Standing Committee on Natural Resource Management (Climate Change)
Parliament House
Maquarie Street
Sydney NSW 2000

9 May 2008

Via email: climate.change@parliament.nsw.gov.au

Dear Vicki Buchbach, Committee Manager

Re : Inquiry into Emissions Trading Scheme

I would like to strongly endorse an emissions trading scheme (ETS) for Australia that has broad coverage and no limitation to genuine offsets. The effects of an ETS on matters related to natural resource management (NRM) depend on several design features of the ETS. The latest information available to me on ETS design comes from the Garnaut Climate Change Review's "Emissions trading scheme discussion paper" released in March 2008. This submission is focussed on your three points:

Implications for natural resource management in NSW of national and international emissions trading schemes with a particular emphasis on:

a) Costs and benefits for natural resource managers of national and international greenhouse gas emissions trading schemes;

b) Transitional arrangements for participants in the NSW emission scheme to a national scheme; and

c) Economic and environmental implications of offset activities for NSW.

I have included other contextual information in the first few paragraphs and in the following Appendices:
Appendix 1. Terminology and definitions
Appendix 2. Ways to reduce emissions
Appendix 3. Definition of an Offset
Appendix 4. Permit value

If you have any questions or require further clarification please do not hesitate to contact me.

Kind regards

David Pepper

Essential features of proposed ETS design

The ETS design presented in the discussion paper has the following essential features. An independent carbon bank (ICB) would frequently (weekly-yearly) auction permits to ETS participants from five sectors, initially excluding agriculture and forestry sectors. Government and residential sectors were implicitly excluded. It is not clear whether those excluded will be allowed to trade offsets in the domestic emissions market, though there seems to be some logic to and support for them being able to. Permits will have a fixed CO_2-e value (covering six Kyoto greenhouse gases) and that value would persist until the permit was used to acquit emissions. Hoarding, lending and trading of permits in the CO_2-e emissions market will be allowed. Lending will be allowed but only exclusively by ICB and particular agents, who will be able to charge interest on repayments. Participants will be required to measure their emissions, acquit them against permits and report to ICB. If they fail to do this they will be charged a penalty and a make-good provision. The ICB will audit some reports to verify accuracy and generally handle compliance matters.

The number of permits or rate of permit release by ICB will be guided by our national emissions trajectory of annual emissions budgets set by Government to achieve domestic emissions targets and to adhere to international agreements. The rate of permit release will have a significant impact on permit demand and permit price. The costs of an ETS will be passed through to individuals and households. Trade-exposed, energy-intensive industries (TEEIIs) will be given a discount on permits so they can maintain their market share at levels they are predicted to achieve when all their competitors belong to comparable ETSs in countries adhering to international agreements on CO_2-e emissions reduction. The auction of permits will deliver enormous revenue to Government, for it to fund the ICB and to redistribute strategically.

Points about the context of an ETS and this submission

More care could be taken with terminology and definitions (Appendix 1), especially in the design phase of an ETS. It might be important when we are talking about *apples* that we are talking about the same type of *apples*. CO_2-e flux is measured in units with time and area dimensions, for example t CO_2-e/m^2/year (Fig 1) which defines a particular quantity of gas molecules (tonnes of CO_2-e) per unit area (m^2) per unit time (year). Therefore, activities with an impact on time (release rate of permits, hoarding permits) or area (land-use change, afforestation) may potentially impact emissions.

I do not wish to be extremely alarmist but we should consider the scale of the problem, objectively. If the global community is serious about mitigating climate change and all the associated (and uncertain) risks that go with climate change, it has to take action to maintain global mean surface temperature at about 2°C warming above historical levels. This probably requires atmospheric CO_2 mixing ratio to be maintained at 350-400 ppm but currently (2008) we are already at 385 ppm. The effort into emissions reduction has to be global and the reduction severe. The only way to achieve this is to very dramatically (rapidly) decrease using energy from non-renewable (fossil fuel) sources at a global scale. There is practically no way on this planet that this will happen. We should therefore consider some contingency plans just in case. Investment (and incentives to invest) into low-emissions technology (including alternative energy sources as well as CO_2 capture and storage) should be a high priority for Government (State and Federal).

