EMISSIONS TRADING: DESIGNING AN EFFECTIVE, EFFICIENT AND EQUITABLE DOMESTIC SYSTEM

INTRODUCTION

On 29 April 1998, the Commonwealth government signed the Kyoto Protocol, and in so doing, committed to reducing Australia's greenhouse gas ("GHG') emissions by an estimated 35% from business-as-usual ("BAU") growth during the period 2008 to 2012[1]. The Protocol commitment poses a significant challenge for regulators, namely how, in a climate of great political, legal and scientific uncertainty, to mitigate the economic cost, structural adjustment pressures and trade competitiveness impacts the Protocol commitment will generate, whilst capturing the new market opportunities it presents[2]. The Commonwealth government responded to the challenge by implementing a comprehensive suite of domestic policies (predominantly voluntary industry agreements, regulations and information-based strategies) targeted at achieving net GHG emission reductions in many different sectors of the economy[3], and to that end is actively evaluating emissions trading ("ET") as a potentially low-cost regulatory instrument.

Economic theory and a rapidly expanding volume of international and national modelling suggests that a mandatory domestic emissions trading system ("ETS") integrated with international emissions trading ("IET") has the potential to provide the flexibility needed to help Australia achieve its Protocol commitment at the lowest economy-wide cost[4].

---

[1] Prime Minister's Science, Engineering and Innovation Council Work Group, *From Defence to Attack: Australia's Response to the Greenhouse Effect*, 25 June 1999, p 2.

[2] The Australian GHG emission abatement market is estimated at US$7 billion, growing at 4.1% annually, ibid p 7, quoting Quinn, J.B. and Quinn, J., "Growth Opportunities from Environmental Improvement" a paper presented to the 1999 Forum on Sustainable Development, 27 May 1999, Canberra, p 34.

[3] For example, the Greenhouse Challenge program; Greenhouse Gas Abatement Program; new efficiency standards for fossil fuel electricity generators; the Commonwealth assessment of proposed developments that would produce more than 500,000 tonnes of CO_{2e} annually, under *Environment Protection and Biodiversity Conservation Act 2000* (Cth); the mandatory legislative requirement that electricity retailers source an extra 2% of their demand from renewable or waste product energy sources from 2010 - and the associated Renewable Energy Certificates trading scheme; National Greenhouse Gas Inventory; Commonwealth funding of A$387 million funding for the renewable energy industry (covering power sources including solar, hydro, wind, biomass, tidal, wave, geothermal and renewable hydrogen) over 1998 to 2003; enhancing greenhouse sinks (National Heritage Trust - Bushcare, the National Vegetation Initiative (NVI); National Landcare Program; Farm Forestry Program; Plantations for Australia: The 2020 Vision; Forest Industry Structural Adjustment Package; Bush for Greenhouse; and reducing GHG emissions from agriculture (the Commonwealth has provided the CSIRO with funding for anti-methanogen and rumen modifier research); household energy reduction initiatives; and vehicle fuel efficiency standards.

[4] Bureau of Industry Economics (1992), *Environmental Regulation: the Economics of Tradeable Permits: A Survey of Theory and Practice*, Research Report 42, AGPS, Canberra, OECD, (1998),

This paper examines the central issues associated with the design of a mandatory domestic ETS, in particular:

- its relationship with IET;
- the framework and coverage of a domestic ETS;
- the nature of emission permits and the method of their allocation and acquittal;
- carbon sequestration;
- the monitoring, reporting and verification of GHG emissions;
- enforcement mechanisms; and
- timeframe for introduction,

and advances design options that would optimise the theoretical benefits of ET (namely its potential environmental effectiveness, economic efficiency and continued incentives for technological development) whilst minimising the potential for inequitable distributional impacts.

KYOTO PROTOCOL: BACKGROUND

In response to increasing international concern about the implications of global climate change, at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, 155 countries signed the United Nations Framework Convention on Climate Change ("UNFCCC"), the objective of which is to achieve a stabilisation of GHG concentrations in the atmosphere at a level that will prevent dangerous human-induced interference with the climate system[5].

At the third Conference of the Parties to the UNFCCC ("COP3") held in Kyoto in December 1997, 39 developed countries adopted the Kyoto Protocol, pursuant to which they agreed to reduce their collective GHG emissions by 5.2% of 1990 levels by 2008-2012[6]. In order to achieve this collective objective, each signatory to the Protocol (listed in Annex B of the Protocol) was allocated a differentiated target

---

Lessons from Existing Trading Systems for International Greenhouse Gas Emission Trading, OECD, Paris.

[5] The UNFCCC entered into force on 21 March 1994. The implicit, but not legally binding, aim of the FCCC was to stabilise GHG emissions at 1990 levels, by 2000.

[6] Article 3(1).

(termed its "Assigned Amount") of carbon dioxide equivalent ("CO_{2e})[7] that it may emit on average each year from 2008 to 2012[8]. Under the Protocol, Australia committed to limiting its anthropogenic emissions of GHG to an average of 8% above 1990 levels during the 2008-2012 commitment period[9] (that is, a total of 1945Mt of CO_{2e}, hereafter referred to as the "Protocol commitment").

In recognition of the fact that human action can result in CO_2 being removed from the atmosphere and stored in plant biomass or terrestrial "sinks" (a process referred to as carbon sequestration[10]), the Protocol provides that:

> "*The net changes in greenhouse gas emissions by sources and removals by sinks resulting from direct human-induced land-use change and forestry activities, limited to afforestation, reforestation and deforestation since 1990 measured as*

[7] The GHG covered by the Protocol are carbon dioxide, methane, nitrous oxide, hydroflurocarbons, petroflurocarbons and sulphur hexafluoride (Annex A). Equivalence between the different GHGs is based upon the concept of global warming potential ("GWP") as reflected in Article 5.3 of the Protocol. Carbon dioxide has a GWP of 1 over a 100 year period, whereas greenhouses gases such as methane and hydroflurocarbons are estimated to have 21 and 140-11,700 times the global warming impact of one tonne of carbon dioxide released into the atmosphere, respectively, Australian Greenhouse Office 1999a, *National Emissions Trading: Establishing the Boundaries*, Discussion Paper No.1, Commonwealth of Australia, Canberra, p 5.

