WENTWORTH GROUP
OF CONCERNED SCIENTISTS

Submission No.22
TT 25 June 2008

Committee Secretary
Joint Standing Committee on Treaties
Department of House of Representatives
PO Box 6021
Parliament House
CANBERRA ACT 2600

19 August 2008

To the Secretary

On behalf of the Wentworth Group of Concerned Scientists, I wish to make a submission to the Joint Standing Committee on Treaties in regard to the Kyoto Protocol to the United Nations Framework Convention on Climate Change.

If the world is to limit the damage of climate change to 2 degrees above pre-industrial levels, we are going to have to decarbonise the world's energy systems and restore a positive carbon balance in the world's terrestrial landscapes – and we have 40 years.

By any international standard, the Australia government's 60% reduction target is therefore a responsible first step.

1) Climate change science and obligations and opportunities

In regard to the current state of climate change and associated obligations and opportunities, I enclose the Wentworth Group's Proposal for a National Carbon Bank, which sets out the implications of the science on global and national emissions reductions and the opportunities for carbon markets to help the Australian landscape adapt to climate change.

A strategically designed Commonwealth program to restore terrestrial carbon (re-vegetation, soil carbon and biochar) would produce a double environmental dividend, using a price on carbon to help Australia meet its greenhouse gas emission targets, and also restore the native vegetation along all of the nation's river systems, improve water quality and secure landscape health in the face of climate change.

2) International negotiations

The Wentworth Group supports the Australian Government's 60% reduction target by 2050 as a responsible policy. Its commitment to set a medium term target is also responsible.

Given the magnitude and urgency of the challenge, we also argue that Australia should signal to the international community that it would be willing to commit to deeper cuts as part of a broader global response.

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The solution to climate change has three components:

1. Energy technology (to produce carbon pollution free energy);
2. Energy efficiency (using less energy and in the process saving money); and
3. Landscape management (we need to let nature help us, because trees and soils absorb carbon) – which can contribute up to 25% of the solution.

It is important therefore, that Australia continues to support global efforts to better manage tropical forest landscapes. To this end, I enclose a copy of a recent paper by the Terrestrial Carbon Group, How to Include Terrestrial Carbon in Developing Nations in the Overall Climate Change Solution.

The Terrestrial Carbon Group is an initiative of the Wentworth Group. It comprises international specialists from science, economics, and public policy with expertise in land management, climate change, and markets.

The Terrestrial Carbon Group's paper recognises that over the coming decades, vegetated land in developing nations will be increasingly threatened with conversion to agricultural and plantation use, and to human settlements and infrastructure. This will cause greenhouse gas emissions, underscoring the ongoing importance of terrestrial carbon in the climate change solution.

The Terrestrial Carbon Group proposes a market-based system that includes all the components that would need to be agreed at an international level (whether bilateral, multilateral or global). Nations would determine national and sub-national implementation systems targeted to their specific circumstances. The proposed system has two purposes: (i) to allow the international trading of carbon credits based on the maintenance and creation of terrestrial carbon, and (ii) to guarantee that action under the system contributes to long term climate change mitigation.

We encourage the Kyoto Protocol Review to take into account the two papers enclosed.

Yours Sincerely

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Director
Wentworth Group of Concerned Scientists

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PROPOSAL FOR A NATIONAL CARBON BANK

WENTWORTH GROUP OF CONCERNED SCIENTISTS

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Submission to the Joint Standing Committee on Treaties

Proposal for a National Carbon Bank

by the

WENTWORTH GROUP OF CONCERNED SCIENTISTS

The world's climate scientists tell us that we need to keep greenhouse gas concentrations in our atmosphere below 450ppm if we are to have a 50% chance of keeping global warming below a critical threshold of 2 degrees above pre-industrial levels[1].

If you discount 'global dimming' as developing nations mobilise to reduce the human health problems caused by air pollution, we have already crossed the 450ppm threshold[2].

The implication of a global stabilisation target of 450ppm for Australia and the world is simple, but profound.[3,4] No matter which phase in the industrial revolution countries are in, if we are to stabilise the world's climate system, we are going to have to decarbonise the world's energy production systems and restore a positive carbon balance in the world's terrestrial landscapes - and we have 40 years to do it[5].

Science based emissions targets will require far deeper cuts[6], according to the best available science on a 15 percent risk probability, Australia will have to reduce its greenhouse gas emissions in the order of 97 percent. Europe and Japan will need to reduce by 93%, the United States by 97%, China by 79% (table 1).

