderson 2009). The current global population is 6.82 billion (USA 2010) so per capita emissions until 2050 should be below 110 Tonnes or 2.75 tonnes per person per annum. This figure would inevitably reduce as the global population increases. To put this into perspective, the USA emitted 15.85 tonnes per capita in 2006 (Fig 11). This system offers more equity than that agreed to at Kyoto, but it is not without its risks. A per capita system allocates emission rights to a country based on its population, but that country's emissions stem from a variety of sources. Australia's per capita emissions are some of the world's highest, but are not based on lifestyle alone; much of the carbon pollution comes from high emitting industries, it is inevitable sharing those emissions across Australia's relatively small population will result in a high per capita emission. Outsourcing the high polluting industries to highly populated, low emitting third world countries can become attractive under a per capita system. Does it follow there is an argument to consider a country's emissions related to its industrial activity? In Australia CO₂e emissions compared to Gross Domestic Product (GDP) fell 24% in the ten years to 2003; however Australia still has the highest emissions to GDP of any OECD country and probably the world, producing double the emissions to GDP of the UK (Australian Bureau of Statistics 2006). Treating carbon emissions as a tradable commodity that can be outsourced could lead to a form of carbon colonialism and would be contrary to the aim of reducing emissions as it would just move them across borders. Far better to assist developing nations gain industrialisation based on renewable energy sources and low emission practices.

For a first chance of keeping global temperature increases below 2 degrees Celsius, it is necessary to reduce global CO₂e emissions to 750 billion tonnes by 2050. The 2006 emissions into the world would have been 1,167 billion tonnes of CO₂e by 2050. Each person in the US alone would have to reduce their CO₂e emissions to 110 tonnes per year. The US, the world's biggest contributor of CO₂e emissions, has emitted 314,772,000,000 metric tons of CO₂e between 1900 and 2004. The emissions represent 30% of the world's total CO₂e emissions. A world where the global CO₂e concentration stays below 350 ppm is not a chance we will take. 1 tonne of CO₂e is estimated to raise global temperature by 0.00000000000015°C. A world where the global CO₂e concentration stays below 350 ppm is not a chance we will take. Atmospheric Carbon Dioxide Concentration by Year (parts per million).