[8] The majority of Annex B countries agreed to reduce their emissions by 5% of 1990 levels. NZ and the Ukraine agreed to maintain their emissions at 100%. Iceland, Norway and Australia agreed to an increase. Importantly, whilst the EU agreed to 92% it has an internal burden sharing arrangement which sees countries such as Austria, Denmark Germany, Luxembourg and the UK commit to reductions below 90% and Greece, Portugal, Ireland and Spain agree to increases of 125%, 127%, 113% and 155% respectively. Many developing countries such as China and India and members of ASEAN and OPEC are yet to agree to emission commitments. As yet, there is no agreement on abatement targets beyond the first commitment period.

[9] In accordance with its obligations under the UNFCCC, the Commonwealth Government established the National Greenhouse Gas Inventory ("NGGI") which provides an annual report of national anthropogenic emissions and sinks in accordance with IPCC guidelines. The 1997 NGGI, released in September 1999, provides the latest report on Australia's GHG emissions. The total emissions reported in the NGGI do not represent Australia's performance against the Kyoto Protocol. Guidelines for reporting on the Kyoto Protocol, including the 1990 baseline, are still being negotiated. The National Carbon Accounting System (NCAS) underpins reporting of Australia's GHG emissions for the NGGI and the Kyoto Protocol. The current best estimate of emissions for 1990 in the NGGI of 389 million tonnes, includes 27 million tonnes of removals by sinks offsetting an equivalent amount of the gross emissions, and does not include land clearing emissions.

[10] Carbon can be stored by other means including oceans and soils, but measuring these processes poses greater scientific problems than verifying the amount of carbon stored in forests. The NGGI lists managed forests, vegetation thickening on cleared land and pasture improvement as the major means of CO_2 removal. It is critical that not only net but gross emissions of CO_2 are reduced as CO_2 emissions are essentially irreversible - CO_2 sequestered in trees will be returned to the atmosphere, albeit over a number of decades. Consequently, sinks should only be viewed as temporary storage, Cusack, V. "Perceived Costs versus benefits of meeting the Kyoto target for greenhouse gas emission reduction: the Australian perspective, *Environmental and Planning Law Journal* 16(1) February 1999: 53-62, p 56.

verifiable changes in carbon stocks…[may] be used to meet the commitments" [Article 3(3)]

That is, Annex B countries may use "credits" generated by the removal of GHGs from the atmosphere by sinks to meet their targets.

In order to provide Annex B countries with flexibility in terms of "where", "when" and "how" emissions are reduced and thus lower marginal abatement cost ("MAC") opportunities to meet their Protocol commitments, and in recognition of the fact that any GHG emission reduction, regardless of its location, contributes to mitigating the problem of global warming[11], the Protocol provides that, as a supplement to domestic GHG abatement measures, Annex B countries may use the following "flexibility mechanisms" in order to fulfil their Protocol commitment:

1. **Joint Implementation ("JI") -** enables an Annex B country to acquire emission reduction credits from another Annex B country in which it undertakes a specific project aimed at reducing net GHG emissions[12].

2. **Clean Development Mechanism ("CDM") -** provides that Annex B countries may acquire certified emission reduction credits by undertaking specific projects which reduce GHG emissions in non-Annex B countries[13]. A recent report by ABARE stated that there is scope for developing countries to generate emission credits worth up to US$7.1 billion over 10 years under the CDM with technology transfer in the electricity sector alone[14].

[11] CO_2 remains in the atmosphere for between 50 to 200 years and can migrate globally within two years. Thus the origin of emissions makes little difference to the greenhouse effect, Australian Bureau of Agricultural and Research Economics, (1998), *Emissions Trading: Proceedings of the International Conference on Greenhouse Gas Emissions Trading*, Sydney, 21-22 May 1998, ABARE, Canberra, Haites, E. "Optimal Policy Design".

[12] Article 6. For example, in June this year, TransAlta Corp, a Canadian fossil fuel electricity generator announced that it had entered into a hedging contract with Germany's Hamburgische Electricitaets-Werke (HEW) under which it will finance HEW to build new wind powered generators in Germany and then purchase 21,000 tonnes of CO2e reductions generated by the renewable energy over the next seven years. TransAlta is financing actual emissions reductions (ie paying HEW to produce green energy) in Germany in the hope that it will be cheaper than cutting emissions at its own plants in Canada, in Planet Ark, 19 June 2000.

[13] Article 12(3). Importantly, Article 12(10) of the Protocol encourages early abatement action by providing that credits earned from CMD projects from 2000 onwards may be used by Annex B countries in meeting their commitments in the first commitment period.

[14] Plane Ark, 7 June 2000.

3. Emissions trading

Article 17 of the Protocol provides:

"*The Conference of the parties shall define the relevant principles, modalities, rules and guidelines, in particular for verification, reporting and accountability for emissions trading. The [Annex B parties] may participate in emissions trading for the purpose of fulfilling their commitments under Article 3*."

The Protocol took two key steps towards the development of an IET market. The first was to define a cap for aggregate emissions from Annex B countries and the time frame over which the cap will operate (which largely defines the environmental objective of the Protocol). The second was to divide the cap into country targets (which effectively sets the initial allocation of permits among Annex B parties and provides the incentive to implement an ETS in which the value of those permits can be realised). ET alone is projected to reduce the aggregate economic cost to Annex B countries of meeting their Protocol targets by 80% and for Australia by 20%[15].

Whilst the right of Annex B countries to use the above measures for the purpose of fulfilling their abatement commitment is enshrined in the Protocol, the principles, modalities, rules and guidelines necessary for their implementation are currently being negotiated, with the aim being to reach agreement by COP-6 in the Hague in November 2000. Current negotiations are focussed on operationalising the following elements of the Protocol, however, divergent views have emerged[16]:

- definitional and operational issues concerning sinks[17];

[15] Hillman, R. Australian Ambassador for the Environment, "*Climate Change and Emissions Trading: Implementing the Kyoto Protocol – An Update on International Negotiations*", speech to the Committee for Economic Development in Australia, Sydney 6 July 1999. Predictions of permit prices are highly uncertain - if the initial price is around A$30 per tonne of $C0_{2\text{-}e}$ as some predict, Australia's Assigned Amount would be worth an estimated A$60 billion. The net cost of GHG abatement to the economy is likely to be a fraction (10-30%) of that cost, thus it would be less expensive to adopt abatement measures to meet the Protocol target than to purchase permits from other Annex B countries to cover all Australian emissions, op cit n 1, p 4.

[16] Diverging negotiating positions are broadly represented by the views of three groups; the Umbrella Group (comprising Australia, NZ, Canada, US, Japan, Russia Federation, Ukraine, Norway and Iceland), the European Union; and the Group of 77 and China (representing the broad interests of developing countries), op cit n 15.

