

**Submission to
Senate Select Committee on Climate Policy**

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In summary, we need to achieve large cuts now, to do our bit, to help the world avoid global warming. The emissions trading scheme has three flaws: its targets are weak and catastrophic climate change is virtually certain, even if they are achieved. Two, even those miniscule aims, it is unlikely to achieve; three, targets set as percentages, merely postpone catastrophic climate change, and do not avoid it.

The following three points illustrate briefly, the size and seriousness of threat.

The Terms of Reference are addressed, following that.

1. There is plenty of varied original scientific research , showing climate change is real, and proceeding at the upper limits of modelling.

This includes the IPCC reports, plus the more recent findings e.g as reported at the Copenhagen conference 2009. These presumably paint an accurate and true picture of how things are in the real world. Two key quotes must suffice to summarize the current situation.

James Hansen is professor at Columbia University Earth Institute. His testimony on global warming was recently accepted by the UK courts in cases involving building of coal fired power stations. On this basis he recommended that CO₂ will need to be reduced from its current 385 ppm to at most 350 ppm, in order to preserve a planet similar to that on which civilisation developed. Or to put it another way, if we let CO₂ exceed this, we risk catastrophic climate change of possibly 6 degrees warming average which is enough to make the planet in the long run ice free. Such conditions have not existed on earth, for several million years . Drastic and quick limitation in carbon emissions is needed to prevent this, and the Aust governments scheme is unlikely to achieve this. Hansen often summarizes this, as equivalent to banning use of coal, and relying on oil/gas until those are depleted.

Prof Tim Flannery also discussed the rate, at which climate change is proceeding. The Intergovernmental Panel on Climate Change (IPCC) Assessment Reports are widely used as a basis for policy, - Garnaut refers to them. For instance, the IPCC third assessment reports estimated warming between 1.4 and 5.8 degrees Celsius. Most policy workers regarded the upper rates as fanciful, but as climate change has been measured, it turns out to be proceeding at these rates.

"At the time these projections were published, climate skeptics lambasted them as unbelievable and grossly inflated, and widely proclaimed them in the popular press to be scientific scaremongering. By 2007 however scientists had 5-6 years worth of real world data under their belts, allowing them to revisit the projections to determine their accuracy, at least over the near term early portion of the curve. What they discovered, should have made the front page of every newspaper on the planet. Astonishingly, in every instance, the real world changes were right at the upper limit or lay outside even the worst case scenario presented by the IPCC. The full implications of these new studies have yet to sink in among those negotiating the global treaty that is supposed to protect humanity from dangerous climate change. They continue to argue on the basis of the old projections, which call for far less urgent action than what is actually required."

2. Simple metaphor to understand how we contribute to climate change, from small actions e.g driving, domestic lighting.

If you use 1 kW-hour of coal-fired electricity - or burn half a liter of petrol in a car - you are responsible for adding 2 kg of carbon dioxide to the atmosphere, and most of that carbon dioxide stays there for decades or centuries. That notionally double the amount of that gas, over a certain area of the earths surface. That area, for 2 kg, is around half a square meter. And doubling carbon dioxide in the atmosphere, causes several degrees of warming.

Thus you are responsible for causing warming of several degrees - over half a square meter of the earths surface - for at least a century.

This is the scale of change we are responsible for. That is why even small actions, have large impacts. This is why we need to reduce our carbon pollution. Attachment 2 outlines the calculation.

3. To understand how much disruption global warming involves, it's possible to imagine your suburb, being transplanted due north, to a warmer part of Australia.

Adelaide's annual average temp is 15 degrees; 3 degrees of warming makes it 18 degrees. That would be like moving Adelaide entirely - houses, businesses, reservoirs, farms, forests, parks and people - from its pleasant location among farmland and forests - to Port Augusta, at the edge of the Outback. Or to Broken Hill. The disruption to lifestyle can perhaps be imagined. Yet such warming is possible this century if nothing is done to limit carbon pollution.

A map of average temperatures is appended (Attachment 1), in case readers wish to try the same exercise, with their home town.

References

Copenhagen conference (2009): Abstracts from the conference "Climate change: global risks, challenges, decisions", 10-12 March 2009 Copenhagen. IOP conference series, Earth & Environment Science No6.
www.iop.org/EJ/volume/1755-1315/6.

