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Australian Cooperative Research Centre for Renewable Energy and Related Greenhouse Gas Abatement Technologies (ACRE)

**Submission to House of Representatives Inquiry
into
Regulatory Arrangements for Trading in Greenhouse Gas
Emissions**

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About ACRE

The Australian Cooperative Research Center for Renewable Energy and Related Greenhouse Gas Abatement Technologies (ACRE) has as its mission the development of the Australian Renewable Energy Industry (and related technologies) by promoting cooperative activities between universities, businesses and electricity utilities. This includes technical research, educational activities, and policy and market development.

The four major objectives of ACRE are to:

- Undertake strategic research in renewable energy generation, storage, power conditioning , energy efficiency and systems integration
- Perform cost - effective demonstrations of systems that displace fossil fuels and reduce greenhouse gas emissions
- Present a strategic policy framework to government and energy agencies to help provide the basis of a viable renewable energy industry in Australia
- Provide a resource of trained renewable energy technologists and serve as a prime point of the dissemination of research information

Some current activities of ACRE's Policy and Market Development Program include:

1. Market Entry Mechanisms Study (with CADDET and Energy Strategies P/L)
2. Green Power Study (with GreenPower Services and University of Wollongong)
3. Energy Modeling and Policy Development Study (with Institute for Sustainable Futures)
4. Renewable Energy Industry Guide (with Sustainable Energy Industries Association Australia & Bardak Management Services)

5. 2% Renewables Target – Report commissioned by the Australian Greenhouse Office on the Implementation of the 2% Renewables Target.) (with Energy Strategies and George Wilkenfeld & Associates)

Scope of ACRE's submission

A specific Emissions Trading Schemes (ETS) has not been proposed by the House of Representative's Committee making it difficult to directly address the Inquiry's Terms of Reference. ACRE is particularly interested in emissions trading from the perspective of how any scheme that is adopted can be best designed to provide opportunities for the Australian Renewable Energy and Energy Efficiency Industry.

In this situation, it would seem that the key term of reference is the last: *the impact of emissions trading on the environment and industry and the economic and social welfare of the Australian Community*. Our presentation will focus on programs, actions and linkages that will benefit the Australian renewable energy and energy efficiency industries in any emissions trading regime that may be adopted.

Background to the issue

If Australia ratifies the Kyoto Protocol and enough other parties ratify so that it comes into force, Australia will have a legally binding obligation to contain its average annual greenhouse gas emissions at no more than 8% over the 1990 level, in the period 2008 – 2012. Because Australia negotiated such a comparatively lenient target, other protocol signatories will scrutinize our performance closely and expect compliance (as we will of them). The issue then is what mechanisms are necessary so that Australian companies and individuals act in a way that ensures that Australia meets its treaty obligations.

Before Kyoto, the Prime Minister John Howard announced a number of initiatives (20 Nov 97, *Safeguarding the Future: Australia's Response to Climate Change*) aimed at containing greenhouse gas emissions. The forthcoming National Greenhouse Strategy will no doubt contain additional measures. However there is no way to link them quantitatively or to allocate resources between public and private investment options.

Role of Emission Trading Schemes (ETS)

It is ACRE's view that an ETS could provide such a framework and create a market in which all means of reducing emissions can compete. In this context ACRE is most concerned that renewable energy and energy efficiency sector experience a 'level playing field' and are able to compete and develop.

There are advantages to Australia in this outcome well beyond greenhouse gas savings. Jobs and exports will be created, as the demand for these technologies grows in response to expected greater reductions in global greenhouse gases being required to contain climate change. For example, to achieve sustainable development with global CO₂ reductions of 50% by 2050, 80-90% reductions in CO₂ by industrialized countries will be needed. The demand for renewable energy is already growing fast. In one year alone (1996-97) global installed wind energy capacity increased 25% to a total of 7.6 GW. The main buyers were Germany, Denmark and India.