[17] Article 3(4). Progress on sinks was attendant upon the completion of the Intergovernmental Panel on Climate Change special report on Land Use, Land-Use Change and Forestry ("LULUCF") due in May

- the establishment of rules for the implementation of the CMD, JI and most importantly, ET[18];
- compliance with the Protocol and the consequences of a Party failing to meet its targets; and
- developing country participation[19].

The negotiation of rules in respect of these issues is not a simple legal or technical exercise. Rather, as the outcome will have profound international economic, social and environmental distributional impacts, they are politically charged. Agreement is some way off, but is critical for the entry into force of Protocol, which will only occur when at least 55 parties to the UNFCCC (representing a minimum of 55% of total Annex 1 countries' CO_2 emissions for 1990) ratify the Protocol[20].

PROTOCOL COMMITMENT: THE CHALLENGE AHEAD

Australia's Protocol commitment presents a formidable challenge, as it is estimated that it will require a reduction of approximately 35% or 135 million tonnes of CO_{2e}, from "business as usual" growth by 2010[21]. Whilst Australia only contributes 1.5% of global GHG emissions, its per capita emissions are among the highest in the world[22], reflecting Australia's particular national circumstances, namely:

2000. The EU and some developing countries are seeking a limit to which countries can use sinks to meet their targets on the basis that reducing energy consumption is the only legitimate form of GHG abatement.

[18] The EU is insisting on the principle of supplementarity. That is, that CMD, JI and ET be supplementary to domestic action and thus subject to a concrete ceiling. The EU argues that uncapped ET will allow the US to avoid domestic measures and obtain a competitive advantage by meeting the costs of its targets with credits purchased from Russia (which are expected to be available due to the decline in the Russian economy since the 1990 base year). The Umbrella Group is arguing for uncapped IET, op cit n 15.

[19] This issue is intractable and central to the entry into force of the Protocol due to the US's stance that ratification is conditional upon "meaningful participation" by developing countries. It is also central to the environmental effectiveness of ET as it is estimated that by 2020 developing countries emissions will exceed those of developed countries, op cit n 11, p 38.

[20] To date no Annex B country has ratified the Protocol. The US accounts for approximately 38% of the developed world's emissions, thus it is unlikely that the Protocol will come into force without their ratification, providing the US with a power of veto and maximum leverage for negotiations at COP6, op cit n 10, p 54.

[21] In the absence of domestic abatement measures, Australian Greenhouse Office 1999d, *National Emissions Trading: Designing the Market,* Discussion Paper No.4, Commonwealth of Australia, Canberra, p 25. PM Council, p 2. To put the figure in perspective, eliminating all Australian road transport including private cars would achieve a reduction of 60 million tonnes of CO_{2e},op cit n 1.

[22] Ibid, p 9.

- a high dependence on fossil fuels for transport (exacerbated by a decentralised population and preponderance of road over rail transport) and energy production;
- a high proportion of energy intensive industries[23];
- a high proportion of emissions from methane and nitrous oxide[24] and land clearing compared with other Annex B parties;
- that major exports are based on energy intensive products (Australia exports more of its goods to developing countries than any other Annex B country, other than Japan[25]), which also illustrates Australia's particular vulnerability to trade competitiveness issues; and
- a relatively small number of emitters and industries generating a large proportion of national emissions. As at 1 July 1999, the 182 businesses participating in the Greenhouse Challenge program accounted for 25% of national emissions[26].

On current projections, GHG emissions are expected to be 10% to 12% above the Protocol commitment by 2010 due to increased emissions from the electricity and transport sectors[27].

The Commonwealth Government responded to the challenge of meeting its Protocol commitment by implementing a raft of complimentary regulatory instruments aimed at reducing net GHG emissions. However, whilst comprehensive, these measures are unlikely to generate the required level of GHG emission abatement. In recognition of that fact, the Commonwealth Government requested the Australian Greenhouse Office ("AGO"), its lead greenhouse agency, to consider the feasibility and

[23] Many of which, such as the aluminium industry are already operating at the best practice end of the spectrum and have limited, if any, cheap opportunities for emissions abatement.
[24] The agricultural sector contributed around 20% of Australia's net GHS emissions in 1996 (being mainly methane from the digestive systems of cattle and sheep and nitrous oxide from soils),National Greenhouse Gas Inventory Committee, (1999), *National Greenhouse Gas Inventory 1997*, Commonwealth of Australia, Canberra.
[25] Op cit n 11, p 4, McDonald, M., Australian Ambassador for the Environment, *The International Emissions Trading System: Australia's Perspective*.
[26] Op cit n 25. The Greenhouse Challenge is estimated to cover: 100% of emissions from aluminium and concrete production; 98% of emissions from oil and gas extraction; 97% of emissions from electricity generation and distribution; and 97% of emissions from coal mining activities. Coverage in downstream energy-using industries is generally less comprehensive.
[27] Ms Gwen Andrews, Chief Executive of the AGO, Planet Ark, 22 March 2000.

implications of implementing a domestic ETS. Over the past two years, the AGO has, in consultation with a wide range of industry groups, prepared four invaluable discussion papers examining the issues associated with introducing a domestic ETS[28].

TRADEABLE PERMIT SCHEMES: THEORY AND PRACTICE

Tradeable permit schemes ("TPSs"), like other so called "market-based", "economic" or "financial incentive" regulatory instruments, operate by aligning the financial incentives of companies with the government's environmental goal. That is, they provide an economic rationale for compliance.

TPSs have been used to address a variety of domestic environmental problems in many countries in the last 20 years with considerable success[29]. Typically, under such a scheme, a maximum aggregate level of pollution is set below BAU projections (the environmental goal of the policy instrument) and permits equal to that "cap" made available to polluters, who in turn, must acquit (ie retire) sufficient permits to cover their actual emissions. Demand and polluters' differing marginal abatement costs ("MACs") create an automatic market for permits and thus permit price. For polluters whose MAC is higher than the market price for permits, it is cheaper to buy additional permits (rather than invest in pollution abatement measures), whereas for entities with lower MACs, it is cheaper to cut emissions (rather than pay for additional permits) and in doing so, gain a competitive cost advantage. By giving polluters the opportunity to trade emission permits, abatement is undertaken by those who can do so at the lowest cost, thereby minimising the total economy-wide cost of achieving a given level of pollution abatement.