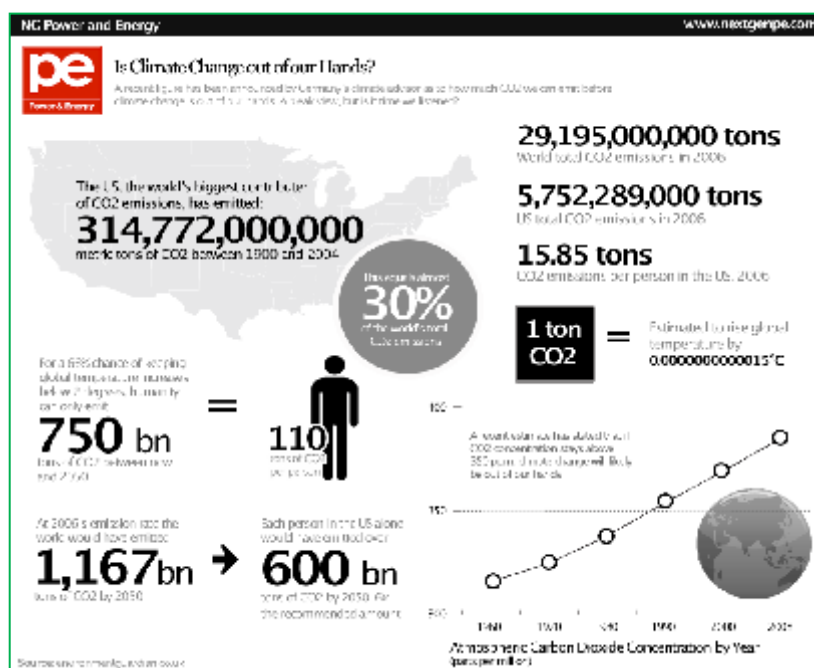


Fig 11. Personal emissions as they relate to USA. Courtesy of NG Power &

Outsourcing the high polluting industries to highly populated, low emitting third world countries can become attractive under a per capita system. Does it follow there is an argument to consider a country's emissions related to its industrial activity? In Australia CO₂e emissions compared to Gross Domestic Product (GDP) fell 24% in the ten years to 2003; however Australia still has the highest emissions to GDP of any OECD country and probably the world, producing double the emissions to GDP of the UK (Australian Bureau of Statistics 2006). Treating carbon emissions as a tradable commodity that can be outsourced could lead to a form of carbon colonialism and would be contrary to the aim of reducing emissions as it would just move them across borders. Far better to assist developing nations gain industrialisation based on renewable energy sources and low emission practices.

There is also the issue of equity of contamination; under a basic per capita system emissions associated with rice farming are considered the same as *luxury emissions* such as air travel, prompting a call for a dualistic system which penalises luxury over subsistence emissions

(Muller/Huq 2006). This becomes significant in newly developing countries where there is a large proportion of the population that still live a hand to mouth existence and are responsible for minimal emissions, while a new wealthy class aspire to western levels of lifestyle. This new class will be responsible for ever increasing emissions at the expense of their poorer fellow citizens.

A per capita system obliges industrialised nations to significantly reduce their emissions, in the case of the USA to 17% of their current level, while giving developing countries the ability to increase their emissions, facilitating industrialisation. For these reasons industrialised nations see a per capita system as a dual threat, firstly to their lifestyle and wealth that is built on high emissions and secondly, they see a commercial threat from the industrialisation of countries such as India and China.

Carbon accounting based on per capita emissions is opposed by wealthy high emitting nations as it undermines their ability to maintain higher emissions than developing nations, but it offers an egalitarian base for an international carbon accounting system and has to be considered in future climate change negotiations (Jones 2009). Jones states not using per capita emissions targets *"amounts to ceding squatters' rights to the atmosphere to the industrialised countries."*

6. Cause and effect.

The inequity of climate change – with the rich causing most of the problem and the poor initially suffering most of the consequences – will prove to be a source of historical shame to our generation if nothing is done to address it. Editor, The Lancet. 15th May 2009

Of all moral and ethical aspects associated with climate change, issues of *cause and effect* are the most fundamental. This is based on the presumption of human rights being higher than emission rights (Hayward 2006). The poorest 1 billion people in the world are responsible for only 3% of the world's total emissions, yet these communities are affected the most by climate change (Costello 2009). Industrialisation resulted in the nations that are responsible for elevated levels of atmospheric CO₂e being the nations that are best prepared to cope with the rigors of climate change. Their economies are diverse, combining a mix of primary production, mining, manufacturing and commerce meaning adverse impacts on one commodity can be fiscally buffered by others. Their affluence better places them to adapt to effects of climate change and sea level rise. Alternatively, poorer agrarian nations are very vulnerable to climate change, any adverse weather events have a direct impact on their ability to export their primary product and in severe cases their ability to feed themselves. Much of the global arable land is situated in low lying deltas as it is very fertile due to deposits of river silt. This low lying land is most vulnerable to sea level rise.

USA, Western industrialised Europe, Great Britain, Japan and to a lesser degree USSR, China, Canada and Australia contributed most to historic CO₂e emissions (Baumert et al 2005) and are still high per capita emitters (IEA 2009). These countries show a blasé attitude to global warming as their technological superiority gives them the confidence they can adapt where necessary, unlike poor nations that have to accept their fate. For example, severe drought in Australia's Murray Darling agricultural area is devastating for the farmers and communities involved, but have only reduced the country's Gross Domestic Product (GDP) by $\frac{1}{2}\%$.