Creating carbon 'sinks' via tree planting is a way that greenhouse gases can be more or less permanently 'sequestered'. If they are used as part of biomass electricity production and / or to offset electricity use (e.g. domestic heating) and then replanted, trees can also be a renewable energy resource with zero net emissions.

The fundamental idea behind emissions trading is that any particular environmental target can be achieved at lower total cost to society if those responsible for achieving the environmental target can obtain 'gains from trade'. This refers to the ability that those with higher cost of abatement will have to pay those with lower cost of abatement to undertake more emission control. Those with higher cost benefit by reducing their net cost of compliance. Those with lower costs benefit because they enter into transactions that yield revenues. And society benefits from having a more cost-effective control program with fewer real resources devoted to the achievement of the environmental goal.

A Possible model - the USA SO₂ Control Program

These concepts underpin the SO₂ control program in the USA whose Phase I aim is to reduce SO₂ (and NO_x) by 10 million tons below 1980 levels by 2000. The 'cap and trade' approach taken allocated permits to release a specified number of tons of the pollutants by the largest SO₂-emitting electric power plants. (Phase II begins in 2000 when all power plants will be included in the program.) A limited number of permits consistent with a 50% reduction on total emissions by 2000 were issued. Each year these power plants need to demonstrate that they hold enough allowance to cover their actual SO₂ emissions. During the year, power plants may keep the permits and release the pollutants, or reduce their emissions and sell unused allowances with each other or with third parties. The fact that the permits have value as an item to be sold or traded gives the owner an incentive to reduce their emissions.

As this market has matured, a number of market institutions have emerged to facilitate trading. As this market has matured, the Chicago

Board of Trade began to trade SO₂ allowances. The SO₂ allowance trading program has outperformed expectations – emissions have been reduced 30% more than required by Title IV and the price per allowance has dropped well below the anticipated cost of control. Each year the program has been in operation, it has achieved 100% compliance. Every utility has met its obligations to either reduce SO₂ emissions or to buy credits from a utility that reduced its emissions by more than the required amount. At least one utility, Niagra Mohawk Power Corporation has even been able to ‘retire’ excess credits by donating them to the Environmental Resources Trust, a private non-profit organization whose “goal is to build a sustainable future by engaging market forces.” Niagra Mohawk gets good PR and can apply for a sizeable federal tax deduction – while the environment becomes cleaner.

