SUBMISSION TO THE
SENATE SELECT COMMITTEE ON CLIMATE POLICY

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This submission relates to Terms of Reference (b), (c) and (d) of the Inquiry.

Climate Change Science (reference c)

The latest report of the Intergovernmental Panel on Climate Change (AR4) released in January 2007 concluded[1]:

- "Warming of the climate system is unequivocal"
- "Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations"
- "The best estimate of the increase in global average surface temperature in the 2090s relative to the 1990s for a high emission scenario (A1FI) is 4.0°C (likely range is 2.4°C to 6.4°C)"
- "Anthropogenic warming and sea level rise would continue for centuries due to the time scales associated with climate processes and feedbacks, even if greenhouse gas concentrations were to be stabilized"

That report was based on peer reviewed science up until early 2006. Since then, there have been many more published studies adding to knowledge on climate change.

The recent International Scientific Congress Climate Change: Global Risks, Challenges & Decisions[2] in Copenhagen in March 2009, presented a number of key messages:

- "Recent observations confirm that, given high rates of observed emissions, the worst-case IPCC scenario trajectories (or even worse) are being realized."
- "Recent observations show that societies are highly vulnerable to even modest levels of climate change, with poor nations and communities particularly at risk. Temperature rises above 2°C will be very difficult for contemporary societies to cope with, and will increase the level of climate disruption through the rest of the century."
- "Rapid, sustained, and effective mitigation based on coordinated global and regional action is required to avoid "dangerous climate change" regardless of how it is defined. Weaker targets for 2020 increase the risk of crossing tipping points and make the task of meeting 2050 targets more difficult.

  "Delay in initiating effective mitigation actions increases significantly the long-term social and economic costs of both adaptation and mitigation."

Examples of recent observed climate changes at or above the worst case from IPCC climate projections for this decade include reductions in summer Arctic sea ice, decreases in rainfall in southeastern Australia, and increases in global average sea level rise.

Emission Reductions to Minimise Dangerous Climate Change (reference d)

On 19 March 2009, the Joint Standing Committee on Treaties tabled its report on Review of the Kyoto Protocol to the United Nations Framework Convention on Climate Change. That review concluded "it is in Australia's interests to secure global agreement to deliver deep cuts in emissions so as to stabilise concentrations of greenhouse gases in the atmosphere at 450 parts per million or lower by 2050."[3]

The IPCC AR4 considered greenhouse gas emission reduction scenarios to stabilise concentrations at a range of different levels, based on published scientific studies. The lowest stabilization scenario was for stabilisation at 445 to 490 ppm CO_2 e and best-estimate global average temperature increases of 2.0° to 2.4°C. This requires global CO_2 emissions to peak in 2000-2015, and global CO_2 emissions to be reduced by 50% to 85% in 2050 relative to 2000.[4]

Note that this stabilisation scenario gives more than 50% likelihood of global average temperature increases exceeding 2.0°C, the threshold for dangerous climate change used by the EU. This stabilisation scenario gives a 5% likelihood of global average temperature increases greater than 4.3°C[5].

To achieve long-term greenhouse gas stabilisation at around 450 ppm CO_2-e, the IPCC AR4 concluded that Annex I (developed) countries would need to reduce emissions by 25% to 40% in 2020 relative to 1990 levels and by 80% to 95% in 2050[6.]

Using a 'converge and contract' approach to equitable allocation of emission reductions, leading to approximately equal per capita global emissions, 50% to 85% reductions in global CO_2 emissions in 2050 correspond to Australian emission reductions of 90% to 97% in 2050 (Table 1).[7] All the world's industrial and industrializing economies will need to reduce their emissions by similar amounts: Europe and Japan by 93%, the United States by 97%, China 79%.[89]

Table 1

Global per capita greenhouse gas emissions reductions required to achieve 450ppm CO_2e by 2050 – top 17 countries (emissions per capita)