Conversely nations that rely on agriculture for their survival fare much worse when the effects of climate change hit. Drought in Sub Saharan Africa has caused famine, social fragmentation and poverty (Glantz 1988) (Fig 12).



Fig 12 African famine. Courtesy of Corbis Bettmann

The story with floods caused by climate change and sea level rise is much the same. Industrialised countries like Britain are installing climate fortifications such as the London Thames Barrier completed in May 1984 and already considered inadequate for the effects of global warming (Doyle 2002). Sea level rise is predicted to be between 1 metre and 1.4 metres by 2100 (Vermeer 2009) (Fig 13). With a 1 metre sea level rise delta counties such as the Nile delta and Bangladesh will be devastated. The World Resource Institute's Crystal Davis writes; *“With just a one-meter rise in the Mediterranean Sea, the Nile Delta stands to suffer tremendously. Rising seas would destroy parts of the protective offshore sand belt, which has already been weakened by reduced sediment flows resulting from the construction of the Aswan Dam in 1970. Without this sand belt, water quality in coastal freshwater lagoons will be altered (threatening one-third of Egypt's fisheries), groundwater will be salinated, and recreational tourism and beach facilities will be inundated. Furthermore, a*

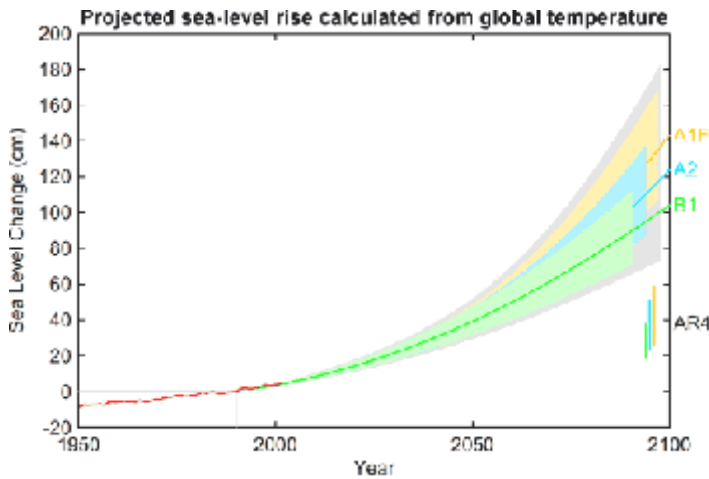


Fig 13 Projection of sea-level rise from 1990 to 2100, based on IPCC temperature projections for three different emission scenarios.. Also shown in red is observed sea-level (Vermeer 2009)

predicted 6.1 million people will be displaced and 4,500 square kilometres of cropland will be lost" (Davis 2007) and according to the UK Royal Society "a one metre sea level rise could flood 17 percent of Bangladesh, one of the world's poorest countries, displacing tens of millions of people and reducing its rice-farming land by 50 percent."

Uganda's President, Yoweri Museveni felt the need to announce at an African Union summit in 2007 that developed countries were "committing aggression" against Africa by causing global warming responsible for severe flooding of Uganda, Sudan, Ethiopia and Kenya

(Okeowo/Kampala 2007) Fig 14. This flooding was predicted by climate models, yet the inhabitants of those countries are subsistence farmers with very low emissions so have no ability to affect levels of atmospheric CO2.

Every day decisions are being made by people in corporations of the western world who will not suffer the consequences of their decisions in terms of climate change. Some poorer countries such as Viet Nam and Mozambique are making some headway in addressing poverty, literacy and health, these advances are fragile and climate change could overwhelm their advancements, what is needed is reduced vulnerability, not increased threat (Watkins et al 2008). International commitments based on a premise that the current national carbon emissions situation should be considered as some sort of default position to negotiate from ignores the fundamental issue of *cause and effect* so must be considered flawed. There is urgency to act on climate change, yet despite the 2007-2008 United Nations Human Development Report saying; "If mitigation does not start in earnest right now, the cost of adaptation twenty or thirty years from now will become prohibitive for the poorest countries" little headway has been made by the developed world in mitigation (Watkins et al 2008).

