

Submission to Australian Senate Extreme Weather Inquiry

Introduction

I am a pretty ordinary Australian with no special skills or experience in agriculture, health, transport or disaster management. Neither have I been placed in any urgent life threatening instance from extreme weather to speak from personal experience.

I am in fact fairly risk adverse at my present age in life. I used to take more risks in my youth. I even cycled from Sydney to Canberra, without a bicycle helmet, in the 1970s to camp on the lawns of parliament house. The issue was uranium mining. There were efforts made then to discuss Australia's energy future and energy alternatives. I helped (in a small way) construct a demonstration solar hot water system in front of parliament house. But most politicians were not listening to my small voice then.

My voice grew stronger at the end of the 1990s with the advent of the internet. I had become a web developer and web content administrator, a citizen journalist and blogger writing stories from the streets, on issues and from people who were largely ignored by the mainstream media.

Around 2003 I started to take an especially keen interest in the climate change issue, educating myself by reading scientific reports and studies, and writing up and communicating the issues raised online. I was still a small voice, but somewhat more amplified than in 1976.

Climate change and Extreme Weather

From my extensive layperson's reading, I have no doubt we are changing the climate through greenhouse gas emissions. And one of the results of that is more frequent and intense extreme weather events. I have read the IPCC Special Report on Extreme weather. James Hansen describes what is happening as loading the climate dice.

We are changing the background climate conditions to a warmer atmosphere and ocean. A warmer atmosphere dries out soils and vegetation, changes rainfall patterns, increases temperatures, causes more extreme droughts, storms and heatwaves. And increases the fireweather conditions. Elevated sea surface temperatures assist with storm and tropical cyclone formation and intensity.

According to CSIRO and BOM much of south eastern Australia and the south west are showing a clear trend over the last few decades for drier conditions and drought, and increasing fire weather. When it rains the storms and cyclones are likely to be more severe causing hailstorms, torrential downpours and flash flooding.

Scientists have been telling us this for the last couple of decades. But it has only been recently we

are taking more notice of the warnings.

Of course there has always been severe weather, but we are seeing extreme events more frequently, and when they occur they are more intense than the weather we had during the middle decades of the twentieth century. We have rigged the climate dice. We are seeing it currently with the extreme heatwave and ferocious bushfires across Australia; in the number of temperature records being broken. And this trend is happening on a global basis.

The trend is clear: extreme weather is only going to worsen, both in frequency and intensity. The world has warmed globally by 0.8 degrees, and in Australia by 0.9 degrees. But most of the global warming energy has gone into heating the oceans. Even if we could stop all anthropogenic emissions today, the vast inertia in the ocean would result in perhaps another degree rise in average global temperature still taking place.

Managing the risk, mitigation, adaptation

Dealing with Climate change is about managing risk. Unfortunately we haven't managed that risk very well up to the present time. We should have started action on reducing carbon emissions twenty years ago. Instead we face increasing extreme weather events. Our mitigation tasks to avoid dangerous and catastrophic climate change now involve making costly rapid emission cuts plus the costs of adaptation and disaster response plans to extreme weather events and other climate impacts such as sea level rise.

So how do we manage extreme weather events into the future?

1. Mitigation. We need to increase our ambition in cutting greenhouse gas emissions sharply.

The 2007 Bali roadmap advised that industrialised countries, like Australia, should cut emissions by 25-40% of 1990 levels by 2020. We are very far from doing that: 5% reduction on 2000 levels by 2020 just doesn't cut it. Carbon dioxide is cumulative in the atmosphere, so the more we can cut, the earlier, the better for our atmosphere and climate. This will affect the intensity and frequency of extreme weather events far into the future for our children and grandchildren.

Climate maths

We need to look at the simple climate maths. To achieve a limit of 2 degrees of warming, as widely agreed internationally in UNFCCC negotiations including by Australia, we can only afford to emit globally 565 gigatonnes of CO₂. However, known fossil fuel reserves - oil, coal, natural gas - amount to over five times this quantity, some 2,795 gigatons in reserves.

John Schellnhuber, Director of the prestigious Postdam Institute for Climate Impact Research (PIK) has stated "If we venture far beyond the 2 degrees guardrail, towards the 4 degrees line, the risk of crossing tipping points rises sharply. The only way to avoid this is to break the business-as-usual pattern of production and consumption."

