

## ***Beyond Zero Emissions***

Beyond Zero Emissions is a not-for-profit, volunteer run climate change campaign centre. We differ from mainstream environmental groups on one very important point - we believe that we have already allowed climate change to go too far, and must act immediately to reduce our levels of greenhouse gas emissions to zero and below. We are involved in political lobbying, corporate and community campaigning, education, research, solution development and have a weekly radio program on 3CR community radio.

This submission is based on interviews of various world experts that have been conducted on our radio show.

### ***The science says: climate change is a global emergency***

In 2007, satellite images showed that the summer ice extent in the Arctic had shrunk to an unprecedented level. This is a 22% loss of the summer ice extent between 2005 and 2007 and is far worse than any of the predictions published by the IPCC. Dr Wieslaw Maslowski, research associate professor at the Department of Oceanography at the US Postgraduate Naval School, predicts that, on our current emissions trajectory, the summer ice extent in the Arctic could be completely gone by 2013.<sup>1</sup> What's more, he first announced these predictions 5 years ago and he said recently, that it is only now that "the media is definitely getting much more interested."

Dr Maslowski talked about the IPCC climate models; "Comparing those models simulations predictions with the satellite observations of the Arctic sea ice extent actually shows that most of those models are too conservative [in] predicting the current and the past ice extent changes in the Arctic..."

What our... study contribution to this overall topic is that we're saying that the satellites are only observing the two-dimensional changes in the sea ice in the Arctic in terms of this ice extent. However we do not have the observations of ice thickness – the third dimension, the vertical dimension... And our studies are suggesting that actually the volume and the thickness is decreasing even faster than the aerial observations from satellites... We're saying that if we already have lost about 40% volume in the Arctic so far, if we project this trend ongoing for the last 10 - 15 years, we probably will reach zero in summer some time mid next decade."

This has several consequences. Firstly, it has the effect of reducing the surface albedo. Dr Maslowski continued, "By removing sea ice, the ocean absorbs much more energy from the sun than the sea. Ice has very high reflectivity so it's not only that we observe more solar radiation but also that the solar radiation hits the top surface of the ocean, which then eventually; heats [the] ocean... So if we increase the temperature in the Arctic we might see some increases in the sea level due to simply increasing the temperature. The other aspect of the no ice in summer in the Arctic is actually its potential effect on melting the Greenland glaciers flowing into the oceans. We already have seen the potential effect of warmer surface water entering glaciers and melting the ice flowing out into the glaciers from Greenland. [This] might be actually accelerating the flow from the central Greenland towards the coast." This puts us on the verge of dangerous tipping points.

## ***Point of no return***

NASA's Dr James Hansen, arguably the world's leading climate scientist, said "The Arctic sea ice is a very different problem from the ice sheet, in the sense that the Arctic sea ice is a reversible phenomenon on time scales that we can think about, unlike the ice sheets. If we let those reach a point of no return so they start to collapse then we're really in trouble, because it takes many thousands of years to build an ice sheet."

"We will have to restore the point of energy balance because as it stands now we will lose the arctic sea ice without any more greenhouse gases, because there is additional warming that's in the pipeline, because the planet is out of energy balance, just because of the inertia of the system" Dr Hansen continued.

## ***Zero emissions and below***

"That means we would have to reduce the amount of CO<sub>2</sub> at least to the 350ppm level, and we are already at 385. So, we've actually got to go backwards and it's really too bad that we didn't realise this earlier..."

We can see that 385ppm is really going to produce a significantly different planet. And also just looking at what's now happening, not only in the Arctic, and the fact that the ice sheets are not stable with the current CO<sub>2</sub> amount, and the fact that the sub-tropical regions have expanded noticeably by a few hundred kilometres, that's enough to effect the southwest US, the Mediterranean, and Australia...

If we want to reduce the stress on coral reefs, we have to both reduce CO<sub>2</sub> and the warming of the ocean temperatures. So there are a number of things like that which make it clear that we've already passed the target level that we should be aiming for."

Ken Caldeira, of the Department of Global Ecology at the Carnegie Institution of Washington, is the author of the first peer reviewed study which investigated what level of carbon dioxide emissions would be needed to prevent further warming of our planet.<sup>2</sup> He believes the right emission target is zero. He recently gave this amusing account,

"I had an opportunity to brief some congressmen, this was now a couple of years ago on this issue, and I was asked... 'Well, what's the right emission target?' and I said 'Zero', and they laughed and I said, 'If you think emitting carbon dioxide is wrong, then zero is the obvious target', and I used a metaphor, I said, 'look, if you think mugging little old ladies is wrong, you don't ask, oh what's our target for the rate of mugging little old ladies, you say well, we think it's wrong and we're going to try to eliminate the rate of mugging little old ladies and I think it's a similar thing!'"

## ***The right target***

Dr Hansen added, "We're pushing the atmospheric composition beyond the level which will give us a stable climate... there has been no prior examples in the earth's history where greenhouse gases have increased this rapidly.