Industrialised wealthy western nations need to change their ways of conducting business, from that of single-mindedly perusing maximum profit, to considering the effect their boardroom decisions on the poorest of the world and acting accordingly. These are the only actions that should be considered by a civilised society.



Fig 14 Flooding in Uganda 2007 Picture courtesy of Ugandaclusters.

7. International climate negotiations.

Imagine 10 rabbits lost at sea, in a boat carved out of a giant carrot. The carrot is their only source of food, so they all keep nibbling at it. The boat is shrinking rapidly – but none of them wants to be the first to stop, because then they'll be the first to starve. There's no point in any of them stopping unless everyone stops – if even one rabbit carries on eating, the boat will sink.
(Apologies to Beatrix Potter) **Danny Chivers.**

It is difficult to imagine how climate negotiations can be conducted successfully on an international level by western nations when there is so much wealth inequity in their own countries. The disparity between the lowest and highest paid workers is increasing. In Australia the minimum wage is \$543.78 for a 38 hour week (FairWork 2010), while in 2007 *'Smart Company'* reported Rupert Murdoch earned \$37.92 million as the CEO of *'NewsCorp.'* In that same year the highest paid CEO in the world was Stephen Schwartzman who earned US\$702 million (Goldman 2009). Determining an ethical wage parity ratio would need a starting point, George Monbiot mused that the lowest paid worker should not earn less than 1% of the CEO's salary (Monbiot 2000). If applied to *NewsCorp*, workers on the minimum wage would get \$7,292 per week. Applying the 1% rule to Australia's minimum wage allows for a CEO to earn \$2.8 million, which is still an excessive amount.

The world is a heterogeneous place, with vastly varying standards of living. The United Nations Development Report on Climate Change says "*The world's poor and future generations cannot afford the complacency and prevarication that continues to characterize international negotiations on climate change.*" (Watkins et al 2008). No one nation can win the battle against climate change, international cooperation is not an option, it's an essential. From an ethical or moral point of view the current format of climate negotiations fails miserably, participants are single minded in their pursuit of their own nations interests and developed countries use filibustering to delay making commitments that respond to the plight of poorer countries. For the nations of Kiribati, Marshall Islands, Tokelau and Tuvalu that plight is their very existence, as they are about four metres above mean sea-level. For African nations it is the fate of subsistence farmers who face crop devastation. Negotiations for rich industrialised nations like USA and Australia endeavour to maintain their wealth and lifestyle built on high emissions. China negotiates to increase their emissions to fuel economic growth in the face of being the highest emitting nation. It is this struggle between wealth and survival that is the hallmark of climate change negotiations, yet it is future generations that stand to bear the brunt of climate change and their voice is absent. In Australia's case the Kyoto negotiations were well executed and had the specific aim of undermining the international process. The Howard Government refused to adopt Kyoto yet remained a signatory to Kyoto to allow them to be part of any negotiations, using this opportunity to good effect in pursuing Australia's best financial interest (Hamilton 2007). With the change of Government in 2007 came the adoption of Kyoto; however no carbon tax or trading system exists to fulfil that commitment through to 2012. USA has taken a different path by saying their adoption of Kyoto commitments was dependent on "*meaningful participation*" (Sari 2005) by developing nations, an attempt to sidestep the fact they were the highest historic emitters and still have one of the highest per capita emissions in the world (IEA 2009). As the west negotiates its carbon responsibility on economic grounds, it begs the question what cost a human life and what cost a nation? Nicholas Stern's report said global warming could shrink the world economy by 20%, while taking action now would cost about 1% of global GDP. This refusal to act can only be seen as brinkmanship or recalcitrance in the light of scientific evidence that the cost of mitigation is far less than the cost of not mitigating (Stern 2007).