Stationary Energy

Australia's stationary energy has been highly reliant on coal to produce a large portion of our electricity to date. But the carbon pollution and damage to the atmosphere and oceans (ocean acidification) from coal fired power now needs to be fully accounted. We need to transition from coal and natural gas to low carbon technologies: wind, solar thermal (with storage), solar PV, wave, geothermal. We have an abundance of renewable resources in Australia which can be developed, if the right policies are put into place to regulate the energy sector. We have a first rate industrial research community in our Universities and CSIRO. We need to leverage this knowledge. The renewable energy startup fund and renewable energy target are a good start, but the target now needs to be lifted.

Transport

We need increased fuel efficiency standards for new cars to reduce transport emissions, and investment in public transport and cycling networks to encourage reduced vehicle usage in our cities and regional towns.

Our freight transport is dependant on cheap fossil fuels, and we are now past peak oil. We need to look at more carbon efficient ways of freight distribution and transport of goods and produce, including preferential treatment of rail and sea transport over road between major distribution nodes.

Agriculture and Forestry

Agriculture and forestry activities are a major source of carbon emissions. We need to research methods of reducing emissions from these activities and incorporate methods of agriculture that limit emissions and even capture emissions (Biochar?). I know CSIRO and other scientists are researching this and it is an important aspect of climate mitigation.

We need to reduce soil erosion and nutrient pollution of our rivers and take care of our groundwater systems and farm for the long term.

For forestry we need to stop native forest clear fell logging activities, and start reforestation programs to enhance forest carbon sinks. Research has indicated that mature temperate native forests like Victoria's Mountain Ash are huge stores of carbon and biodiversity, and also more resistant to bushfire than regrowth forests. Old growth forests trap moisture and provide an important bulwark against bushfires, while previously logged forest regrowth with trees of the same maturity will tend to burn at a much higher intensity.

With a significant portion of native forests burnt in the 2009 Victorian bushfires, logging in these forests needs to stop immediately to preserve biodiversity and prevent 'landscape traps' in which the forest ecosystem is permanently changed to a more fire-prone landscape which provides far less ecosystem services.

But fire is also a natural part of the Australian landscape, and aboriginal nations used controlled fire burns to enhance this landscape for providing food and safety. Active programs of controlled burning during winter are necessary to reduce fuel load, and to help forest ecosystems that rely on fire to regenerate.

Coastal Development

Many of us live near the sea, or visit our beautiful beaches for holidays. We need to take great care with coastal development. Mangroves, coastal wetlands and seagrass meadows are highly important as blue carbon sinks, animal nurseries and biodiversity hotspots.

I asked Professor Lesley Hughes at a Climate Commission public forum in Melbourne about what long term plans there are to encourage the migration of coastal wetlands inland as sea level rises. Her brief answer? None. We need to start long range planning to allow these ecosystems to migrate inland as sea level rises. They provide important ecosystem services for biodiversity, carbon storage and for extreme weather storm surge and tsunami protection.

Coal Export

Perhaps Australia's greatest contribution to global atmospheric CO₂ emissions comes from the coal we export. Taking into account the simple climate maths as stated above, we should not be developing new coal mines, new coal export terminals or coal seam gas. Mining exploration and development should be significantly regulated with much more input and say by local communities. We should be discouraging coal export, with a view to phasing it out over the medium term.

2. Adaptation Planning and Disaster Management Response plans.

We need to have comprehensive response and adaptation plans for individuals and communities to implement for different extreme weather events. We need to educate people in disaster preparedness to strengthen resilience in the face of extreme weather events and disasters.

It has been gratifying seeing that there have been almost no casualties from the intense fires we have been experiencing in Australia over this summer. I think the deaths from the 2009 black saturday fires and the efforts of emergency services over the last three years in educating the community have raised the awareness of many people of the importance of having personal response plans and the dangers of extreme fire weather and bushfires. But I suspect bushfire disaster response plans will still need tweaking.

I am very concerned that funding for the Bushfire CRC is about to end in June 2013, with no ongoing Federal Government funding. We spend millions on the cost of fighting bushfires each year, surely we can afford a few million dollars to continue funding ground breaking and internationally significant long term research into bushfires, bushfire management, adaptation and response. Australia should be at the front in this area of research. Such a funding cut is very short-sighted.

We also need to develop disaster response plans for flash flooding, flooding, tropical cyclones and for heatwave and drought. Much of this work has been done, to varying degrees. People need to have the information to look after themselves or know where and when to go during an extreme event.