The "theoretical" strengths (and practical limitations) of a properly designed ETS over other regulatory instruments such as "command and control" regulations or carbon

---

[28] Op cit nn 7, 21, AGO 1999b, *National Emissions Trading: Issuing the Permits*, Discussion Paper No.2, AGO 1999c, *National Emissions Trading: Crediting the Carbon*, Discussion Paper No.3, Commonwealth of Australia, Canberra.

[29] Op cit n 11, p 12, Beil, S., Fisher, B. S., Hinchy, M. *The Economics of International Trading in Greenhouse Gas Emissions: Some Post Kyoto Issues*. USA: Clean Air Act Emissions Trading Policy issued in 1982 allows the trading of emission reduction credits ("ERCs"), namely surplus emission reductions achieved beyond baseline emission levels, and allows "offsets", "netting" and "banking"; USA: Oxygenated Gasoline Program and Low Emission Vehicle Credit program; Australia: NSW, SA and Victorian Murray Darling Basin Salinity and Drainage Strategy; and Germany's "TA Luft"

taxes are the subject of extensive academic literature[30], and for that reason, I do not propose to canvass the issues in detail, other than to set out a brief summary below:

1. Environmentally effective

An ETS guarantees the achievement of the desired environmental goal, as the regulatory authority controls the number of permits made available, and in so doing, aggregate emissions (provided the ETS is adequately enforced). An ETS enables an environmental target to be achieved with speed, and provides policy makers with relative flexibility to respond to changes in scientific knowledge, economic conditions and adjustment pressures experienced by different sectors of the economy (by adjusting the number of permits released into the market).

2. Economically effective

The principal attraction of an ETS is that it is a potentially low cost policy instrument: both in terms of industry-wide abatement costs and the administrative cost to regulators. Unlike direct regulatory intervention, a properly designed ETS provides emitters with the flexibility to determine their own least cost compliance strategy (that is, how, where and when[31] to reduce emissions), and in so doing, minimises the social cost of achieving a given level of pollution reduction. The efficiency gains under any ETS will depend upon the extent to which the ET market approaches the "perfect market" of neoclassical theory in which emitters have access to perfect information and adopt profit maximising behaviour by setting their MACs equal to the price of a permit. However, experience gained from other TPSs shows that an ET market is unlikely to be perfect: transaction costs may be prohibitive and create significant market distortions and emitters may not act in economically rational way due to:

Scheme, OECD, (1994), *Managing the Environment: The Role of Economic Instruments*, OECD, Paris, p 89.

[30] Op cit 29, p 11, Stavins, R. and Whitehed, B. "Market-based environmental policies" in Chertow and Esty, D. (eds) *Thinking Ecologically*, Yale University Press (1998), Pearce K and Turner K, (1990) *Economics of Natural Resources and the Environment*, Harvester Wheatsheaf, London.

[31] Each emitter will have a least cost path to reducing GHG emissions due to differences in their capital stock, production practices and commercial opportunities.

- ignorance - lack of information on: the energy efficiency of their production processes and products; and the availability of abatement equipment and alternative energy sources; or
- inertia - emitters may be unable to invest in energy efficiency equipment due to high discount rates (planning for the turnover of capital stock may take decades) and opportunity costs. Unless permit fees (in the case of emitters subject to an ETS) and energy costs (in the case of consumers) are a sufficiently large component of total expenditure, emission reduction may not be prioritised as an area of cost minimisation.

3. Technological Innovation

Unlike regulations, an ETS is "technology forcing"[32], that is, it provides continuous financial incentives for emitters to adopt technological and process driven innovations to reduce their net GHG emissions. The Protocol has created a business environment in which new industries (new and renewable energy[33]. and carbon sequestration), markets (GHG assessment and monitoring services), and technologies (GHG emission abatement equipment) can flourish, The rate of investment will accelerate with rising permit prices.

4. Acceptability

ET is concordant with dominant policy principles such as the Polluter and User Pays Principle, free market economics (ET is perceived as more libertarian than regulation or carbon taxes and hence may be more politically acceptable to industry) and free trade liberalisation, however, there are significant concerns about the national and international distributional impacts of an ETS and its effects on Australia's trade competitiveness.

Given the significant theoretical potential of ET, the challenge is to design a domestic ETS and market conditions that will come as close as possible to living up to the theoretical model.

---

[32] Jacobs, M. *The Green Economy*, Pluto Press (1992), p 154.

[33] In the renewable energy sector alone, the new market opportunities in Australia are estimated to be between A$2-4 billion over the period to 2010, op cit n 1.

A DOMESTIC ETS: CENTRAL DESIGN ISSUES

Prior to any consideration of the central issues involved in designing an effective, efficient and equitable domestic ETS, and the assessment of design options, it is critical to bear in mind that:

- it is the Protocol commitment, not ET per se, that will restrict economic growth in Australia by an estimated 0.2% to 0.6% of GDP annually[34], force major structural adjustment and raise "hot air"[35], "free rider" and "carbon leakage" [36] problems. The challenge is to design an ETS that to the extent possible, mitigates these problems and thus is more politically acceptable to target groups who will have to cooperate in its implementation.
- a domestic ETS would only be one (albeit it a major plank) of a comprehensive set of GHG emission reduction policies being pursued by the Commonwealth Government to meet its Protocol commitment.

As a starting point for examining design options for a domestic ETS, the AGO proposed nine principles to underpin the objectives of a national ETS, which in summary emphasise the need for an ETS to help achieve compliance with Australia's Protocol commitment in a way that is cost-effective, equitable, timely and in the national interest, recognising uncertainties, the disparate costs, opportunities and adjustment pressures industries will face as a result of emission constraints and the potential impact upon international competitiveness[37].

As previously stated, the principal attraction of an ETS is that it has the potential to assist Australia achieve its Protocol commitment at the lowest economic and social

[34] Op cit n 28, p 15.
[35] Refers to the fact that many countries' Assigned Amounts are inflated. For example, the Ukraine and Russia's GHG emissions are currently at least 30% below their 1990 levels (due to a decline in economic activity), which could lead to a large surplus in permits, thereby compromising the environmental effectiveness of the Protocol and delaying "real" emission reductions. It is important to note that Australia negotiated the inclusion of land clearing in its 1990 baseline (which in 1990 accounted for 25-30% of overall emissions). By 1995, land clearing decreased by 33% from 1990 levels and continues to decline, thus conferring upon Australia an inflated baseline, op cit 10, p 55.
[36] As previously stated, many of Australia's trading competitors are based in non-Annex B countries. The Protocol does not provide for GHG emission reduction commitments by developing countries, consequently the Protocol may result in an expansion of the output of less efficient producers in such countries – phenomenon referred to as carbon leakage.
[37] Op cit n 21, p 9.

cost. For that reason, it is essential that any ETS be designed so as to realise its full economic efficiency potential by:

- minimising transaction costs for participants through cost-effective design of GHG emission monitoring and reporting requirements and simple, transparent and certain trading rules that as far as possible rely on existing legal, administrative and market structures which are familiar to participants and which require minimal government interference in the market;
- creating market confidence through credible verification and enforcement provisions (which are also vital to the environmental effectiveness of an ETS);
- minimising participants' ability to exercise anti-competitive behaviour; and
- providing participants with information (on new abatement technology and future ET policy) to assist them make economically rational strategic emission reduction decisions.