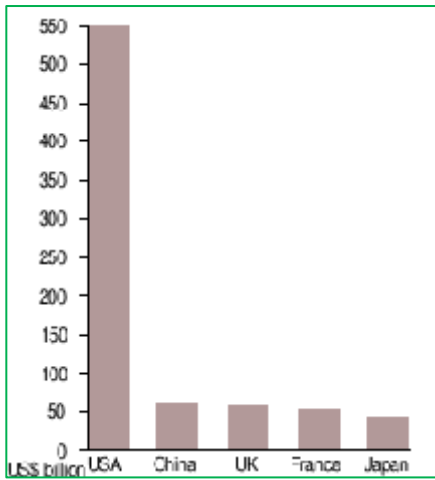


Fig 15. Defence spending of the 5 highest spend nations. Courtesy of Stockholm International Peace Research Institute

In the lead-up to The United Nations Climate Change Conference 2009 (COP 15) at Copenhagen developing nations asked the USA to divert 50% of their defence spending to global warming mitigation (Grey/Mason 2009 {2}). This is a compelling notion, climate change is a greater global threat than Saddam Hussein ever was, mobilising the sort of international cooperation and funds dedicated to the Iraqi war for climate change mitigation would go a long way to addressing climate change. There is a case for western nations diverting money from defence to assist third world countries mitigate and adapt to global warming as this would assist them to become self sustaining based on renewable energy, hence maintaining their low carbon footprint. Funds spent on adaptation would better prepare them for the effects of climate change, given their aforementioned susceptibility to it. To understand the implications of this we need to explore why developed nations spend huge amounts of money on defence; at the moment the USA spends

annually \$550 billion which is over 23% of its budget on defence, this equals 41.5% of the global budget (Global Issues 2009) (Fig 15). Australia's defence budget for 2010/2011 is significantly less at \$30.8 billion from a \$338 billion annual budget. The earliest of societies considered defence important, the elevated locations and form of their settlements were chosen for ease of defence (Newman/Kenworthy 1999). It was and still is a case of the 'haves' defending their wealth and possessions against the 'have nots'. An egalitarian world would see wealth and resources being spread more fairly than today, this disparity prompted Ian Lowe to say "*Dogs and cats in Australia eat better than people in other parts of the world*" (Fora Radio 2010). The call for a more equitable use of defence spending is not new, the United Nations Development Report on Human development advises that the global spend on defence is tenfold the spending on international aid, furthermore, 5% of the defence budget could overcome extreme poverty by providing food, water, shelter and basic education to all those who are not getting it at the moment (Watkins et al 2005). If climate change were acknowledged as a security threat funds would flow to it more readily. Developed countries spending some of their defence budget on helping poor nations deal with climate change would assist global cooperation and hence national security (Schubert et al 2007). The alternative is ever increasing spending on defence to protect wealthy nation's financial advantage, an advantage that ironically is being squandered on defence. As the adverse effects of climate change bite countries like Australia will have to spend evermore on border security to deal with the inevitable increase in '*Climate Refugees*' (Friends of the Earth 2006).

International negotiations on climate change have to facilitate urgent reductions in atmospheric CO₂e emissions, primarily from developed nations. They have to be conducted in a way that ensures developing nation's growth is based on renewable energy. The plight of poor nations has to be addressed, with development funding focusing on assisting them deal with the negative impacts of global warming. The ability of future nations to have a good quality of life has to be integral to any outcomes.

8. Where to from here?

"Humans progress is neither automatic nor inevitable. We are faced now with the fact that tomorrow is today. We are confronted with the fierce urgency of now. In this unfolding conundrum of life and history there is such a thing as being too late. We may cry out desperately for time to pause in her passage, but time is deaf to every plea and rushes on. Over the bleached bones and jumble residues of numerous civilisations are written the pathetic words: TOO LATE."

Martin Luther King Jr.