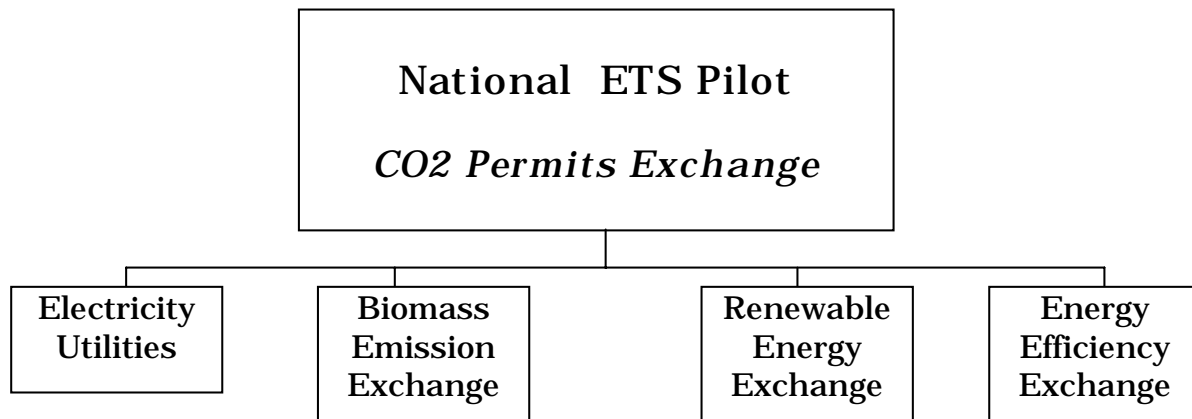
An Australian Pilot ETS

An ETS using such a ‘cap and trade’ regime is one of the favored models to reducing greenhouse gases in a flexible, equitable and efficient way. It is also based on a well-understood ‘stock market’ model of how to administer, value and trade a scarce commodity. It would be to Australia’s advantage to gain early experience of such a scheme even if it is a ‘pilot’ scheme. The Canadian government recently (June 98) set up a Greenhouse Gas Emission Reduction Trading Pilot (GERT) to provide practical experience with this market-based approach. GERT was launched by a multi stakeholder partnership including industry, government, and other groups. Projects that have been generating reductions since 1 January 1997 will be accepted. To ensure that Australia is well placed to participate in any future international ETS, an Australian ETS pilot should be commenced sooner rather than later.

How to allocate the permits is a complex issue. ACRE is keen to ensure that energy efficient and renewable energy technologies are included in any ETS pilot.

Which sectors? Which gases?

To keep any ETS pilot stage simple it would be advisable to take a ‘sector by sector’ approach and to focus initially on CO₂ (with the intention of bringing in other greenhouse gas emissions later as they become quantifiable). Other human –induced greenhouse gas emissions (such as methane from coalmines and cattle) could be added to the ETS based on their CO₂ equivalent, depending on the capacity to measure or infer emissions balances. Sources, sinks and gases not included directly, because of difficulties in tracking aggregate balances, could be incorporated into ancillary project-specific efforts to create credits that could be ‘imported’ into the core ETS.



Electricity generation currently accounts for a substantial proportion of greenhouse gas emissions, mainly CO₂. As a 'stationary', centralized source of greenhouse gas emissions which is administered by a limited number of large corporations, it is also a sector whose emissions are relatively easy to quantify, monitor and document. The industry is undergoing major commercial restructuring and has recently established the National Electricity Market Management Company (NEMMCO), a body that would be well placed to monitor an ETS.

In addition, the electricity industry is already scrutinizing and acting on its greenhouse gas emissions through both the introduction of Green Power schemes and via the Federal 2% Renewables Mandate (PM's Statement, Nov 97). Activities such as these are important as they represent many of the 'emission saving activities' which will be needed and 'traded' in an ETS. Thus, the electricity sector is a crucial player in 'kick starting' a viable domestic market for Australian renewable energy technologies.

Links to other policies and objectives

An ETS should be constructed so as to compliment other policy measures (such as the 2% renewables target) and market measures already underway (such as Green Power Schemes).

One of the stated intents of the "2% Renewables Target" is to promote the Australian renewable energy industry. The success of this industry will form the basis of Australia's ability to create a niche in the world renewable energy scene as the industry grows and export potential increases. The potential of the Australian renewable energy industry will depend on whether the export of small scale systems to 3rd world villages (a potential market much bigger than anything in Australia) can be increased and perhaps considered to be part of the 2% target. This would be analogous to participation in a Clean Development Mechanism project under the Kyoto Agreement. If CO₂ credits created via the 2% target are traded across States as part of an ETS they will also feed into any international ETS that Australia eventually takes part in.

Green Power – the new renewable energy ‘product’ being offered to customers at a premium by 12 Australian electricity utilities - allows consumers to make an environmental choice about the kind of electricity they use. Green Power projects and promotions make renewable energy ‘visible’ to the average consumer, especially if the marketing of these products is done widely and well. Utilities gain experience in the grid-connected application of renewable technologies, which can be a major factor in creating company acceptance. Green Power can also be a means for utilities to reduce their emissions and create CO2 credits within an ETS framework.

Just over a year ago, Australian utility interest in Green Power was limited to a localised market trial being carried out by a single electricity retailer. Now Australia has one of the highest concentrations of Green Power products on offer anywhere in the world and is attracting international attention for the development of the accreditation process. Any ETS must ensure that it is compatible with Green Power Schemes.