"I think an initial target of 350 [ppm concentration of CO<sub>2</sub>] is doable provided we phase out coal, and although that sounds like a real tough job, in fact it's doable... I mean if we compare it to how much effort we put into World War II, it's a doable job and the incentives are just as great as they were then. So I'm a little surprised that some scientists are saying we have to make the target something that is doable. I think we have to make the target whatever is needed."

## ***The way forward***

Ken Caldeira agrees; “I think an appropriate analogy is World War II. In World War II we started that war flying biplanes and in response to the Nazi threat we developed jet air planes, integrated circuits and radar and in the space of just a few years had a real transformation of a wide range of technologies.” Climate change should be taken “with the same sense of gravity”.

## ***Policy and government***

Government has a critical role to play in implementing solutions to climate change through the setting of short-term binding emissions targets and providing incentives for zero emissions technologies.

“While there does need to be technology development, if people knew they just weren't allowed to build carbon emitting devices, cars, power plants, etc. that emit carbon dioxide, that would be great incentive to develop the new technologies... it should basically be against the law to make anything that emits carbon dioxide into the atmosphere,” Mr Caldeira said.

Dr Tim Flannery said “I'm constantly astonished in Australia by the lack of leadership on behalf of our state governments in this area. I'm not saying they haven't done many good things, but they need to get very, very aggressive on this now because time is really running out... The government needs to invest in its own future and get away from these 19th century technologies and straight into the 21<sup>st</sup> [century], because that is where the wealth of the state is going to be.”

## ***Phase out coal***

“Government has a real role in legislating” Dr Flannery continued, “and they should simply be saying right now, there is no way we're going to build a new coal fired power plant in Victoria. In fact over the next 40 years, our intention is to de-commission all existing plants”. At Beyond Zero Emissions, we believe that coal use in Victoria can be phased out in three years. We have just released phase one of Victoria's zero emissions energy transition plan, which will be submitted to the Garnaut Review separately (see *Coal switch: halving Victoria's greenhouse emissions*).

Australia should lead the world in the phase out of coal. Addressing the leaders of the UK, Germany, USA and Australia, Dr Hansen insisted that “The most important thing is to have a moratorium on new coal fired power plants that don't capture CO<sub>2</sub> and then to phase out the dirty coal use over the next 2-3 decades... I think that it's going to become very clear, I would say within a decade or so, that these coal plants are simply not compatible with keeping a planet resembling the one in which civilisation developed. And I think there is going to be eventually pressure to in effect bulldoze those plants, so economically they just don't make sense.”

Mr S. David Freeman also agrees. He said “you could have the law in Australia that says from this day forward there will be no new coal-fired plants, no new lignite plants, no new nuclear plants and that all of the future belongs to the sun and the wind and efficiency

measures. That's what we've got to do all over the world". Mr Freeman is an American engineer and attorney. He has had a 50 year career in the U.S. energy industry, holding key positions in power utilities and helping successive US administrations develop and implement energy and environmental policies. He is the former head of the largest utility company in the US, the Tennessee Valley Authority, which is larger than Victoria, NSW and Queensland's power systems combined. He has written extensively on how the US can reach a 100% renewable energy target in 20 years. He has many objections to the coal industry and the strong influence it has on governments all over the world.

### ***There is no such thing as 'clean coal'***

Mr Freeman stated "Coal is inherently filthier than dirt, and anyone that uses the phrase 'clean coal' is misleading, either deliberately or otherwise, misleading the public. It is the most carbon intensive of all the fuels, so when you burn it you are emitting more carbon into the air than if you were burning anything else. But then the local air pollution from burning coal is well understood but we've become complacent about it. It's the fine particulate matter from coal that goes past your nasal passages into the deep recesses of your lungs, and into your bloodstream. It's a killer. And coal contains all sorts of things like mercury, lead etc., that are not even controlled... We've stopped using coal for heating in the home because it's so damn dirty, and filthy and polluting. So, you know there is a river in Egypt that flows all over the world, it's called 'denial', and I think that some people in the coal business, beholden to the coal industry, are in denial.

We've just become very complacent because these industries are among the largest capital aggregators in the world, they've got more money than the government in some ways and they're pouring advertising at you."

All government funding for so-called 'clean coal' (carbon capture and storage) research should cease and be redirected instead, into proven, existing renewable technologies. Mr Freeman continued, "If 'carbon capture and storage' was such a great idea, why don't they implement it on an existing power plant? They're not doing that, they continue polluting as usual and holding out this theoretical possibility as an excuse for building new power plants. And then when someone has them put their feet to the fire and said, 'Ok what is the cost of a new coal fired plant with coal capture?' their numbers became astronomical and it is very clear that a solar plant would be cheaper even on the incomplete basis of the pricing of energy."

### ***Renewables Rollout***

Mr Freeman said, "It's a travesty of major proportions for an area that has got such enormous solar power like Australia to be burning coal or lignite... The technology to harness the sun is here, the technology to harness the wind is here".

### ***Technological solutions are available right now***

Existing renewable energy technology is available now, at scale, with proven reliability, capacity and scalability, and at a cost that is far lower than the real cost of fossil fuel generated energy. We can begin the initial stages of the zero-emission transition right now.