This submission is focused on natural resource management, in the following context. Natural resources support primary industries (agriculture, forestry, fishing and mining), tourism, recreation, habitat for flora and fauna, ecosystem services (oxygen, water filtration, biodiversity), ecosystem health (self maintenance). Some of our State and National goals include: sustainable water supply, improved biodiversity, sustainable use of land (soil and water system), economic sustainability, social well-being.

a) Costs and benefits for natural resource managers of national and international greenhouse gas emissions trading schemes

An ETS will probably lead to the following – and relate to NRM in the following ways.

- Increase energy efficiency – all activities involving energy use in NRM will potentially come into focus with a view to reducing energy use.
- Use more energy derived from non-fossil sources to replace energy derived from fossil sources – again all activities involving energy use in NRM will potentially shift to alternative energy.
- Generate sinks – existing activities or new activities will potentially add value to or become part of business models.

Costs and benefits for NRM will depend on a number of factors. The cost of mitigating emissions will manifest in Permit price which will be passed through to individuals and households. The cost of all goods and services will increase. Will sectors outside an ETS be allowed to trade offsets generated by emissions reduction and / or sinks? Under the current proposed design, agricultural and forestry, government and residential sectors will not be included.

Global emissions from land-use change (1.5 Pg C year^{-1}) and fossil fuel (8.4 Pg C year^{-1}) were around 9.9 Pg C year^{-1} (in 2006). Effort (investment) into reducing emissions from land-use change is required and offsets are required for emissions from fossil fuel in the short to medium term. Therefore, rehabilitation of degraded lands (e.g. cleared land which is no longer arable, mine sites) and increasing native vegetation (increases biodiversity), and increasing forest plantations are all activities that should benefit from increased levels of investment. Permit price will be the driver of change. Allowing those who do not belong to the sectors participating in an ETS to still trade their offsets in the emissions market will facilitate increased levels of investment into NRM activities.

b) Transitional arrangements for participants in the NSW emission scheme to a national scheme

The ICB (or a government department) will look after compliance. The ICB and all participants in an ETS will require crystal clear guidelines on monitoring and reporting CO_2-e emissions. Once these guidelines have been defined, either before or by the start of an ETS in 2010, they can be applied to the past and present activities of participants in the NSW emission scheme. Monitoring present activities will benefit from the new clear guidelines. 'Monitoring' past activities will largely rely upon perceptions and fairness.

Does CO_2-e trading which occurred in the past have a value today? If the equivalent of permits were banked they would have value today. Sinks generated over the last decade were either traded or not; that is, their value was either realised or not. Many sinks and many increases in energy efficiency (both types of offsets) occurred in the past but not all of these efforts realised their economic value in the emissions market in the past. Should offsets generated from increased efficiencies or sinks have any value in a national ETS that begins in 2010? Without a detailed knowledge of the NSW emission scheme, I would argue that they do not. All starters should start afresh. However, participants in the NSW emission scheme will benefit through the 'know how' they have gained through their participation in an emissions scheme. Sink managers will be ready to showcase their 'product' in the emissions market early and gain the best price for it. In short, they will have the advantage of knowing how the emissions-trading game works, with better knowledge and exposure than new starters. Already equipped with some 'know how' they also have two years to prepare for the best start in a new race that begins in 2010.

c) Economic and environmental implications of offset activities for NSW

It makes great economic and environmental sense to allow offsets. The more offsets the better.

Potential Offsets

1) CO_2-e emissions reduction net of the reduction to meet budget (trajectory level in that year, (Appendix 3) – permits held in surplus after acquitting all emissions.
2) Any domestic CO_2-e emissions reductions by non-participants in an ETS
3) Any CO_2-e sinks generated in Australia
4) All of the above outside Australia

Economically

All offsets (1-4 above) will benefit the State and nation economically. The bulk of emissions stem from energy use derived from fossil fuel combustion. Because a very large fraction of our energy derives from fossil fuel, we need to reduce energy use to reduce emissions. To meet internationally agreed targets (our national trajectory; see Fig 2) we need to reduce energy use by a specific amount. A fraction of the reduction required could be offset and effectively allow us to use low-cost energy derived from our abundant fossil fuel resources for longer while we make the transition to a low-emissions economy. Allowing offsets will thus buy us time (and save costs) to adjust domestically whilst adhering to our international agreements (see Appendix 2). Although Australia's contribution to global emissions is small (around 1%), and our reduction in emissions will not make a very significant quantitative contribution to global reduction in emissions, it is extremely important geopolitically that we join with the international community to tackle this global problem. It is also important that we invest heavily into developing low-emissions technology as soon as possible. Offsets will buy us time but eventually offsets (1-4) will ‘run out’ with respect to increased efficiencies or ‘fill up’ with respect to sinks.