The Green Power market has already had an impact on the number of major new renewable energy projects commissioned, under construction or committed. New projects include the 0.6 MW wind turbine in Newcastle, the 5 MW wind farm at Crookwell, 200 kW solar PVs in Singleton and two 50 kW PV systems in Dubbo and Queanbeyan of NSW. In addition another 30 - 50 MW of new wind, non-flooding hydro and biomass projects are currently in the planning stages.

Reducing CO2 in the electricity sector

The ultimate aim of the Kyoto Protocol and of an ETS is to reduce greenhouse gases. Focusing on the electricity sector, there would seem to be three main ways to do this:

- generate electricity from renewable energy sources to produce no - emission ‘green electrons’ (e.g. wind, solar, biomass, hydro, tidal)

In some instances renewable energy sources can provide a multiple benefit to society. For example, the planting of eucalyptus oil mallee (See Appendix B) can provide a short term biomass energy crop, a long term carbon sequestration mechanism, a groundwater salinity control mechanism, a degreasing solvent – plus create jobs and local income.

- ‘displace electricity’ – reduce the need for electricity by promoting energy efficiency (through energy efficient appliances and building design) and technologies which provide direct heat (e.g. solar hot water, gas heating and cooking)

For example, an energy efficient fridge that saves 400kWh per year for 15 years could be estimated to save 6 tonnes of CO2 in its lifetime. If CO2 emissions were worth \$9/tonne

this would be equal \$54 in any ETS. This would be a worthwhile incentive for any manufacturer.

- sequester carbon – create or maintain greenhouse gas ‘sinks’ (e.g. tree planting, reducing land clearing)

All of these approaches are valid and could be the means by which electricity utilities create excess credits for sale into an ETS. However, there are different issues associated with monitoring and measuring the ‘CO2 equivalent’ of greenhouse gas savings generated.

For example, the emissions saved via tree planting or reducing land clearing are subject to greater methodological uncertainty and the activity is dispersed among many farmers and landholders, rather than undertaken by large corporations. It may be advisable to issue permits to an aggregated grouping such as State Governments, who would then be responsible for estimating the net sinks vs. emissions.

With respect to energy efficiency, the real question will be how to make the inclusion of energy efficiency administratively efficient and valid in terms of CO2 savings. For example, it would be necessary to limit participation to appliance categories that have put in place Minimum Energy Performance Standards (“5 Star Energy Labeling Schemes”) for their product.

Energy efficiency is very effective in reducing energy use. Companies participating in the SEDA-sponsored ‘Energy Smart Companies’ program have delivered an average internal rate of return on their energy efficiency investments of 41%, twice the authorities guaranteed 20% minimum rate. In 1994, a consortium of US utilities actually contributed \$US30m to the development of an energy efficient fridge via the ‘Golden Carrot’ competition. These utilities recognized the savings they would make from delaying (or negating the need for) costly new power plants that would result from energy efficiency on the part of their customers.

A mechanism needs to be put in place so that manufacturers of energy efficiency appliances can claim credits up front based on an estimate of standard equipment life and energy use. As the failure to take up energy efficiency is indicative of market failure there is also scope for putting in place complimentary programs to correct this situation.

With respect to renewable energy, the CO2 savings would be calculated relative to the fossil fuel electricity replaced and would depend on the parameters of particular installations and estimated or actual output. For

equipment which replaces electricity directly (such as solar hot water systems) an approach similar to that for energy-efficient appliances could be used: estimate the CO₂ savings over a product's lifetime, taking into account factors such as climate and whether natural gas was available.