Climate change is a uniquely difficult problem, it requires global cooperation and action before the full effects become apparent, otherwise some changes will be irreversible and feedback effects may be unstoppable. The sheer magnitude of the task of keeping global warming to less than 2°C is daunting enough to induce inaction. For these reasons some people have become pessimistic about our future, the term '*Apocalyptic Nihilism*' (Eckersley 2007) has entered our lexicon, when discussing global warming, Eckersley asks 'How should we face humanity's problems, with nihilism, fundamentalism or creativity?' We do need to be positive in our deliberations on the future, as pessimism can be counterproductive and would be a recipe for failure.

Society has overcome moral dilemmas in the past, despite significant vested interests being put at risk. As a community health risk, action on climate change can be compared to the installation of London's sewers in the late nineteenth century. In 1847 Parliament formed the Metropolitan Board of works under the supervision of Joseph Bazalgette to construct the sewers and associated pumping stations (PortCities 2010). This is pertinent as it is one of the first instances of community health being considered in the national interest, with the rich funding work which saved the poor from the ravages of waterborne disease. As an atmospheric risk climate change can be compared to ozone depletion, an issue relating to harmful emissions of chlorofluorocarbons (CFC) that damaged the ozone layer, comparable to CO₂e causing climate change. International cooperation resulted in the *Montreal Protocol on substances that deplete the Ozone Layer*. It has been described as "*an international treaty that was first agreed to in 1987. Signed by just 24 nations in 1987 but subsequently ratified by over 180 governments, the Montreal Protocol is widely considered to be the most successful of the global environmental treaties.*" (Benedick 2007). Ozone depleting chemical use was widespread as a refrigerant gas and propellants for pressure pack spray cans. The CFC manufacturers fought the ban in an attempt to protect their commercial interests. Ultimately the largest of these chemical companies, DuPont was commercially advantaged by their banning (Greenpeace 1997).



Fig 16. African Slaves in 19th century. Courtesy of The Library Company of Philadelphia.

As a moral issue addressing climate change can be compared to the abolition of British slavery in 1833 (Fig 16). The wealthy classes of England had based their fortunes on the slave trade and were reluctant to change this. The first papers leading to the banning of slavery were presented to the privy council in 1788, but it was not until 1833 while on his deathbed William Wilberforce heard Parliament had passed the 'Abolition of Slavery' Bill (Carey 2002). This issue bears a close resemblance to climate change as the righting of an obvious moral travesty overcame the interests of private and

corporate profits.

These examples offer hope and demonstrate we need a multifaceted approach to carbon reduction, moral and ethical responsibility needs to be exercised at international, national and community levels. There is some international will to make commitments, however these seemed doomed to remain unrealised. Currently climate change negotiations seem to be at a stalemate, developed high emitting nations seem to have no intention of changing their ways, no matter how compelling the scientific evidence is, they use the same negotiating frameworks to come up with the same results. What is needed is a new decision making framework which treats people of the world equally. This framework must span the divide between short waved political cycles and the long wave carbon cycle. One aspect of such a framework being obsolete is the use of a 'Neo liberal growth economics model' as the vector for assessing success. It is cheap non renewable energy which that fuels such economic growth, resulting in anthropogenic CO₂e, this is a ferris wheel that takes us nowhere other than to higher global temperatures. The United Nations Human Development Report states; *“There could be no clearer demonstration than climate change that economic wealth creation is not the same as human progress. Under current energy policies, rising economic prosperity will go hand-in-hand with mounting threats to human development today and the well-being of future generations.....There could be no greater challenge to our assumptions about progress than that of realigning economic activities and consumption with ecological realities”* (Watkins et al 2008). We all have to commit to genuine quadruple bottom line decision making and adopt a Schumacher type framework for accounting while applying Keynesian style incentives for abatement and adaptive infrastructure.