Flannery (2008): Tim Flannery: "Now or never", Quarterly Essay No 31, 2008, see pp 16-17

Hansen (2008): James Hansen, M Sato, P Kharecha, D Beerling et al: "Target atmospheric CO₂: where should humanity aim?" The Open Atmospheric Science Journal vol 2, p217-231 & supporting material

Terms of reference:

(1) (a) the choice of emissions trading as the central policy to reduce Australia's carbon pollution, taking into account the need to:

(1ai) reduce carbon pollution at the lowest economic cost,

The central problem is to reduce carbon pollution. The reductions needed are large and they need to be achieved within the next decade to avoid catastrophic global warming. The aims of the current mechanism are less than is needed, and even so, I have not seen any convincing evidence, trading will achieve these. The evidence I have seen of trading schemes, is they are ineffective, in solving the serious environmental problems.

My thinking comes from the River Murray-Darling basin, where introduction of a water trading system, was supposed to solve problems there. The river is still in crisis, the lower lakes around the river mouth are drying out. Wetlands, swamps, redgum forests along the river bank have been deprived of their regular floods, for several years now and are dying. Nearly all available water goes to human needs as first priority. In Adelaide we can observe this, from the lack of water reaching the large lakes at the river mouth, and the Murray Darling Basin Authority's weekly river reports. These latter document declining flows, empty storages, and rising salinity. This situation has persisted despite the introduction of the trading scheme. Water has indeed been traded, but the amounts bought have been miniscule compared to environmental needs.

On this evidence I am persuaded, trading though cheap, will not do what it needs to.

(1 a ii) put in place long-term incentives for investment in clean energy and low-emission technology, and

Again a trading scheme will not achieve this. This is from my experience with home solar. Wishing to do what I could to avoid causing carbon pollution, I installed a 2 kW solar panel system at home, to generate electricity for myself and some surplus. The system cost \$24,010 and has a notional lifetime of 10 years.

Besides the moral incentive, of feeling one was doing the right thing, there were 3 three sources of financial incentives. In the long term (system lifetime-10 years) these are as follows:

- Federal government grant, \$8,000.
- State government feed-in tariff, \$10,000.
- Federal govt trading scheme in renewable energy certificates - \$1,224.

This trading scheme too, was supposed to provide incentives, to householders to invest in clean energy. It failed to provide any help of significance. Thus of the only other trading scheme I've experience of - it too failed to put in place long term incentives. I think the carbon trading scheme may well fail also, and I have yet to see a compelling argument otherwise. Trading schemes may be popular, but the only question is whether they can actually achieve, what needs to be done.

(1 a iii) contribute to a global solution to climate change;

See response to 1d.

(1 b) the relative contributions to overall emission reduction targets from complementary measures such as renewable energy feed-in laws, energy efficiency and the protection or development of terrestrial carbon stores such as native forests and soils;

There is no one big thing we can do to tackle climate change. There are a whole range of things, and we need to keep doing all of them, all of the time. E.g

Energy efficiency is most important. Most people at home are unaware of how their energy gets used, and are not aware of how severely, even small amounts of power use or small motor journeys, contribute to global warming. Use of bicycles and walking have a role here, and would provide people with exercise also, keeping them healthier and tackling another national problem, overweight/obesity.

However, domestic energy consumption is only a fraction of the total. The commercial sector, left to themselves, will use as much energy as they can, to maximise returns to shareholders - ie no limits. There needs to be strict govt control on what they use. Energy intensive industries often threaten to move overseas, but the benefits of operating in Australia, are much more than merely cheap power. If they move overseas, they lose these other benefits also e.g educated workforce, infrastructure, technology, good legal system, communications, etc.

Feed-in tariffs: I run a 2 kW solar PV system at home. Feed-in tariffs in S Australia, encouraged me to decide to instal the system, and will help pay for it. See response to 1 a ii.

carbon stores in native forests - a great idea. Current research from ANU, suggests they lock up large amounts of carbon. There needs to be a ban on clear felling these old growth forests.

Plantations are less effective, as the carbon is only locked up for the life of the trees and then gets re-released to the atmosphere.

(1 c) whether the Government's Carbon Pollution Reduction Scheme is environmentally effective, in particular with regard to the adequacy or otherwise of the Government's 2020 and 2050 greenhouse gas emission reduction targets in avoiding dangerous climate change;

These targets are presumably on 2000 levels:

- 5-15% reduction by 2020, depending how other nations act
- 60% reduction by 2050
- Stabilization at 450 ppm CO₂ in the atmosphere

Prof Jim Hansen of Columbia University, a respected Planetary physicist, has looked at what levels need to be achieved to avoid catastrophic climate change. As with all science, there are errors and uncertainties in his work. But his work has stood up well to scientific debate; recent measurements have confirmed his view that climate change is rapid; and his broad assessments thus seem to be useful.