It is often suggested that tree planting for sequestration and sink creation may be taken up as an easy, cheap 'solution' to the build up of atmospheric CO₂ - and that this will result in delaying investment in renewable energy and energy efficiency. Any ETS - and related policy and program measures - should ensure that sequestration, energy efficiency and reduction of actual emission are all developed in a complimentary and parallel fashion. This will ensure that Australia is in a good position to take advantage of all the commercial opportunities that will result from greenhouse gas reduction efforts on the international scene.

Summary

- Start Australian ETS pilot soon - GERT or USA SO₂ model
- ETS based on 'cap and trade' system
- Start with CO₂ from electricity generation
- Include in ETS the three ways to reduce CO₂ from electricity sector
 1. renewable electricity generation
 2. energy efficiency / displace electricity
 3. sequester
- Include other sectors and greenhouse gas emissions as they become measurable
- Include carbon sequestration / 'sinks' as they become measurable
- ETS must compliment and be integrated with other policies and market activities, e.g. 2% Renewables Target and Green Power

Dr. Odile Pouliquen-Young
Institute for Science and Technology Policy, Murdoch University,
Perth

The question I would like to address is about what regulations can insure that greenhouse credits through planting are effective and lasting.

I am currently studying the impacts that climate change will have on the native fauna and flora of Western Australia. So far we have been using the CSIRO Division of Atmospheric Research climate change model DARLAM and looked at the impacts of temperature increases and rainfall variations on the distribution of 92 species of a plant genus endemic to the South-West of the state.

The results of the research are indicating that climate change will have a devastating effect on this genus, the impact being proportional to the global temperature increases chosen. Species with a small current distribution disappear at the lowest temperature increase, while all species suffer a contraction in their distribution. Most species will have to move south to 'track' their favourable climate.

Planting trees is considered by many to be a valid trading mechanism to offset greenhouse gas emissions from other industry sectors, other states or other countries. Issues regarding trading emissions mechanisms arise from this research. I will concentrate on long-term planting, where the trees are not harvested.

Any trading regulation considering long-term planting of trees will have to consider climate change impacts on species and ecosystems, as well as the length of time over which carbon sequestration is measured, and the benefits for other landscape-based activities such as salinity control and biodiversity conservation.

INQUIRY INTO THE REGULATORY ARRANGEMENTS FOR
TRADING IN GREENHOUSE GAS EMISSIONS

Submission from Associate Professor Allan Barton, Murdoch
University

- This submission addresses carbon credits trading, and in particular the additional national benefits that are possible for Australia
- For the foreseeable future the industrialised world will not be able to avoid converting fossil fuel carbon into carbon dioxide
- While technologies may be developed in the future to sequester carbon by chemical and/or physical means, currently tree-planting is currently the only practicable method to take up significant quantities of carbon dioxide from future (and possibly, eventually past) fossil fuel burning
- The effective carbon storage time associated with tree planting is variable, so trading legislation should accommodate this
(Trees can act either as long-term sinks to sequester carbon dioxide generated from fossil fuels, or as short rotation crops of renewable biomass used as alternatives to fossil fuels)
- Trading regulations should ensure that carbon credit plantings and international trading of carbon credits will provide Australia with real and lasting benefits
(For example, trading regulations should encourage offset tree plantations or crops in Australia, not overseas)
- Australia's coal export industry should be enabled to offer overseas customers offsetting carbon credits from Australian tree plantings as a commercial trading incentive
- Carbon credit trading can provide finance for projects that might not otherwise proceed, for example:
 - to establish land care tree planting programmes (eg salinity control)
 - to establish secondary industries, such as leaf oil for pharmaceutical and industrial chemicals, where the main purpose is either carbon sink or renewable biomass.
- The trading regulations should be sufficiently flexible to accommodate complex outcomes.

As a case study, the planting of eucalyptus oil mallee provides simultaneously

- a short rotation (2 years) biomass energy crop
- a long term (hundreds of years) lignotuber carbon sequestration mechanism
- a groundwater salinity control mechanism
- a degreasing solvent from the leaf oil that is a substitute for petroleum-based solvent.

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