A cheaper transition to a low-emissions economy will allow greater levels of investment into low-emissions technology. Breakthroughs in low-emissions technologies will have global applications and thus the potential to generate wealth and perhaps make a significant contribution towards global emissions reduction.

The more offsets the better. It makes good sense to allow everyone to trade their offsets in the emissions market even if they are outside sectors included in an ETS. Not allowing agricultural and forestry, government and residential sectors to trade their offsets in an emissions market makes very poor sense. By allowing them to trade and in this sense including them in an ETS will effectively achieve much broader ‘coverage’ and greater offsets, more time to make the transition to low-emissions economy. Greater offsets will also effectively allow us to use low-cost energy derived from fossil fuel resources for longer and keep any advantages this provides us in markets overseas. Politically this will pull people together, make them feel part of the effort to combat climate change and not feel like all the advantages are going to the ‘big end of town’ at their expense; during a time when the cost of living for individuals and households is expected to increase substantially.

Environmentally
The more native vegetation and forest plantations the better. Forest sinks created through afforestation mop-up CO_2 from the atmosphere but they also provide a multitude of other important environmental services such as, filtering water, pumping water vapour into the atmosphere and affecting the distribution of precipitation, producing oxygen, they also produce feedstock for honey and wildlife which return nutrients to vegetation, enhance biological diversity, even moderate soil temperature and respiration.

From a global vegetation perspective, vegetative productivity correlates with water availability. In the absence of disturbance, vegetation will therefore grow to a steady state that accommodates water availability. If water availability declines, vegetation will adjust to the new water regime. Vegetation will ‘use’ water from soil and in many cases from deeper groundwater sources. This water ends up as water vapour in the atmosphere within and above the canopy. Water vapour ‘pumped’ into the atmosphere by vegetation drawing it from soil sources can affect water drainage from the soil profile and hence, run-off or groundwater recharge (water yield). Water vapour in the atmosphere within and above the canopy can also influence local patterns of rainfall. Expansion of forestry plantations and/or native bush regeneration may therefore affect both these processes at the regional scale. A decrease in vegetation generally reduces water vapour flow to the atmosphere and increases run-off or groundwater levels (water table level). A rising water table level after clearing vegetation can lead to soil salinity problems. Land-cover change can reduce regional rainfall as a result of reduced water vapour flow (e.g. Sahel) and albedo (reflected solar radiation). Increased vegetation will generally increase water vapour flow to the atmosphere and should reduce the risk of soil salinity problems and could lead to higher regional rainfall.

Some risks of including CO_2-e sinks in an ETS

Generating sinks effectively buys time for a cheaper transition to a low-emissions economy (by emissions here, I mean emissions from fossil sources). By definition this will delay action on emissions reduction and diminish incentives for developing and implementing low-emissions technologies. The Government should use the considerable revenues from the sale of permits strategically to boost incentives for developing and implementing low-emissions technologies. This is a very important part of a pragmatic approach. There is a strong case for having an ETS based on geopolitical reasons rather than our direct (small) contribution to global emissions reduction. However, while geopolitics are extremely important, the very best action Australia could take is to promote investment into R&D (including commercialisation) for home-grown, low-emissions technologies. This would be very much in Australia's economic interest and would accelerate technological solutions and possibly allow a relatively small country to make a big contribution towards global climate change mitigation.