In order to be political acceptable, the risks and costs associated with ET must be distributed equitably across society[38] and an ETS must be transparent. That is, participants must have a clear understanding of the rationale for its introduction and of the environmental purpose to be served. It is also important that an ETS is designed so as to preserve the maximum flexibility of government to respond to changes in scientific knowledge and structural adjustment pressures.

The Relationship between a Domestic ETS and International Emissions Trading

As a starting point, it is important that a distinction be made between the implementation of a domestic ETS and international emissions trading ("IET") (discussion of the latter being beyond the scope of this paper).

The national government of each Annex B country is responsible for ensuring that its aggregate emissions do not exceed its Assigned Amount, and for that purpose, may decide:

1. to adopt purely domestic GHG abatement policies (such as a carbon tax) in order to meet its commitment under the Protocol, and not engage in IET with other Annex B countries. One policy instrument that may be adopted is a *closed*

[38] Op cit n 32, p 152.

domestic ETS established under national law, pursuant to which the national government may distribute its Assigned Amount (or part thereof) as emission permits to domestic emitters and restrict trade in those permits to within national borders;

2. to itself engage in IET[39] in addition to implementing domestic emission abatement regulatory instruments;
3. to enact domestic legislation mandating emitters of GHG (from specified industries or activities) within its national boarders to acquit permits sufficient to cover their emissions, but recognising permits obtained on the international market for that purpose (ie a *domestic ETS open to the IET market*). Under this scenario, the national government would release part of its Assigned Amount as emission permits onto the domestic market and allow the holders of those permits (private and public corporations) to trade them on both domestic and international markets. The national government would, in effect, be authorising the private sector to engage in IET on its behalf[40]. By applying a limit on the number of permits issued (up to its Assigned Amount) and requiring that permits be acquitted to cover emissions, the government could effectively limit the amount of GHG emissions in its jurisdiction.

Given the benefits of ET discussed above, interest from the Commonwealth and State governments in ET as a mechanism to assist Australia achieve its Protocol target is strong and has been steadily growing in recent years[41]. It is implicit from the ET discussion papers prepared by the AGO, that in order to fully capitalise on the efficiency benefits associated with ET, the Commonwealth Government favours

[39] The national governments of Annex B countries may voluntarily choose to participate in IET by: (a) purchasing part of the Assigned Amount of another Annex B country, if their countries' projected emissions are likely to exceed their Assigned Amount, or selling part of their Assigned Amount to another Annex B country if their countries' projected emissions are below their Protocol target; (b) acquiring or transferring emission reduction credits associated with JI; or (c) acquiring or transferring certified emission reduction units associated with CMD projects.

[40] The Protocol recognises the potentially important role of the private sector by expressly providing that the national government of each Annex B country may authorise legal entities to participate under its responsibility, in the generation, transfer or acquisition of emission reduction units under JI and CMD, Articles 6(3) and 12(9) respectively. Thus the players in the IET market are likely to be both national governments and private sector traders. It is widely accepted that as the private sector has experience in trading and is best informed about abatement costs, they would be more efficient agents in an ETS than governments.

[41] ET has strong in principle support not only from the Commonwealth, but also several States including NSW and WA.

adopting the third policy approach of establishing a domestically administered, internationally integrated ETS, and conferring on private sector agents authority to act on its behalf in IET.

Integration of Australia's domestic ETS with the IET market is essential in ensuring that the economy-wide costs of meeting the Protocol commitment are minimised, as participation in IET would provide market depth, minimise transaction costs and provide Australian industry with access to the widest range of low cost abatement opportunities[42]. In order for seamless integration to occur, a domestic ETS would need to automatically recognise permits that may have originated from one of five possible sources:

1. emission permits issued by the Commonwealth government from its Assigned Amount;
2. emission permits issued by another Annex B country from its Assigned Amount and acquired by entities operating in Australia through IET;
3. certified credits issued by the Commonwealth government to owners of the rights to sequestered carbon. The number of permits issued in respect of sequestered carbon would be unlimited;
4. certified credits from JI projects undertaken by investors (public or private) in Annex B countries. Permits would be issued by the host country from sequestration credits or from their Assigned Amount and may be acquired by entities operating in Australia; or
5. certified credits from CDM projects undertaken by investors (public or private) in non-Annex B countries.

The most important issue in designing an efficient domestic ETS is to ensure that it is fully compatible with the "*relevant principles, modalities, rules and guidelines, in particular for verification, reporting and accountability*" for IET to be developed under the Protocol (the acceptance of which will be a condition of participation in IET

[42] The recognition by a national ETS of permits created by sequestration, JI and CMD would result in a number of dividends: trading would improve the environmental effectiveness of the Protocol as the extent of carbon leakage would be reduced; at an international level, the overall cost of meeting the collective reductions would be minimised thus leading to greater certainty that that the Protocol will be implemented in full; and at an international level, the disparity in the differential impacts of Annex B abatement policies on non-Annex B countries would be reduced leading to a more equitable outcome for those countries.

market). The fact that rules for IET will not be finalised until COP 6 in November this year at the earliest, provides no justification for stalling debate on issues associated with the design of a domestic ETS. However, as discussed below, it does have implications for the timing of the introduction of an ETS and its ultimate form.

The Nature of Emission Permits

Under a domestic ETS, a tradeable unit or "emission permit" would constitute a authority or licence to emit one tonne of CO_{2e} on a one-off basis anywhere in the world, and would be freely transferable within and across national borders. Consistent with the rules of the Protocol, a permit would have an indefinite lifespan and could be used at any time during the first commitment period or "banked" for acquittal in any subsequent commitment period[43]. Permits would be unlikely to exist on paper, rather like CHESS traded securities, they would exist in electronic form as unique serialised units. In this way, the national and international trading and tracing of permits could be facilitated through computerisation and the internet and take place simultaneously, thereby improving transaction efficiency and promoting compliance.