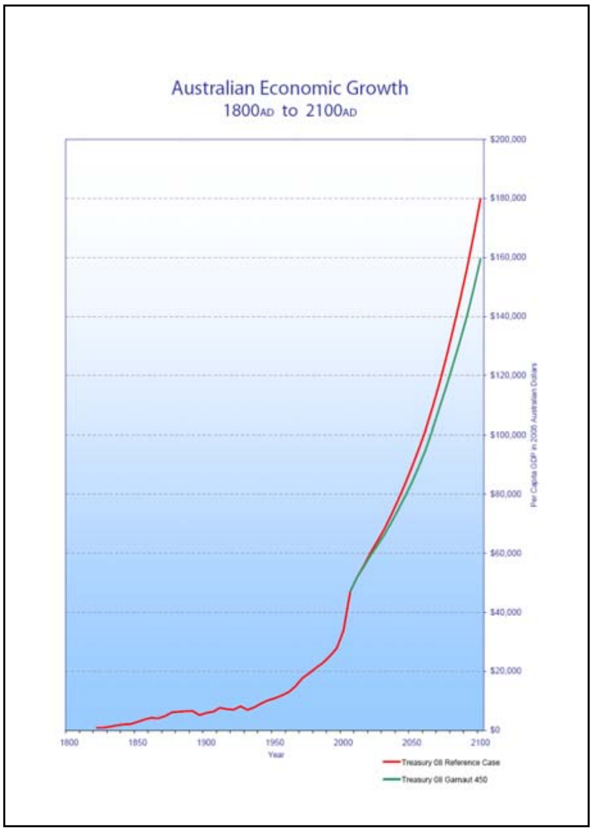
(includes total emissions, CO2, CH4, N2O, PFCs, HFCs, SF6 – includes land use change and intl. bunkers)

						Reductions to 450ppm by 2050		
						Probability		
						15%	50%	85%
Country	MtCO2	Rank	% World Total	Tons Per Person	Rank	85% Reduction	67.5% Reduction	50% Reduction
Malaysia	861	9	1.94%	37.4	1	98	95	93
Australia	509	14	1.15%	26.6	2	97	94	90
Canada	751	10	1.69%	24.4	3	97	93	89
United States of America	6,611	1	14.91%	23.4	4	97	93	89
Indonesia	3,068	4	6.92%	14.9	5	95	89	83
Russian Federation	1,991	6	4.49%	13.6	6	94	88	81
Brazil	2,333	5	5.26%	13.4	7	94	87	81
Korea (South)	547	12	1.23%	11.6	8	93	85	78
Japan	1,406	8	3.17%	11.1	9	93	85	77
European Union (25)	4,982	2	11.23%	11	10	93	85	76
Myanmar	521	13	1.17%	10.9	11	93	84	76
South Africa	455	15	1.02%	10.3	12	92	83	75
Congo, Dem. Republic	408	17	0.92%	8.2	13	90	79	68
Mexico	682	11	1.54%	7	14	89	76	63
Iran	435	16	0.98%	6.8	15	88	75	62
China	4,850	3	10.94%	3.8	16	79	55	32
India	1,574	7	3.55%	1.5	17	47	-13	-73
World	44,347		100.00%	7.3				

The implications of global stabilisation target of 450ppm for Australia and the world is that we effectively need to both completely decarbonise the world's energy production systems, and also restore a positive carbon balance in the world's natural landscapes - our forests and our agricultural lands.

While the political and technical challenges are enormous, the recent analysis by the Australian Treasury shows how economically feasible this is provided we act early and give industry time to transform its energy production systems.[10]

This graph is based on the Australian Treasury analysis and Australian Treasury projections of future economic growth in Australia. It highlights the implications of achieving a 450ppm CO_2 e target on the Australian economy.[11]



The red line shows the projected explosion in wealth expected between now and the end of this century if GDP continues to grow in the order of 1.5 per cent per capita per annum.

The green line shows what a reduction in GDP really means if we commit, as part of a global response, to stabilising greenhouse gas concentrations at 450 ppm CO_2 e by 2050.