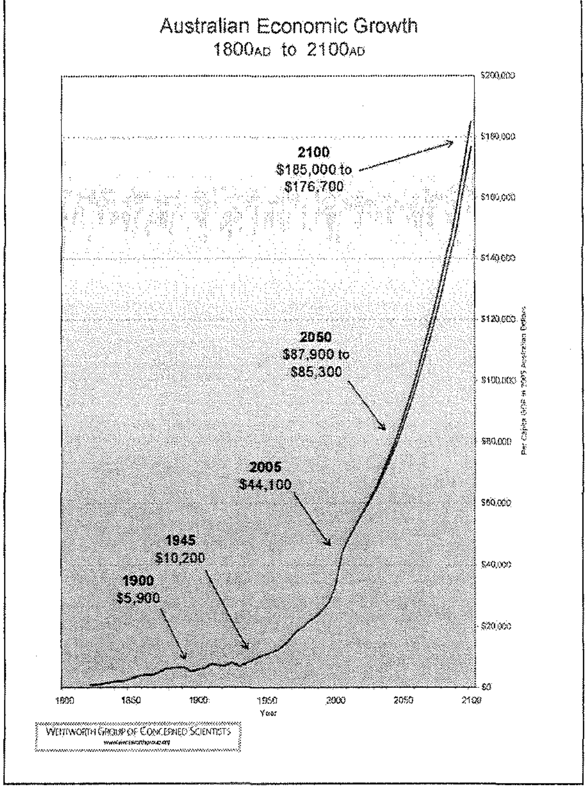
Table 1

Global per capita greenhouse gas emission reductions required to achieve 450ppm CO2e by 2050

(includes total emissions, including CO2, CH4, N2O, PFCs, HFCs, SF6 - includes land use change & 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				

In comparison to these risks, the economic impacts of even large emissions reductions are small. Achieving stabilisation at 450ppm CO2e requires a global reduction in the order of 70 percent by 2050[7,8,9].



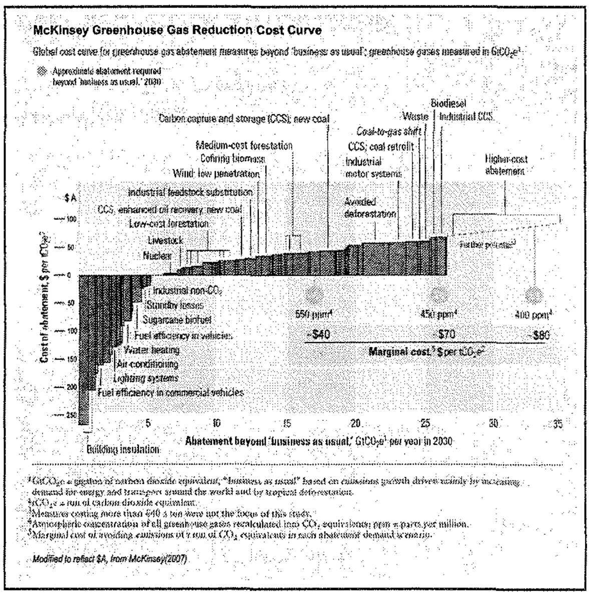
The overwhelming majority of economic models indicate that stabilising atmospheric concentrations around 450 ppm CO2e would involve a 'cost' of 1% of GDP or less by 2050[10].

So how is this possible?

The McKinsey cost curve for greenhouse gas reduction helps explain this apparent paradox[11].

It shows the solution to climate change has not one, but three components:

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



It is in this last component that lies at the heart of an opportunity presented to our generation that many would argue was not available to earlier generations.

By reducing carbon pollution in the atmosphere, we can also create an economic system that will conserve the world's biodiversity, because rainforests and restored river basins store vast quantities of carbon, so healthy landscapes will become more valuable than cleared ones.

This is what we call the new 'economics of nature'[12]. Because landscapes absorb vast quantities of carbon, 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.

Carbon economics provides us with an opportunity in Australia, in overcleared landscapes such as the Murray Darling Basin and south west Western Australia and also, for Australia to contribute to a global solution to conserve and repair the world's tropical rainforests.