After the event there will be recovery and rebuilding phases. Plans for emergency assistance and more long term recovery and rebuilding will be necessary. Having comprehensive disaster management plans in place will make recovery much easier in most instances.

3. Assessment of future impacts on infrastructure, agriculture

As severe weather events grow more intense, damage to infrastructure will become more severe. We need to increase building codes and engineering standards to have a much higher capacity to withstand predicted extreme weather events over the coming century.

Recent heatwaves have shown that some of our urban public transport infrastructure - our Metropolitan railway system - has not been built for the extreme heat conditions we now experience in our cities during heatwaves. We need to look at upgrading that infrastructure to withstand the extremes that global warming will inflict on us over the next century. Older infrastructure may need substantial retrofitting to be less susceptible to breakdown during extreme weather.

Extreme weather events can also decimate agricultural production. We need to be able to support our agricultural producers to recover from those events quickly, and have the distribution processes to avert food shortages caused by severe weather.

4. Changing energy use behaviour

Like many people around Australia I have endeavoured to play my small personal part in reducing my energy and carbon footprint: energy saving bulbs, turning out lights, buying 100% greenpower, paying my gas utility to offset emissions, installing solar PV panels, composting and recycling, reducing car use. My household - my daughter and myself - I calculate emits just 1.6 tonnes of greenhouse gas emissions per year - mainly from car use. It is not difficult to do with a little bit of effort, and we need a continuing program to educate and encourage low carbon footprint lifestyles.

Climate Emergency

I believe we face a climate emergency due to the danger of climate feedback mechanisms and tipping points in the climate system that may lead to runaway climate change. Ask the scientists, this is a very real worry and concern. But we don't know how soon these feedbacks will kick in, or whether they have already started. The rapid reduction in Arctic sea ice is just a first indicator. We may be seeing the first signs of major climate feedback in widespread permafrost melting and initial release of methane hydrates trapped in Arctic ocean sediments.

Even without considering climate feedback mechanisms, the World Bank report last November made very clear that business as usual will take us to a 4 to 6 degree world by the end of the century. Such a world would be hellish to live in and would probably condemn literally billions of people to death by starvation and famine, not to mention the devastation it will do to global species biodiversity, the fellow creatures and plants we share planet earth with.

I don't want that future for my 12 year old daughter, or for my one year old grandchild from my stepdaughter. They deserve a better future. How about your children and grandchildren?

I thank the Senate for this opportunity to put my ideas forward. I hope my voice carries a little more weight than it did in 1976.

John Englart

References

- Dr Judith Ajani, ANU Fenner School of Environment and society - Native forests for bioenergy or biodiversity? Youtube video, November 2011 <http://www.youtube.com/watch?v=zwnZwJhUpm0>
- Karl Braganza, David Jones and Yuri Kuleshov, December 23 2011 - The Conversation website - [*Australia expecting an active cyclone season, but future cyclones still hard to predict*](#)
- Bureau of Meteorology Special Climate Statement, Australia's wettest two year period on record; 2010-2011 (PDF) Issued 7th February 2012 <http://www.bom.gov.au/climate/current/statements/scs38.pdf>
- Bureau of Meteorology Special Climate Statement 43 - [*Observed records for January heat event*](#) (PDF) - Last update 13 January, 2013 by Climate Information Services, Bureau of Meteorology. <http://www.bom.gov.au/climate/current/statements/scs43.pdf>
- Wenju Cai et al, Nature, 15 August 2012 *More extreme swings of the South Pacific Convergence Zone due to greenhouse warming* (abstract) (Full paper - PDF) doi:10.1038/nature11358 <http://www.csiro.au/~Media/CSIROau/Portals/Media/%20Releases/2012/Nature-Warming/MoreExtremeSwingsSouthPacificConvergenceZoneGreenhouseWarming.pdf>
- Peter Christoff, 2 November 2012 Article on The Conversation website – Why Australia must stop exporting coal <http://theconversation.edu.au/why-australia-must-stop-exporting-coal-9698> Retrieved 17 January 2013
- Climate Commission report (2013), *Off the Charts: Extreme Australian summer heat* http://climatecommission.gov.au/wp-content/uploads/CC_Jan_2013_Heatwave8.pdf
- Coumou, D et al (2013): Global increase in record-breaking monthly-mean temperatures. Climatic Change (online) [doi:10.1007/s10584-012-0668-1] (abstract) <http://link.springer.com/article/10.1007/s10584-012-0668-1>
- Paul J. Durack, Susan E. Wijffels, Richard J. Matear, Science Journal published by AAAS, *Ocean Salinities Reveal Strong Global Water Cycle Intensification During 1950 to 2000*, (abstract) DOI:10.1126/science.1212222 <http://www.sciencemag.org/content/336/6080/455.abstract>
- James W. Fourqurean et al, Nature Geoscience, 20 May 2012, *Seagrass ecosystems as a globally significant carbon stock* (abstract) doi:10.1038/ngeo1477 <http://www.nature.com/ngeo/journal/vaop/ncurrent/full/ngeo1477.html>
- Carsten Segerlund Frederiksen et al (2011), International Journal of Climate Change: Impacts and Responses - *Changes and Projections in Australian Winter Rainfall and Circulation: Anthropogenic Forcing and Internal Variability* (abstract) <http://ijc.cgpublisher.com/product/pub.185/prod.104>
- Greenpeace Report - *Boom Goes the Reef: Australia's coal export boom and the industrialisation of the Great Barrier Reef* (2012) (PDF) http://www.greenpeace.org/australia/Global/australia/reports/GBR_Report.pdf
- Hansen et al (2012), [*Perception of climate change*](#) PNAS August 6, 2012, doi: 10.1073/pnas.1205276109 <http://www.pnas.org/content/early/2012/07/30/1205276109.abstract>