This graph shows that, on the balance of probabilities, we can stabilise the world's climate system without destroying the machines of the industrial revolution, provided we change the way we power them.

A price on carbon can drive the next industrial revolution, but this transition needs to begin immediately.

Opportunities for Managing Terrestrial Carbon (reference b)

Very large emission reductions are needed to achieve long-term greenhouse gas stabilization at around 450 ppm CO_2 -e because the concentration of long-lived greenhouse gases in the atmosphere in 2005 was 455 ppm CO_2 -e[5], already exceeding the 450 ppm CO_2 -e long-term stabilization level. The concentration in 2008 was above 460 ppm CO_2 -e.

In other words, greenhouse gases need to be actually removed from the atmosphere to achieve this stabilization level, not further emissions.

Most of the public debate in Australia has been centred around the cost of mitigating existing greenhouse gas emissions from energy generation. Whilst reducing emissions from energy generation is fundamental if we are to have any chance of achieving such a target, this focus has masked the many opportunities for Australia and the world of harnessing the power of restoring terrestrial carbon (bio-sequestration).

The solution to climate change has not one, but three components:[12]

1. Energy technology (to produce carbon pollution free energy) – this needs to provide 50% of the solution;
2. Energy efficiency (using less energy and in the process saving money) – that's 25% of the solution; and
3. Landscape management (we need to let nature help us, because trees and soils absorb carbon) – that's also 25% of the solution.

Reducing the destruction of these stores of carbon by reducing land clearing, and increasing carbon stocks through revegetation and improving soil carbon, makes landscape management a fundamental part of managing the CO_2 balance in the atmosphere.

It also presents our generation with the opportunity to not only stabilise the world's climate system, but to also create an economic system that will restore degraded landscapes and conserve the world's biodiversity. Tropical rainforests and restored river basins can become more valuable than cleared ones.

This is a profoundly important concept. We can design the carbon economics so that for the first, and possibly the only time in human history, we can grow the world economy without destroying nature.

Tropical rainforests cover only seven percent of the world's land surface[13], yet they contain almost half of the world's terrestrial biodiversity. Over half of these forests have already been cleared, and current clearing rates are staggering - 13 million hectares is cleared every year.[14]

But tropical deforestation is not only destroying nature, it is also directly releasing a staggering 8 to 20% of all global carbon emissions.[15]

If the western industrial economies including the US, Europe, and Australia are prepared to invest, it will not only provide the world with up to 25 percent of the solution to climate change, it will, for effectively no additional cost, also finance the conservation of vast tracts of tropical landscapes[16].

The opportunities are not just in the tropics. For Australia the story is similar: carbon pricing has the potential to fundamentally change the pricing signals in rural Australia[17], and as a consequence how we manage the Australian landscape.

Properly designed, carbon pricing is capable of creating a self funding mechanism to repair degraded landscapes, such as in the Murray Darling Basin, at a scale that would have been unimaginable even a few years ago.

Investments for storing carbon in Australian landscapes can be targeted to produce multiple environmental and economic benefits:

- restoring native vegetation along the nation's rivers, wetlands and estuaries, which would improve water quality and re-connect fragmented landscapes;
- expanding habitat to create viable populations of threatened species - a foundation stone for the long-term conservation of biodiversity; and
- improving soil carbon in agricultural landscapes, which improves productivity in soils which have been in slow decline over the past two centuries.

Conclusion

We support the message from the International Scientific Congress that "delay in initiating effective mitigation actions increases significantly the long-term social and economic costs of both adaptation and mitigation".

A risk-averse society would seek to reduce the likelihood of global average temperature increases exceeding 2.0°C to much less than the 50%. This would require long-term greenhouse gas stabilization at levels substantially below 450 ppm CO_2-e and closer to the pre-industrial levels of 280 ppm CO_2-e.

The only possible way to achieve this outcome is to accelerate the speed of reduction. This implies the need for deep cuts to greenhouse gas emissions by 2020 and harnessing the full benefits offered by storing carbon in our terrestrial landscapes.

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