“It’s simply a failure of government policy,” said Dr Flannery, that has caused Australia’s slow uptake of renewable energy technologies, we must “make sure the government invests in the appropriate technology for Victoria’s [and Australia’s] future.” It is political, not technological, failures that are debilitating the way Australia currently deals with climate change solutions – this is why the Garnaut Review needs to recommend the deepest emissions reduction targets possible.

## **Solar Solutions**

Australian Dr. David Mills is known worldwide for pioneering Compact Linear Fresnel Reflector (CLFR) technology and for his work in non-imaging optics, solar thermal energy and photovoltaic systems. His former laboratory at the University of Sydney developed and licensed the evacuated tube solar water heater technology. Failing to receive funding from the previous Howard government for his solar thermal projects, he took his technology to the US, where he founded Ausra. (See <http://www.ausra.com/news/>) He is now solar entrepreneur with US venture capital. Ausra is building a 177 MW solar thermal power plant in California. His technology is touted to be able to provide 90% power generation capacity for the US.<sup>3</sup>

Even without the same level of subsidies that fossil fuels receive, solar thermal power generation is becoming economically competitive already. Dr Mills said “We are in a market situation where there is not a lot of enthusiasm inside the company for actually giving figures to the public about potential costs, but we do state very clearly that it is our intention to compete with conventional coal and my guess is that it would happen in the United States in about the timeframe of 2011 roughly. We will probably get to the plant size where that's possible.

And conventional coal is cheaper by far than coal with sequestration. Coal with sequestration usually requires at least an advanced form of coal technology which happens to be actually more expensive than our solar plants and then on top of that there's the sequestration that's unproven.

So it's not just a costs argument. It's actually a validation that has to take place. Solar thermal has been proved for many years but nobody has successfully proven a coal sequestration plant. There are a lot of people who state in fact it doesn't work or has great dangers associated with it from leakage. And the final thing is that by the time they get one operating which will be in 2020... that's an inappropriate time to begin,” as it will be too late to mitigate the dangerous albedo flip of climate change.

Using solar thermal technology, Dr Keith Lovegrove from the Australian National University (ANU) has found that a 35 x 35km area could generate enough electricity to power the whole of Australia.<sup>4</sup> So, the potential is enormous.

## **Australia as a world leader**

We have the opportunity to export large scale solar technology, instead of coal. This will help developing nations, such as China, start with zero emissions technology, rather than allowing them to make the same mistakes that we have made in the developed nations. Dr Hansen said China and India “aren't going to do anything until we do, and they're not going to have the mechanisms for fixing the problem if we don't develop them. You know, we've caused the problem and we're going to have to help take the lead in developing the solutions and we don't have any time to waste arguing about whether developing countries will come along, I'm sure they will, we can't ask them to take the lead. We certainly have to do that... we should

consider the technology that we develop to be for the global good and not insist that they pay special prices to the people who invented them because we're going to have to get them implemented pretty quickly.”

## ***Agri-char Solutions***

Dr Tim Flannery talked about the need to draw down the excess carbon in the atmosphere which has been accumulating since the Industrial Revolution – the developed world’s carbon debt. Terra-preta or agri-char has been used in the Amazon since the times of the ancient Mayans.<sup>5</sup> It is a by-product of bio-gas production and not only absorbs CO<sub>2</sub> from the atmosphere but also increases the fertility of the soil.

Dr Flannery explained, “If you used these agri-char based technologies and you have your aggressive re-forestation projects for the world’s tropics, you could conceivably be drawing down in the order of 10 to 15 giga tonnes of carbon per annum by about 2030. At that rate we could bring ourselves down below the dangerous threshold as early as the middle of this century, but whether the world can actually get its act together and do that is another matter. This is the first real directed experiment at planetary engineering that we are talking about here, and we don't really have the political structures in place to enable us to implement the technology that we already have. So I would see the change basically as a political one. Its a global political change and the Kyoto process that rolls out now from Potsdam this year and then Copenhagen next year will be the key factors in the success or failure of us humans to do that.”

## ***We can achieve zero emissions***

The world’s top scientists and thinkers agree that we must not only target zero emissions but also actively draw down atmospheric carbon to eliminate the developed world’s carbon debt. This is the only target that will save us from the verge of dangerous tipping points in the Earth’s climate balance. We need to move as quickly as possible with the proven technologies we have today. Australia has the opportunity now to become *the* world leader in solar and other renewable technologies. Let’s take it!

Thank you for the opportunity to make a submission to the Garnaut Review.

## End notes

- 1 <http://news.bbc.co.uk/2/hi/science/nature/7139797.stm>
- 2 <http://globalecology.stanford.edu/DGE/CIWDGE/labs/caldeiralab/>
- 3 <http://www.reuters.com/article/pressRelease/idUS212105+06-Mar-2008+BW20080306?sp=true>
- 4 <http://www.beyondzeroemissions.org/media/2007/09/11/07/concentrating-solar-thermal-solution-climate-change>
- 5 <http://www.energybulletin.net/29250.html>

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