It is important to make a distinction between offsets as being reductions in positive CO_2-e flux and offsets as being negative CO_2-e flux. Increasing negative CO_2-e flux without physical limits means that we could in theory keep the same level of emissions (positive CO_2-e flux) and still achieve a reduction in net emissions and our trajectory. The danger in this approach is that the capacity to generate negative CO_2-e flux may change or 'dry up' suddenly (for example, temporarily during drought, or more permanently via increased desertification as a result of climate change impacts). If this happened then we would have to start from scratch in reducing emissions by reducing use of energy generated from fossil sources and/or by replacing the use of energy generated from fossil sources with energy generated from renewable sources or nuclear reaction (including solar radiation, and accounting for full costs of using uranium and risks associated with storing nuclear waste on Earth, currently our only inhabitable planet). Even within the physical limits that do exist for sink capacity, this risk will still be present albeit at a diminished level. Offsets will buy us time but this risk needs to be managed including a contingency plan that is possible. Probably the best approach to manage this risk is to encourage investment into low-emissions technology so that this technology arrives sooner rather than later. Investment into low-emissions technology (including alternative energy technologies) should be at a massive scale and the Government (State and Federal) should allocate the largest share of the revenues generated from permit sales into this area.

Forest sinks fluctuate from year to year depending on the availabilities of plant resources (water, nutrients and light), and temperature has a significant effect on rates of biochemical reactions (e.g. metabolism, photosynthesis). Fluctuations occur in negative CO_2-e flux (negative indicates uptake) and positive CO_2-e flux (positive indicates emission) and both affect the net CO_2-e flux. In a good year for plant growth, negative CO_2-e flux > positive CO_2-e flux and result in a net uptake of CO_2 and will thus be a sink. In a poor year, negative CO_2-e flux < positive CO_2-e flux and result in a net emission of CO_2 and will thus be a source. Forest managed for productivity will probably be a sink in most years. Forest not managed for productivity will vary with the elements. If sinks are counted in good years in forest not managed for productivity should they be counted in poor years when they are sources? If National Parks for instance sell their sinks in good years should they pay for their sources in poor years? Furthermore, if forests are expanded to generate sinks, because there will be more of them, when they burn they will release much more CO_2 than before the expansion. In Australia, rainfall in regions with productive forest is predicted to decrease, so forest conditions will become drier and maybe more susceptible to fire (both frequency and intensity). The larger the sink the greater the risk of “fugitive” emissions (e.g. fires release CO_2 from vegetation sinks; climate warming can release CO_2 from soil, geological activity might release CO_2 from geological sinks).

APPENDICES

Appendix 1. Terminology and definitions

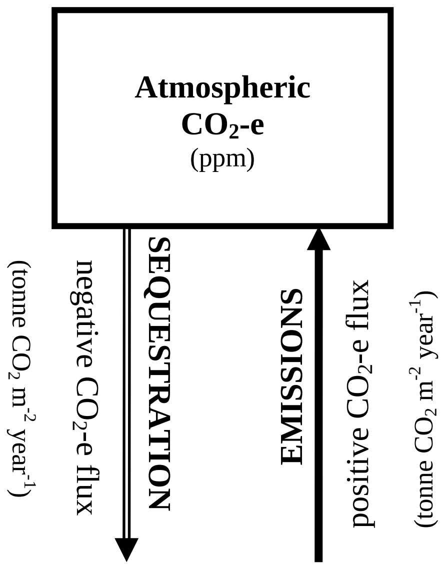

Fig 1 CO_2-e flux includes a time dimension: the term ‘emissions’ represents positive CO_2-e flux into the atmosphere and the term ‘sequestration’ represents negative CO_2-e flux into forests or other sinks. It is important to remember the time dimension in discussions involving atmospheric levels of CO_2-e.

Some terminology used in the discussion paper is an abbreviation of an abbreviation and begins to detract from the main aim of reducing emissions. Terms like, cumulative emissions, carbon trading, carbon world, carbon economy should at least replace the word carbon with emissions and cumulative may mask an important time dimension (Fig 1). Organic matter, and indeed the biosphere, is largely made of carbon – indeed we are a piece of this carbon world. In particular, and in long-hand, we are collectively trying to reduce CO_2-e emissions derived from the combustion of fossil fuels (coal, gas, oil) and from land-use change (including, gas released from agriculture, forestry and mining). We should not lose sight of the main objective of reducing CO_2-e emissions, trading CO_2-e emissions permits, etc. Emissions from the combustion of bio-fuels (methane gas, bio-diesel) are excluded because they are from renewable sources. Even this is not straightforward at times, for instance, methane gas emitted from livestock is really derived from renewable sources (e.g. grass). Careful definition of terms will become important when our activities involve both emissions and financial transactions under an ETS.