It is critical to the effective functioning of an ETS that emitters are given as much certainty and security as possible about the legal status of permits and the rights and obligations associated trading under the ETS, both during the first commitment period and beyond. Such conditions would facilitate investor confidence in the ET market and the development of robust forward permit markets whereby emitters could "insure" themselves against the risks of future adverse price variations in permits by entering into hedging contracts (futures contracts on permits and options on futures). A robust futures market in permits would:

- assist in spreading risk[44];
- facilitate efficient investment planning; and
- play an important role in price discovery[45].

[43] Article 3(13) of the Protocol allows Annex B countries to bank any surplus of their Assigned Amount for a subsequent commitment period . The fact that the total number of permits available is limited means that it is unnecessary to limit the duration of permits.

[44] Decisions to install abatement technology, sink enhancement activities and R&D are all risky activities. Derivative markets would allow the spreading of risk beyond those involved in abatement to the broader permit market, thereby stimulating more abatement activity.

[45] Hedging contracts would provide an indication of the future value and availability of the commodity.

The creation of valuable property rights (that is, a right to emit a specific quantity of GHG) where none existed before (previously the environmental and social impacts of GHG emissions into a communally owned resource were reciprocal externalities) and the initial vesting of those rights in the Commonwealth, raises the critical policy issue about the method of allocation of permits. The method of allocation adopted, IET liability rules[46] and the framework of the ETS will be largely determinative of the property status of emissions. If emitters are required to purchase permits, permits should confer upon the holder comprehensive rights of ownership including the right to compensation in certain circumstances the event that permits are summarily repossessed by the Commonwealth[47].

Framework of ETS

The framework of a domestic ETS should be based upon a cap and trade model, under which a defined amount of permits are released into the market for trading and emitters are required to hold permits equal to the volume of CO_2e emissions for which they are responsible. However, some proponents have strongly argued for a baseline-credit model to form the basis of a domestic ETS[48], under which each industry, participant, or even individual plant would be allocated a pre-determined emission baseline (namely a schedule of declining allowable emissions over the first commitment period which was below BAU) based upon assumptions about their projected emissions. If a participant reduced their emissions below the baseline, they could sell the unused portion of their profile (referred to as "emissions credits") to other participants in the market. Proponents of a baseline-credit model argue that it

[46] One issue yet to be resolved at an international level is that of liability or allocation of risk where emission permits sold by an Annex B country are subsequently found to be in non-compliance with the Protocol. Issuer liability would have the party which issues the permit bear the responsibility for finding other means to meet its target if it is found to be out of compliance – the permit remains valid in the hands of the buyer. Buyer liability would mean the buyer would be unable to use permits to meet its target if the party that issued the permits was out of compliance. In this case, the price of permits would reflect the risks associated with their issuer's assessed capability to meet their target. There are a range of possible mixed approaches.

[47] Section 51(xxxi) of the Constitution provides that the Commonwealth may only acquire property if it provides compensation on "just terms". Importantly, if the initial allocation of permits is conservative, the right to compensation should not be excluded as the government would not need to repossess or reallocate permits. In ETSs where permits are grandfathered such as the US's SO_2 trading system, permits are expressly stated not to constitute a property right and can be rescinded without compensation by the government, op cit 4.

[48] Arguing that it would complement existing programs such as the Greenhouse Challenge, op cit n 21.

focuses more attention on investment in emission reduction technologies and activities than a cap and trade ETS.

A baseline-credit model is not a desirable framework for a domestic ETS as:

- it is inconsistent with the cap and trade approach of the Protocol;
- determination of individual baselines in a way that reflected future emission requirements and adjustment pressures yet, in aggregate, summed to Australia's Assigned Amount would involve unnecessary layers of administrative complexity and cost, bureaucratic intervention and arbitrary decision-making and would be inherently more uncertain than a cap and trade approach. Accordingly, the potential for overrunning Australia's Assigned Amount would be inherently greater;
- it could pose market liquidity problems as the market for credits is likely to be thinner than the market for permits;
- it generates the potential for double counting of emission reductions[49];
- it presents particular market entry and exit difficulties[50];
- it raises equity concerns as emitters are allocated a tranche of free emissions based upon their past or predicted future emissions and this allocation may bear little or no relationship to the costs that a particular participant would face in reducing their emissions; and
- verification of emission reductions from individual baselines would require more complex analysis and monitoring and would be more information-intensive than acquittal of permits for total emissions under a cap and trade system. Hence transaction costs would be significantly greater.

In contrast to a baseline-credit model, an ETS based upon a cap and trade framework would:

- be consistent with the model which underpins the Protocol;

[49] Op cit n 21, p28.
[50] The government would have to maintain a sufficient "buffer" stock of its AAU for allocation to new entrants, adjust all baselines to accommodate new entrants or require new entrants to purchase their permit requirements on the market - which would restrict market entry, competition and investment. In respect of emitters who close or downsize their plants, the issue is whether they should be able to sell "their" credits.

- allow for a transparent and easily adjustable cap on emissions, providing greater certainty of meeting Australia's Assigned Amount during the first commitment period and beyond; and
- have lower transaction costs, thereby facilitating more comprehensive coverage.

Coverage of ETS (sectors)

Comprehensive emissions coverage under an ETS is important because:

- it would drive abatement incentives into all parts of the economy, thereby maximising the chances of capturing least cost abatement opportunities;
- it would ensure equality of treatment between participants and minimise incentives for emissions and investment to leak to sectors and firms outside the ETS;
- it would reduce the opportunity for anti-competitive behaviour in the market, the absence of which is essential for a competitive and efficient ETS; and
- it would increase the number of market participants and thus market liquidity and efficiency.

However, the desirability of comprehensive coverage must be balanced against the need for an ETS to be limited to those sectors and activities where:

- GHG emissions are capable of assessment, reporting and verification with reasonable degree of certainty, cost-effectiveness and practicability;
- low cost abatement opportunities exist; and
- there is a capacity to pass on permit and transaction costs.

Achieving optimal ETS coverage is the most complex design issue facing policy makers and a comprehensive discussion of the considerations involved is beyond the scope of this paper. Set out below is merely an outline of one possible approach.