- A.E.A. Hasson, G.A. Mills, B. Timbal and K. Walsh, (2008) *Assessing the impact of climate change on extreme fire weather in southeast Australia*, CAWCR Technical Report No. 007. http://www.cawcr.gov.au/publications/technicalreports/CTR_007.pdf
- Heather Keith et al (2009), [Re-evaluation of forest biomass carbon stocks and lessons from the world's most carbon-dense forests](http://www.pnas.org/content/early/2009/06/24/0901970106.abstract), PNAS <http://www.pnas.org/content/early/2009/06/24/0901970106.abstract>
- IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX) <http://www.ipcc-wg2.gov/SREX/>
- David Karoly (2009) Realclimate Blog - *Bushfires and extreme heat in south-east Australia* <http://www.realclimate.org/index.php/archives/2009/02/bushfires-and-climate/>
- Thomas R. Knutson et al, *paper in Nature Geoscience* February 21, 2010 - *Tropical cyclones and climate change (abstract)* doi:10.1038/ngeo779
- Kuleshov et al (2010) from the National Climate Centre, Bureau of Meteorology published in January 1 2010 in the *Journal of Geophysics Research - Trends in tropical cyclones in the South Indian Ocean and the South Pacific Ocean (abstract)* doi:10.1029/2009JD012372
- Mark Z Jacobson and Cristina L. Archer, *Saturation wind power potential and its implications for wind energy (abstract, Full Paper PDF)* Published online September 10, 2012, doi: 10.1073/pnas.1208993109 PNAS September 10, 2012 <http://www.stanford.edu/group/efmh/jacobson/Articles/I/SatWindPot2012.pdf>
- Lindenmayer et al (2011), [Newly discovered landscape traps produce regime shifts in wet forests](http://www.pnas.org/content/108/38/15887-15891) PNAS September 20, 2011 vol. 108 no. 38 15887-15891 <http://www.pnas.org/content/108/38/15887.short>
- Lucas, C., K. Hennessy, G. Mills and J. Bathols, 2007: [Bushfire weather in Southeast Australia recent trends and projected climate change impacts.](http://www.royalcommission.vic.gov.au/getdoc/c71b6858-c387-41c0-8a89-b351460eba68/TEN.056.001.0001.pdf) <http://www.royalcommission.vic.gov.au/getdoc/c71b6858-c387-41c0-8a89-b351460eba68/TEN.056.001.0001.pdf>
- Christopher Lucas (2009), Centre for Australian Weather and Climate Research Melbourne, VIC Australia, *Climate change impacts on fire weather* http://www.cawcr.gov.au/events/modelling_workshops/workshop_2009/papers/LUCAS.pdf
- Peter MacReadie et al, *Global Change Biology*, 23 November 2011 - *Paleoreconstruction of estuarine sediments reveal human-induced weakening of coastal carbon sinks (Abstract)* DOI: 10.1111/j.1365-2486.2011.02582.x
- Kate Marvel, Ben Kravitz, Ken Caldeira. (2012) *Geophysical limits to global wind power.* (Full Paper) *Nature Climate Change*, 2012; DOI: 10.1038/nclimate1683 <http://www.nature.com/nclimate/journal/vaop/ncurrent/full/nclimate1683.html>
- Robert Mendelsohn, Kerry Emanuel, Shun Chonabayashi & Laura Bakkensen, "The Impact of Climate Change on Global Tropical Cyclone Damage" *Nature Climate Change*, 15 January 2012 (abstract) doi:10.1038/nclimate1357 <http://www.nature.com/nclimate/journal/vaop/ncurrent/abs/nclimate1357.html>
- [NOAA Arctic Report Card 2012](#) See review at Climate Citizen Blog: [Global warming breaking records in Arctic says 2012 Report card](#) Retrieved 17 January 2013
- Pan et al (2011) [A Large and Persistent Carbon Sink in the World's Forests](#), *Science*