Hansen (2008) says

"If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on earth is adapted, palaeoclimate evidence and ongoing climate change suggest that CO₂ will need to be reduced from its current 385 ppm to at most 350 ppm. "

Hansen points out, 450 ppm is equivalent to the world at the start of the last round of ice ages, ie a planet that did not have ice caps. Such a climate that has not existed on the planet, for several million years. If 450 ppm is the global target, it will entail dangerous climate change.

Hansen also points out, setting goals in terms of percentages, guarantees failure in the long term, no matter what percentage is chosen. Carbon dioxide stays in the atmosphere for *centuries*, so no matter what percentage is chosen, all the carbon in coal and oil and gas, eventually ends up in the atmosphere. Setting goals in terms of percentage reductions, merely *delays* climate change, but

does not avoid it. All the carbon from coal, oil and gas, eventually ends up in the atmosphere anyway.

A better approach is to express the goal, as total tons of carbon emissions from now on, that humans/Australia can emit without risking global warming. Government will need expert advice on the global figure, and the Australian share of that. Government will also need to fix a year when carbon emissions become zero, and no more carbon is emitted after that. It is likely that to avoid dangerous climate change, carbon emissions would need to be reduced to zero, within 2-3 decades.

Hansen often expresses this as allowing humans to use up known reserves of oil and gas but no more coal. The same end could be achieved, by using some coal and some oil/gas, but this would be more difficult to regulate.

(1 d) an appropriate mechanism for determining what a fair and equitable contribution to the global emission reduction effort would be;

The global warming we are experiencing now, results from carbon dioxide already added to the atmosphere. That carbon dioxide already added, will remain in the atmosphere for centuries, and during that time will continue to cause global warming.

Australia, as one of the developed countries, has been a major contributor to creating this problem. It has been estimated, our share of carbon emissions to date, is about 1%. Yet we have perhaps 0.3% of the worlds population. Our contribution is disproportionately large, and this problem affects not just us, but all peoples in all countries.

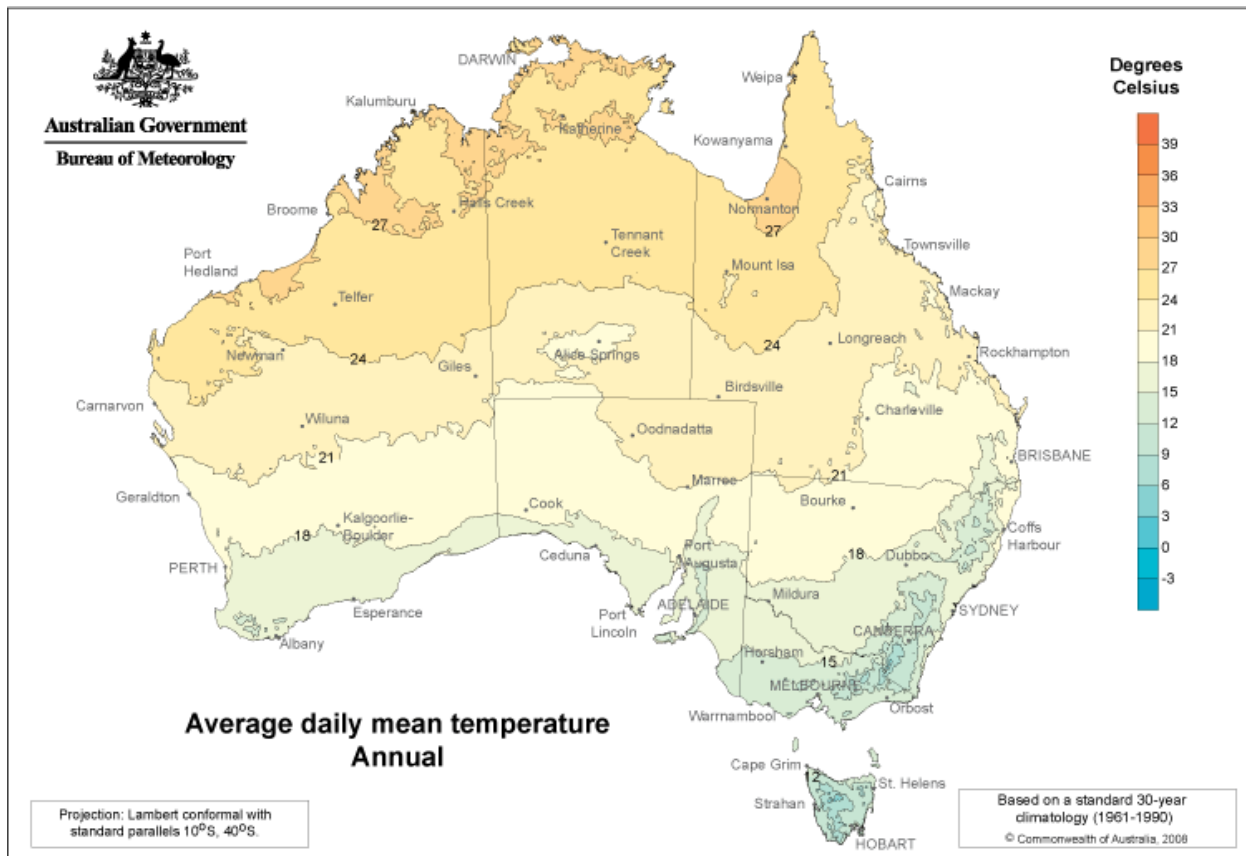
Australia should acknowledge this, and thus take a large responsibility to address global warming. Australia should take on itself a leadership role, and commit to much more substantial reductions, than say developing nations like India and China. These, though larger, have contributed less to the worlds greenhouse problems to date.