The highly concentrated nature of GHG emissions (both in terms of activities and number of emitters[51]) in Australian provides a strong basis (in terms of cost-

[51] In 1997 the energy sector, namely the production, transformation and combustion of fossil fuels comprising: stationary - (50.4%); fugitive - underground and surface coal mining, venting, flaring and leakage from the production and distribution of oil and natural gas, and leakage from natural gas distribution (7%); and transport (21%) accounted for almost 80% of net GHG emissions. In 1997, the

effectiveness) for an "upstream" approach focussed on energy suppliers (importers and producers of fossil fuels) rather than a downstream focus on the energy consumption chain[52]. An ETS that was confined to the energy sector alone would cover approximately 50% of Australia's combustion emissions at the source and would be administratively feasible and cost-effective (ie low transaction costs per tonne of Co_{2e}), as over 90% of the industry is already compiling GHG emissions data for the Greenhouse Challenge program. In addition, the majority of the emitters in the sector are large companies with relatively high discount rates and good access to information on abatement technologies. An ETS that covered energy suppliers could positively influence the behaviour of end users as the full cost of energy was realised[53].

Sadler (1998) argues that approximately 63% of national emissions (comprising emission from CO_2 from energy use, underground coal mines, oil and gas flaring and venting, limestone used in the manufacture of cement and lime and from harvested timber; methane from underground coal mines and perflurocarbons from aluminium smelting), at most, would lend themselves to incorporation in an ETS[54].

Extending EST beyond energy related emissions to other sectors (such as agriculture and waste which account for 20% and 4% of national GHG emissions respectively[55]) and sources (eg the estimated 7 million homes and 9 million motor vehicles in Australia) is not desirable at this point in time given the availability, reliability, cost and practicability of obtaining GHG emission data[56]. Sources that do not lend

---

electricity industry alone accounted for 35% of national GHG emissions, op cit n 25. Electricity retailers submissions to the AGO noted that given the complexity and range of potential emitters, an upstream approach was necessary, op cit n 21.

[52] In the case of fossil fuels, 260 sites produce coal, oil and gas, op cit n 7.

[53] Historically, energy has been underpriced. Thus an increase in price could result in a modification in consumers' behaviour. This is important as responsibility for global warming rests with all society, not just industry. However, given the demand inelasticity of electricity and petrol, a large increase in price may be necessary to influence behaviour, which could have important equity implications (eg a significant increase in the price of fuel could result in the poor loosing mobility and thus bearing the burden of GHG emission reduction and producing environmental inequality).

[54] Op cit n 11, Sadler, H. (1998). "Emission Measurement Requirements to Support Emissions Trading".

[55] Op cit n 25.

[56] Estimation techniques for other activities tend to suffer from higher levels of uncertainty due to the dispersed nature of sources, sources which emit GHG's at very low concentrations and processes that give rise to emissions that are not well understood. For example, there is no practical measure currently available for directly monitoring emissions associated with livestock.

themselves to incorporation in an ETS may be more effectively addressed with other regulatory instruments.

Method of Allocation of Permits

The method of allocation of permits under an ETS is the most controversial issue in the design of an ETS as it will have profound equity implications (namely distributional impacts on the pattern of structural adjustment, investment and regional employment). Designing an ETS which ensures equity in the allocation of emission rights whilst maintaining political support for an ETS poses a significant challenge. Consideration of the issues is normally undertaken in terms of two polar alternative methods of issuing permits: namely "grandfathering" (whereby permits are issued to emitters free of charge at the commencement of the ETS on the basis of their current or past emissions[57]) and auctioning.

Obviously, grandfathering is the method of allocation preferred by industry (which has implications for the ease of introduction of an ETS), and arguably, is a means of compensating companies which will face the largest costs in adjusting their activities to reduce GHG emissions. However, "grandfathering" presents a number of administrative, equity and efficiency problems:

- the allocation of permit entitlements to emitters for the first commitment period raises the same administrative cost issues associated with a baseline-credit system (and information on individual or sector baselines would not be available if a cap and trade system was adopted), and would result in the Commonwealth government incurring substantial upfront costs establishing an ETS which it could not recoup as grandfathering does not generate any revenue.
- it could have perverse efficiency implications as emitters could increase emissions (or defer planned abatement activities) in the lead up to the introduction of an ETS to obtain larger permit entitlements. The corollary of this is that environmentally responsible companies that had taken early abatement action (for example, as part of the Greenhouse Challenge program) would be penalised relative to companies that had disregarded their GHG emissions.

[57] Other allocation criteria could include a performance benchmark or sectorial baseline; recognition of early abatement action; or the extent to which industries would be adversely affected, op cit n 2.

- it would involve a one-off transfer or large amounts of wealth from society at large to selected industry sectors and businesses, with obvious equity ramifications. This inequity would be reinforced by the fact that a one-off allocation would reduce the ability of government to control structural adjustment pressures in the economy arising from meeting the Protocol commitment.
- it would provide windfall gains to incumbents as their "free" permits would acquire value upon the commencement of an ETS, which in turn could potentially have negative impacts on the take up of innovation by prolonging the life of obsolete plants.
- it would discriminate against new entrants who, under a "pure" administrative system, would have to buy all of the permits they required to operate at market prices, compared with existing businesses who would be freely granted permits.

There is considerable political resistance from industry to allocating permits by way of auction, as it is perceived as:

- a defacto uncapped energy tax as it would require businesses to make payments proportional to their levels of emissions. However, under an ETS that applied to the energy sector, energy suppliers would be well placed to pass on the costs of permits prices to consumers;
- a potential cause of inefficiency in the market; and
- a blunt economic instrument causing disruption to industry[58].

However, auctioning does not have the equity and administrative costs problems associated with grandfathering, and produces a "double dividend"[59] as revenue derived from the auctioning of permits (which could potentially be A$12 billion annually[60]) could:

- be redistributed directly back to participants in an ETS on the condition that part or all of the remission be spent on GHG emission abatement measures within Australia. In order to provide certainty for participants and increase the political acceptability of an auction-based ETS, the Government could legislate a

[58] Op cit 21.
[59] Bubna-Litic, K. and De Leeuw, D. (1999), "Can Our Taxation System Support "New" Sustainable Industries? The Argument for Ecotaxes" 16(2) *Environmental and Planning Law Journal*, 140.
[60] Op cit n 28, p 42.

schedule of refund figures (reducing) for the first commitment period that approached 75% of the cost of permits acquitted by each emitter[61], with the balance being applied to the costs of administering the ETS. Environmental effectiveness demands that an auction-based ETS provide recognition and incentives for abatement action undertaken by emitters before the commencement of an ETS (one option would be to provide such entities with a higher schedule of refunds when an ETS commenced to offset their sunk costs[62]).