magazine Vol. 333 no. 6045 pp. 988-993 DOI: 10.1126/science.1201609

<http://www.sciencemag.org/content/333/6045/988.abstract>

- Dr Daniel Pauly a world renown marine biologist and fisheries scientist, in December 2012 called for us to prepare our economy for a war on climate change (ABC Radio Dec 4) He is the latest climate scientist that believes we have a climate emergency.
<http://www.abc.net.au/news/2012-12-04/prepare-economy-for-climate-change-war/4406352?section=business> See Climate Citizen Blog: [Professor: prepare economy for war on climate change](#) retrieved 17 January 2013
- Guy Pearse, Research Fellow, Global Change Institute University of Queensland, Speech to School of Political Science and International Studies University of Queensland on 5 August 2011, "If we don't export it someone else will" etc: debunking the excuses for Australia's precious place in the coal industry's world' <http://www.guypearse.com/wp-content/uploads/2012/09/UQ-LTG-Speech-Aug-2011.pdf>
- Mitchell Power et al (2012), Climatic control of the biomass-burning decline in the Americas after AD 1500 ([abstract](#)) - at The Holocene journal on 14 August 2012. (doi: 10.1177/0959683612450196)
<http://hol.sagepub.com/content/early/2012/08/14/0959683612450196.abstract> See review at Climate Citizen Blog: [Changes in extent and intensity of wildfire linked to Climate change](#) retrieved 17 January 2013
- PriceWaterhouseCoopers (UK) – PWC Low Carbon Economy Index 2012
<http://www.ukmediacentre.pwc.com/Media-Library/PwC-Low-Carbon-Economy-Index-2012-8b8.aspx> See a review of this at Climate Citizen Blog: [Business as usual Carbon emissions heading towards 6C of global warming this century](#)
- Joeri Rogelj et al (2011) Nature Climate Change, October 23, 2011 - [Emission pathways consistent with a 2 °C global temperature limit](#) doi:10.1038/nclimate1258
<http://www.nature.com/nclimate/journal/v1/n8/full/nclimate1258.html>
- Schaefer et al (2012) United Nations Environment Program (UNEP), 27 November 2012 [Policy Implications of Warming Permafrost \(PDF\)](#). www.unep.org/pdf/permafrost.pdf See a review with additional multimedia at Climate Citizen blog: [Methane and CO2 in thawing Arctic permafrost a climate tipping point](#) Retrieved 17 January 2013
- Wolfram Schlenker, and Michael J. Roberts, (2009) - *Nonlinear temperature effects indicate severe damages to U.S. crop yields under climate change* - [Abstract](#) - Proceedings of the National Academy of Sciences of the USA
<http://www.pnas.org/content/early/2009/08/25/0906865106.abstract>
- Maria Taylor (2013) article on the Conversation website, 14 January, 2013 *How we lost 20 years on climate change action* <http://theconversation.edu.au/how-we-lost-20-years-on-climate-change-action-10745> Retrieved 17 January 2013
- Kevin Walsh, Kathleen McInnes and John McBride, Global and Planetary Change, December 2011 - *Climate change impacts on tropical cyclones and extreme sea levels in the South Pacific -- A regional assessment* ([abstract](#)) doi:10.1016/j.gloplacha.2011.10.006
- World Bank report (2012) prepared by the Potsdam Institute for Climate Impact Research (PIK) *Turn Down The Heat: Why a 4°C Warmer World Must be Avoided*
http://climatechange.worldbank.org/sites/default/files/Turn_Down_the_heat_Why_a_4_degree_centigrade_warmer_world_must_be_avoided.pdf