Australia needs to do this unilaterally as a matter of ethical behaviour and good global citizenship. It should not make its efforts conditional on what other nations do.

(1 e) whether the design of the proposed scheme will send appropriate investment signals for green collar jobs, research and development, and the manufacturing and service industries, taking into account permit allocation, leakage, compensation mechanisms and additionality issues; and

In my opinion, no. Green collar jobs are likely to be in small industries. Creating a large obscure market will be a boon to accountants and lawyers only, and the main activity will surely be in corporations finding ways to avoid and minimize their obligations and costs. Small start up firms usually need some form of security for planning, but in a market, price varies, and this will not provide much certainty for people who choose to risk by starting up in this area. If the aim is to encourage green collar work, the scheme needs to be other than this.

Attachment 1: average temperature for various Australian towns and cities.



To help see the effect of 3 or 6 degrees rise in average temperature, we can note the average temp of where we live now (e.g Adelaide) and compare it to conditions in a place, where the average is 3 or 6 degrees warmer (e.g Port Augusta on the end of the Outback; or Marree near Lake Eyre).

http://www.bom.gov.au/jsp/ncc/climate_averages/temperature/index.jsp?maptype=6&period=an, accessed 8 April 09

Attachment 2: Basis of model to help understand responsibility, for how much climate impact, results from personal choices e.g to cook a meal in the oven, or to travel a few km by car.

This is a metaphor to help people understand, just how much climate change, their daily choices entail. The principle can be applied to any activity, provided its energy consumption is known. Like other approaches it focuses on carbon dioxide. Instead of expressing it as tons of gas, it considers the direct impact on the environment, in terms of the area of earth's surface affected by global warming. This perhaps makes clearer, just how much impact our actions have. It also helps us understand our responsibilities for the climate change we bring about.

For the purposes of illustration, let's assume that burning half a litre of petrol, or half a kg of coal to produce 1 kW-H of electricity, adds 2 kg carbon dioxide to the atmosphere (actual figures can be obtained e.g the Dept of Climate Change ; <http://www.climatechange.gov.au/>)

Before climate change the atmosphere had about 300 ppm carbon dioxide, or about 0.3 g of carbon dioxide, above each square cm of the earth's surface. (This is worked out from atmospheric pressure, which is simply the weight of air standing above a certain area of earth ie about 1 kg per cm². Carbon dioxide is roughly 300/1000000 of that). That is to say, if you take a square cm of earth's surface - and consider the atmosphere standing above it, all the way to the edge of outer space - the total mass of carbon dioxide standing above that 1 square cm of earth - is about 0.3 g.

Adding extra carbon dioxide to the atmosphere, can be thought of as doubling the concentration of that gas, in the atmosphere over a part of the earth's surface. E.g adding 2 kg of carbon dioxide, would double the concentration, in the atmosphere over $(2000/0.3) = 6700$ square cm of earth's surface.

IPCC modelling, confirmed by recent estimates, suggests a doubling of carbon dioxide in the atmosphere, is enough to cause several degrees of warming. Hansen (2008) suggests a rapid warming by 3 degrees, then a slower warming of another 3 degrees, making a total of 6 degrees warming. In average temperature.

Thus if one chooses e.g to drive a car for a few km - or do some cooking using 1 kW-h of electricity - one is responsible for causing carbon pollution - that pollution is sufficient to cause global warming over about 0.7 a square meter of the earth's surface.

The result varies a little depending how efficient your car is, or your electricity generator is. It is arguably an over estimate, as some carbon dioxide gets removed from the atmosphere fairly rapidly, and some people may argue it shouldn't be counted. In addition small adjustments are needed, for different molecular mass of CO₂ and other atmospheric gases. The calculation can readily be adjusted for these, and the result, will still be a significant area, of the earth's surface.