Securing Carbon in Tropical Landscapes

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 of tropical rainforest is cleared every year.[14]

But tropical deforestation is not only destroying nature, it is also directly releasing the equivalent of 2 gigatonnes of carbon dioxide into the atmosphere every year: 20 percent of all global carbon emissions.[15]

Land clearing throughout the vast archipelago nation of Indonesia, Australia's nearest neighbour, has resulted in it being the world's third highest greenhouse emitter, behind only the United States and China. Clearing of the vast Amazon Basin makes Brazil the fourth.[16]

TABLE 1. GHG EMISSIONS SUMMARY (MTCO2E)[1]

Emissions sources	United States	China	Indonesia	Brazil	Russia	India
Energy[2]	5,752	3,720	275	303	1,527	1,051
Agriculture[3]	442	1,171	141	598	118	442
Forestry[4]	(403)	(47)	2,563	1,372	54	(40)
Waste[5]	213	174	35	43	46	124
Total	**6,005**	**5,017**	**3,014**	**2,316**	**1,745**	**1,577**

Note: (1) The table excludes EU from the comparison as EU comprises 25 countries. If EU as a block enters the calculation, Indonesia stands 4th, and the ranking are US, EU, China and Indonesia. (2) The data for energy emissions are from 2003. The energy data used IEA's 2005 annual statistics except for Indonesia where PIE 2005 statistics are used. (3) The data for agriculture emissions are from 2005, from US EPA 2006. Biomass combustion is included in the calculation. (4) The data for forestry (LULUCF) emissions are from 2000, from Houghton, 2003. (5) The data for waste emissions are from 2005, from US EPA 2006.

If the western industrial economies of Europe, Australia and America are prepared to invest (by for example linking our carbon emissions reductions targets to markets), it will not only help the world address climate change, it will for effectively little or no additional cost, also finance the conservation of vast tracts of tropical landscapes, and, in the process, open up new economic opportunities for people in the developing world. It will be one of the great legacies of our generation.

Carbon Conservation in Australia

Climate change is predicted to have serious long term economic and environmental consequences for Australia.

Adaptation to climate change has become one of the core environmental challenges for Australia into the foreseeable future. As the landscape dries out and rainfall becomes more variable, environmental assets will come under increasing pressure.

The single most cost effective public policy intervention to help confront this challenge is to restore environmental flows and to restore native vegetation in over-cleared landscapes.

However, carbon pricing provides a unique opportunity to fundamentally change the pricing signals in rural Australia because properly designed, is capable of creating a self funding mechanism to restore degraded landscapes, such as in the Murray Darling Basin and south west Western Australia at a scale that would have been unimaginable 20 years ago.

Proposal for a National Carbon Bank

A strategically designed Commonwealth program to restore terrestrial carbon (re-vegetation, soil carbon and biochar) can produce significant landscape conservation benefits and at the same time play a significant role in meeting Australia's commitment to a 60% reduction of greenhouse gas emissions by 2050.

The Wentworth Group of Concerned Scientists propose the establishment of a National Carbon Bank as one instrument to advance this cause.

The National Carbon Bank would produce a double environmental dividend, using a price on carbon to help Australia meet its greenhouse gas emission targets, and also restore the native vegetation along all of the nation's river systems, improve water quality and secure landscape health in the face of climate change.

The first asset to target would be restoring native vegetation along the nation's rivers, wetlands and estuaries. This would produce two landscape benefits of national significance: improved water quality, and re-connecting fragmented landscapes.

The second asset to target would be to expand habitat to create viable populations of threatened species and ecological communities. Creating viable local populations is a foundation stone for the long-term protection of threatened species.

Both outcomes are core Commonwealth Government environment responsibilities.

The third asset to target would be soil carbon in agricultural landscapes, once the institutional issues of permanence and cost-effective monitoring have been resolved and agreed internationally.

The National Carbon Bank is viable because the landmark reforms in Australian agriculture through Landcare and the Natural Heritage Trust over the past two decades has produced the scientific understanding, institutional capacity and public goodwill for such an initiative. There is hardly a farmer in Australia today who does not appreciate the value of native vegetation in creating healthy river systems, and its value to individual farmers.

Who owns the carbon?

Because the Commonwealth is purchasing 'ecosystem' services (carbon sequestration, improved water quality, restored biodiversity and providing salinity control) from willing sellers, a National Carbon Bank established by the Commonwealth government would own the carbon asset, just as any private offset purchase scheme would have contractual ownership of the carbon.

This bank would provide financing for revegetation of areas of high conservation value across Australia, on the condition that it owns the resultant carbon sequestered and if the vegetation is subsequently cleared, the Commonwealth is reimbursed for the resultant loss.

The government can do three things with this carbon title:

- It can use it to help meet Australia's international greenhouse gas reduction obligations;
- It can sell the carbon value back into the market (producing a net public benefit of improved water quality and restored biodiversity, at lowest cost); or
- It can hold it in the National Carbon Bank as an economic asset and sell it into the post-Copenhagen global carbon market, turning a profit as the price of carbon increases.