A standardised mechanism for pricing carbon is an important starting point, however this cannot be seen as a 'silver bullet', there also needs to be an internationally recognised regulatory system that mandates restraint in emissions, even when the emitters can afford the financial cost. If we rely on pricing alone we are putting our faith in a market based solution, the same market that has to take responsibility for global warming in the first place, carbon will become just another tradable commodity, pandering to wealthy countries and disadvantaging poorer ones. The regulatory system should oblige developed countries to reduce their emissions and assist developing nations to take a low carbon path to overcome their poverty through development. This will require both financial and technological transfers from rich to poor. There is a risk of the world developing *climate change apartheid* when it comes to adaptation efforts. For wealthy western citizens adapting to climate change could be as simple as adjusting the setting on an air conditioner. While for the poor of the world trying to feed their families in times of drought means an already inadequate diet becomes even more austere. With regard to sea level rise, western countries are building storm barriers, while a Bangladeshi farmer's options for adaptation are to teach his family to swim. The world's poor are being harmed by a problem that is not of their making (Tutu 2008).

In Australia, the 2007 general election delivered a new Labor Government with a mandate to address climate change in a meaningful way by introducing a Carbon Pollution Reduction Scheme (CPRS). As Australia heads towards another general election that mandate was not realised, any chance of Australia having a CPRS under a Labor government was postponed to 2013. While opposition to the bill from the Liberal Party was disappointing, Labor could have worked with the Australian Greens to get the legislation through. A central factor in the loss of enthusiasm on the CPRS is the powerful lobby groups associated with the big polluters such as the coal industry. (Hamilton 2007). The breaking of such a significant election promise lends support for two changes to the electoral act regarding the conduct of elections. Firstly, public funding being made available for Elections and a cap placed on the amount of any donation along the lines of the NSW Standing Committee Report (Furolo 2010). Secondly, on significant long term issues like global warming, election promises should take the form of a contract with the community that has legal standing.

This may require a referendum and subsequent amendment to the Australian Constitution, but the effort would be worth it as it would ensure election promises on significant issues are not made lightly.

At community and Local Government level changes are happening because people do understand the need for action. Local government has traditionally been a leader on environmental issues and climate change is no exception (Strachan 2009). State and Federal leaders should take a lead from their junior partners. Community activism sites such as 'Getup' (www.getup.org.au) are redefining how the community lobbies decision makers, while initiatives such as 'Days of Change' (daysofchange.org) and 'Living Smart' (www.livingsmart.org.au) are empowering people to start the process of change. The greatest challenge facing society at the moment is to bridge the gap between the community who are ready to take on the challenge of global warming and the politicians who are hesitating for fear of losing their corporate backing and their political careers.

The United Nations should focus on climate change above all else, lesser development work will have short lived benefits in the face of climate change. Committees should be set up to determine what global climate accounting model will be adopted, what per capita emissions are appropriate and what mechanisms will be used to bring developed countries towards those levels and historic emissions must be allocated once and for all. These committees should include members of developing nations and third world nations and their outcomes have to be binding. Countries that refuse to cooperate should be considered to have declared war on the rest of the world and treated with sanctions to bring them into line. Defence budgets must be slashed and that money put to address the threat of climate change, for it is a far greater threat to global peace and security than any dictator presents. Developed countries have to accept the absurdity of spending vast amounts of money on defence of their affluence. For example the '*Stockholm International Peace Research Institute*' calculates that in 2009 the USA will have spent US\$663,255,000,000 on defence which represents US\$2,155 for each US citizen, the United Kingdom spends US\$883.59 per capita on defence and Australia US\$718.95. Spending 10% or 20% of this on climate change would make the world a better safer place to live.

As developed worlds cut their energy use and developing worlds take up technologies we will have to do more with less. Techniques of *Frugal Innovation* and *Frugal Engineering* need to become commonplace (Economist 2010). The *Economist* report cites the Mac 400 which is a very cheap, portable and easy to use ECG machine developed in India and a water filter made from the husks of rice which is one of the country's largest waste materials. The developing world's desire to industrialise is seeing them use different paradigms to the western world to achieve those ends; this paradigm of frugality must also be adopted by developed nations.