Emissions are better defined as CO_2-e flux because it is the mixing ratio of gases in the atmosphere that defines the level of gases in the atmosphere causing global warming and forcing climate change (Fig 1). The mixing ratio in the atmosphere determines the level of greenhouse gas, and is better expressed in either parts per million (ppm) or molar ratio (µmol greenhouse gas/ mol air). This is an important distinction to make because the rate of CO_2-e release (positive CO_2-e flux) into the free atmosphere is one important determinant of atmospheric CO_2-e levels, the other important determinant is the negative CO_2-e flux (sequestration) into sinks; most sinks though are net storage of negative CO_2-e flux minus positive CO_2-e flux – indeed, the atmosphere is itself a sink or compartment in the global carbon cycle. Thinking in terms of flux is also helpful when it comes to understanding feedbacks to atmospheric levels due to land-use change, global warming that stimulates soil respiration, drought that can limit soil respiration – they all affect the rate of CO_2-e release (positive CO_2-e flux) into the free atmosphere and therefore the mixing ratio or level in the atmosphere. Slowing the *rate* of CO_2-e release is perhaps a less ambiguous description than reducing emissions.

Appendix 2. Ways to reduce emissions

Reductions in net emissions can be achieved by:

- Increased energy-use efficiency; that is, reduced use of energy generated from non-renewable sources (coal, gas, oil);
- Replacing the use of energy generated from non-renewable sources with energy generated from renewable sources or nuclear reactions;
- Creating negative CO_2-e flux to offset positive CO_2-e flux; that is, creating sinks to offset sources; or if you like, offsetting emissions with sequestrations.

At a global scale, say today, many transactions will take place and *work* will be performed but the amount of money will not change that much it will just be redistributed a little differently. The work performed expends a finite amount of energy for that day and produces a certain flux of CO_2 (t CO_2/Earth's surface area/day). The only ways available to reduce CO_2 flux are to work less or more efficiently or use sources of energy that either mop-up CO_2 (renewables) or don't produce it in the first place (nuclear energy, including solar energy from our sun - the Earth's nuclear reactor).

Appendix 3. Definition of an Offset

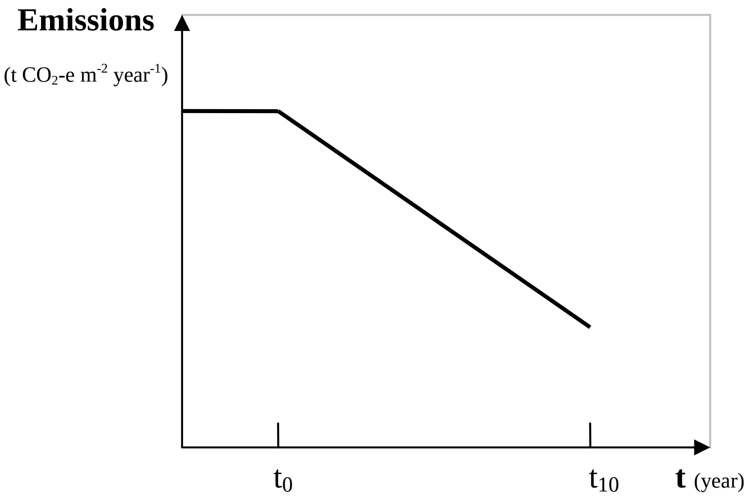

Fig 2 Diagram of national emissions trajectory beginning at a current level at time t_0 and decreasing over a period ending at time t_{10}. The trajectory level each time period is the budget.