Multiple Benefits

The National Carbon Bank investments are targeted to produce multiple environmental (and eventually) economic benefits:

- storing carbon in terrestrial landscapes;
- improving water quality, restoring biodiversity and providing salinity control; and eventually,
- improving the long-term health of agricultural, rural and urban landscapes.

This scheme needs to be planned so that it does not cause perverse outcomes in other sectors. There is a real risk, for example, that increased forestry will produce carbon credits at the expense of water allocations.

Funding would therefore be targeted to sites identified by the 56 existing regional natural resource management boards (called Catchment Management Authorities in some states).

These boards would produce maps of river, wetland and estuary systems and areas for habitat restoration that they recommend become eligible for National Carbon Bank investments, through their Catchment Action Plans.

Because of investments in science over many decades, identifying river, wetland and estuary sites should take no more than 6 months for many CMAs (eg the Goulburn Broken CMA in Victoria and the Murrumbidgee CMA in NSW), and possibly 12 months for others that are less advanced. Identifying habitat restoration sites would take longer, as the science is less advanced.

Multiple benefits can also accrue by using land management techniques to increase the sequestration of soil carbon. Increased sequestration would deliver advantages through the greater presence of a range of soil carbon compounds - from re-active organic carbon, used by plants and soil organisms to re-cycle nutrients, to the relatively inert soil carbon compounds (including chars and charcoals), which help build structure and storage mechanisms for water and nutrients. In addition, whilst forming a fundamental component of productive agriculture and forestry systems, great potential exists for soil carbon to deliver a significant proportion of Australia's international greenhouse gas reduction obligations. For this reason alone, as the monitoring science for soil carbon continues to improve[17], the spotlight on soil carbon sequestration will intensify.

Scientists are also currently exploring the option of adding man made bio-char[18] to soils as a means of increasing the inert carbon store in soil. While work still needs to be done before wide-spread application - on the impacts of bio-char on soil biological function[19] and the significant energy requirements of the production process - it is worth keeping abreast of developments in this area.

The targeted funding from the National Carbon Bank will provide another public policy benefit. It will accelerate the reform of natural resource management programs, from the current grants based system into a series of cost-effective market based instruments. Voluntary, tender based, auctioning or other market based instruments would become viable because they would now be operating at an economic scale.

The National Carbon Bank is similar to other investments in offsets programs because both would use carbon pricing to store carbon in terrestrial ecosystems. The difference between the two is that offset schemes simply value carbon and will be established anywhere in the landscape with any type of vegetation which yields the most cost-effective carbon outcome, whereas the Carbon Bank investments are targeted to produce multiple environmental (and eventually) economic benefits.

Conclusion

The National Carbon Bank provides a unique opportunity for Australia to advance the Landcare reforms, provide a financial vehicle to begin the process of adapting the Australian landscape to climate change, and at the same time, provide a cost effective investment vehicle to assist Australia meet its 60% greenhouse gas reduction target.

Notes and References

[1] IPCC, 2007: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* Table TS.5, p 66.

[2] IPCC, 2007: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* Figure SPM2, p4.

[3] based on figures published by the World Resources Institute, 2007. *Climate Analysis Indicators Tool Version 5.0,* and IPCC Synthesis Fourth Assessment Report, November 2007. Table SPM.6.

[4] IPCC, 2007: *Summary for Policy Makers.* Synthesis Fourth Assessment Report, November 2007. Table SPM.6 p 21.

[5] Table TS.5. (reference 1 above) gives the 'best estimate' for holding global temperature increases to below 2.1 degrees over pre-industrial levels, by keeping CO2e

concentrations below 450 ppm, and Table SPM.6. (reference 4 above), which gives probabilities of achieving the 450ppm (445-490) CO2e target by 2050 based on the future emissions scenarios used by the IPCC.

[6] Cosier, P., 2008. *Science based emissions targets will require far deeper cuts.* Wentworth Group of Concerned Scientists. Submission to Garnaut Review on Climate Change, February 2008.

[7] An approximation of the IPCC Table SPM6, which states that a reduction in global CO2 emissions in 2050 (as a percentage of 2000 emissions) in the range of -85% to -50% is required to achieve a CO2e stabilisation in the range of 445 to 490ppm by 2050. The figures correspond to the 15^{th} and 85^{th} percentile of the IPCC's Third Assessment Report (2001) scenarios distribution, which was also used for the 2007 analysis. It is also consistent with Table 8.2 in the Stern Review, based on Meinschausen et al, 2006.

[8] Stern, N. 2007. *The Economics of Climate Change: The Stern Review* Cambridge University Press, p227.

[9] Meinschausen et al. 2006. *Multi-gas emission pathways to meet climate targets*, Climate Change, 75: 151-194

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