9. Conclusion.

"Our generation has inherited an incredibly beautiful world from our parents and they from their parents. It is in our hands whether our children and their children inherit the same world."

Richard Branson

The weight of scientific evidence for climate change and the severity of potential effects results in a moral imperative to act. Responsibility for action lies with industrialised nations whose historic emissions created increased anthropogenic CO₂e in the global atmosphere. Climate change is a wicked problem (Briggs 2007), it will not be easy to address, however it is vital the global community



Fig 17. Planet Earth. Courtesy NASA

mitigates carbon emission as a matter of urgency. The imbalance between responsibility for and vulnerability to climate change dictates that developed nations not only bear the greatest responsibility for mitigation, but must also help poorer countries with adaptation.

The magnitude of the global warming threat makes its resolution as critical as that of any war, the time for brinkmanship is over; national leaders must attend discussions with a genuine intention to act with cooperation. The threat global warming poses to national security requires countries to dedicate significant parts of their defence budgets to addressing it. The alternative is burgeoning defence budgets to maintain the ever increasing global inequities.

International negotiators must put aside vested interests and short term gain, for those gains will be insignificant compared to long term costs climate change promises all nations. The time has come for economists to listen to scientists, the bubble of growth economics is about to burst, peak oil dictates the period of growth fuelled by oil is close to the end. Political leaders need to consider future implications of their decisions; the carbon cycle is much longer than the political cycle. Leaders need to take advice from futurists, decisions must be made in timescales economists do not understand, nor care about, our descendants' rights are important and should be central in debates on action to deal with global warming. There was a time when parents worked to leave a better world for their children than they inherited from their parents; it is time to return to that ethos. Most of all decision makers have to listen to their constituents, and deliver on commitments related to global warming, rather than showing weakness in the face of cashed up lobby groups. Decisions must take into account the impacts on the poorest of this planet, usually those with the weakest international voice, to do otherwise would be morally bankrupt. Global warming refugees will be a problem in orders of magnitude greater than current refugee pressures felt by developed nations.

National responsibilities for historic emissions and emissions reduction targets must be integrated into a global carbon accounting scheme based on concepts of an *'atmospheric common'*. This

scheme must be committed to globally, with sanctions placed on countries failing to implement their commitments. Such a scheme should have robust checks and balances to guard against it being taken over by global financial markets for their own ends and the dangers of 'Carbon Colonialism' manipulating the interests of poorer countries.

Global warming cannot be addressed by a modified 'business as usual' approach; it's a time for radical changes in the way we do business and quantify success. The neoliberal growth economics model used by most western nations must be abandoned, genuine quadruple bottom line tests must be used to gauge a nation's success. Economic growth is not a good way of judging a nation's quality of life and locks society into industrial and financial growth based on exploitation of fossil fuels which exacerbates global warming. It also promotes rapid exploitation of resources which squanders future generation's access to those resources.

It is inevitable there will be winners and losers and we can expect those facing losses will be vocal, but change is essential, otherwise life, human and nonhuman will lose. If our politicians are not brave enough to make change the community must help them with bottom-up leadership. Individual commitments are not enough on their own, but entire communities making those commitments can start-up the engine of change. Then politicians will follow as they always have.

Mitigation must be considered the primary focus; adaptation only addresses the symptoms and not the underlying causes of global warming. However, some at risk agrarian nations should be given international aid as they stand to lose their ability to feed themselves if unable to defend themselves against the ravages of climate change. Such aid should integrate adaptation into existing poverty reduction strategies and target inequities of wealth, gender and location. Without a defence against climate change any development progress is at risk of being turned around by global warming, it will also be an investment in a more equitable world (Watkins et al 2008).

The current paradigm applied to international negotiations on global warming requires changing; wealthy western nations should no longer base their standpoints on their own fiscal benefits. Climate change negotiations must be based on how to reduce the impact on poor nations and how to leave a better planet for future generations, to do otherwise would result in the current generations leaving a shameful legacy for the future of the planet.

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