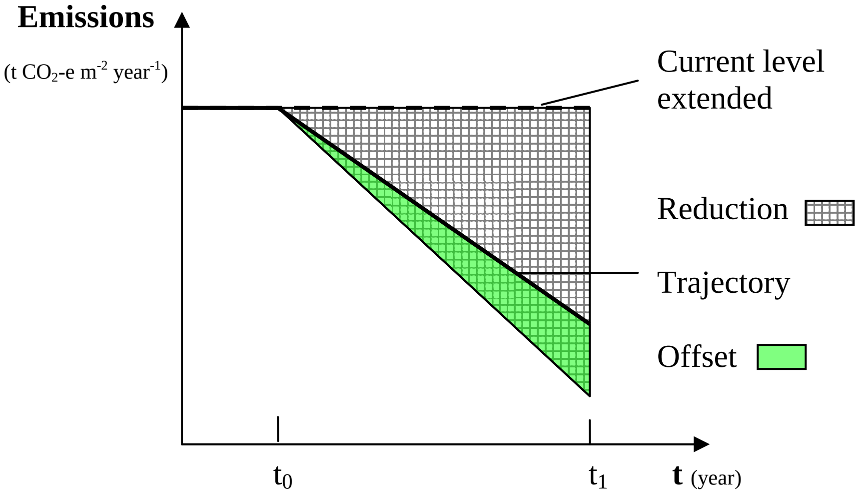

Fig 3 Emissions for a single entity begin at a current level at time t_0 and are reduced over a period ending at time t_1. The offset is the fraction of reduction in emissions below the trajectory.

Appendix 4. Permit value

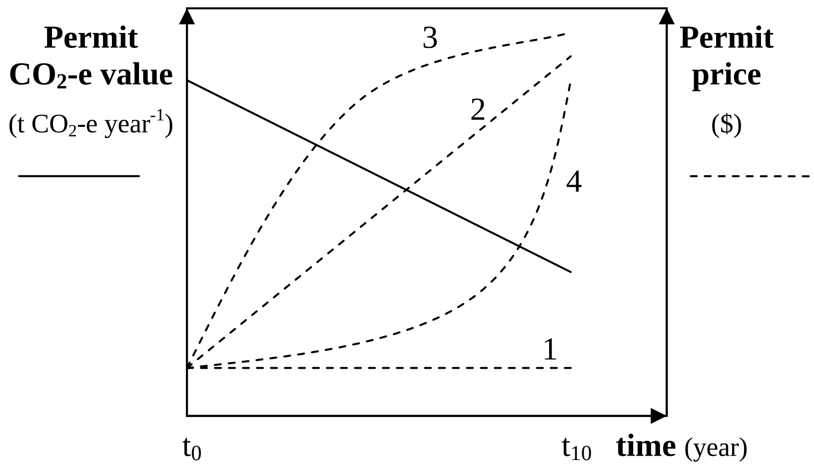

Fig 4 Permit value: the CO_2-e value begins at a current level at time t_0 and is adjusted downwards over a period ending at time t_{10}. The government adjusts the CO_2-e value downwards by an amount to achieve our national emissions trajectory. The dollar value of the permit is left to the market and it is uncertain which way it will change. It could remain at the same price for many years (1), or increase at a steady rate (2), or increase rapidly in the early stage of an ETS then start to level off as efficiencies are achieved and technology is implemented (3), or increase slowly in the early stage of an ETS then start to increase rapidly as entities frantically require more permits to acquit their emissions and comply with the scheme to avoid penalty, or finally, decrease as the need for permits decreases because efficiency and technology have been a roaring success (not shown).

Other points to consider about Permit price.

It is uncertain whether Permit price will increase up to A) the price of alternative energy, B) interest rate charged on permit loans, or C) penalty rates.

Permits hold there value while traded and remain in circulation (like money). However, when permits are acquitted they become like feedstock for production, they are consumed and are taken out of circulation (unlike money). There will need to be crucial differences between how the ICB operates (ie controls permit price) compared to how the Reserve Bank of Australia (RBA) operates to control cash rate. The supply rate of fixed CO_2-e-value permits will be governed by our national emissions trajectory *unless* the Government buys a lot of offsets from overseas.

Permits with an expiry date will lead to frantic behaviour in the market.

The time dimension is important (Fig 1). Banking will affect emissions because it will affect the rate of energy use allowed in a particular period, or it will affect the rate of other activities producing other greenhouse gases. It is important to consider the potential that banking could have as a negative influence on economic growth and intrinsic developments.

Buying permits is equivalent to buying energy (energy used or energy required). Speculating on the price of permits for profit will tend to amplify fluctuations in the availability of permits and in the price of permits in the market place.

Modelling impacts on our economy and society is practically a waste of time given the business as ‘unusual’ scenario – based on historical events, we do not know what the future holds. However, modelling can help with the design of an ETS and the best parameter values to use within the design.

We do not want to create an ETS that presents a bigger risk to the quality of life than climate change impacts.