- be hypothecated for expenditure by government on abatement research and other emission reduction and sink projects, thereby promoting new industry and creating new investment and jobs;
- be applied to remove distortions in employment and investment and to compensate sectors affected by an ETS;
- be added to general government coffers. A number of commentators have argued persuasively, that this revenue could drive a broader a shift in the tax base away from labour (eg payroll tax), which would in turn have important social equity benefits[63].

The above options for recycling permit revenue are not mutually exclusive (and are limited only by international trade and investment rules[64]), and their application could achieve a more equitable and politically acceptable outcome than administrative allocation, whilst retaining greater control and flexibility in the hands of government to deal with adjustment pressures.

Issuing Permits

[61] At the end of every acquittal period, each participant could receive a refund equal to a percentage of the average market price of permits times the number of permits acquitted by the participant, during the relevant acquittal period.

[62] In order to be effective, rules would need to be agreed now, as capital investment in abatement equipment requires long planning.

[63] Thereby providing an incentive for firms to shift their focus from automation (which replaces labour with fossil fuel energy use) to energy conservation, op cit n 32, p 147. Johnstone, C. "Counting on Natural Capital" in The Courier Mail, 15 April 2000, p 29 quoting Paul Hawken who states "*we have to revise the tax system to stop subsidising behaviours we dont want (resource depletion and pollution) and to stop taxing behaviours that we do want (income and work)*".

[64] The Commonwealth Government must ensure that it does not unreasonably intervene in the international ETS market and create market distortions by regulating, taxing or subsidising the sale of emissions permits within a domestic ETS.

The Protocol is not prescriptive about the amount of permits Annex B countries may release in any year, which allows for emissions fluctuations and flexibility within the first commitment period. The number and frequency of permit distributions of Australia's Assigned Amount will need to balance the desirability of providing participants with as much freedom as possible to determine their optimal emission reduction adjustment path over the commitment period with the need to ensure national compliance with the Protocol commitment at the lowest social and economic cost, and will reflect:

- the need for the government to retain a buffer to cover emissions falling outside sectors covered by the ETS and the risk of non-compliance[65];
- the need to adjust the number of permits released over time as experience with compliance procedures and indirect economic impacts of ET grows; and
- equity concerns that a one-off allocation of permits which would put adjustment decisions in the hands of the owners of emission sources, rather than government.

It would be preferable to "stream" permit allocation over the commitment period so as to enable the government to manage the resulting structural adjustment and price pass through effects that may conflict with regional employment and other economic and social policy objectives[66]. The Commonwealth government regulatory agency nominated to oversee the ETS (referred to as the "NRA"), could auction permits (with first rights to Australian emitters) until a well-established IET market developed, at which time permits could be sold directly onto the market[67].

Assuming that agreement on the methodologies, rules and guidelines for measuring carbon sequestration in "Kyoto forests"[68] is reached at COP 6, the NRA (or entities

[65] It is critical that the number of permits auctioned is set at a realistic amount otherwise society bears the risk of non-compliance with the Protocol commitment - assuming aggregate GHG emissions were on target, reserve permits could be into the market later in the first commitment period. A firm in financial difficulty could sell its permits to an offshore company and not have sufficient permits to cover its actual emissions. Penalties for non-compliance would have no effect in this situation.
[66] Options for reducing GHG emissions include: early reductions, linear reductions and later reductions, op cit n 28, p 19. The Government could facilitate emitter and investor certainty about the future availability of permits by establishing rules and schedules that would guide allocation decisions in future periods.
[67] This approach is recommended by Norway's Oil and Energy Ministry's Domestic Emissions Trading Committee, in Planet Ark, 20 December 1999.
[68] That is, forest-related activities which complied with the definitions of afforestation and reforestation in the Protocol.

accredited by it) could issue permits to the owners of the rights to sequestered carbon under a progressive system, whereby permits equal to the verified annual change in carbon stock (ie CO_2 accumulated in plantation forests net tree loss due to disease, fire, death, culling and harvesting) would be issued retrospectively. Persons responsible for harvesting timber would be required to acquit permits if harvesting resulted in a net annual reduction in the carbon stocks of their managed forests. It is essential that both Commonwealth and State governments actively facilitate national and international investment in Australian sinks as, in addition to being a low cost abatement option[69], sinks have the potential to deliver secondary environmental, economic and social benefits (eg amelioration of dry land salinity and loss of biodiversity, and improved agricultural productivity of land)[70]

Once a permit (irrespective of its origin) had been issued, subsequent trading in the secondary ET market would be likely to occur through a centralised institutional financial exchange such as the Sydney Futures Exchange[71]. A financial exchange would minimise transaction costs for participants and the risks associated with trading, by providing a clearing house for exchanging cash payments and documents authorising the transfer of permits. Like any other internationally traded commodity, brokers, dealers and financial advisers would assist buyers and sellers conduct their transactions and provide advice on permit prices, futures prices, market trends and conditions and trading opportunities. The role of the government in the operation of the secondary permit market should be limited to market oversight and surveillance under existing legislation such as the *Trade Practices Act 1974 (Cth)*[72].

[69] The cost of vegetation sinks such as plantations compares favourably with other abatement options. Many carbon emitters are anticipating the introduction of ET by purchasing options on carbon stored in timber plantations. Analysts in WA suggest that if a tonne of CO_{2e} is valued at A$20 tonne, the financial return over a 30 year cycle could significantly increase. That is, a tree would have a market value in addition to its value for timber, which may provide the margin necessary to make tree farming economically viable, op cit n 1.

[70] Under ideal conditions, 1 million hectares of new forest could absorb about 25 Megatonnes of Co2 annually, which would lower Australia's present GHG emissions by approximately 9%, in CSIRO Solutions for Greenhouse, www.csiro.au. Commercial forestry can improve the value of agricultural land in economically marginal rural communities.

[71] Depending upon the volume and complexity of the market.

[72] In order to ensure the efficient functioning of a domestic ETS, rules need to be put in place to ensure permits can be sourced on a fair and competitive basis, that is, to prevent market distortions arising from dominant national and international suppliers and buyers of permits exploiting their market power (eg the hoarding of permits to block market entry). One solution is to ensure the maximum number of players in the market by enabling non-emitters (eg super funds and conservation bodies) to purchase permits. Financial exchanges would be likely to establish rules to maintain the integrity of the market

In order for a domestic ETS to be widely accepted, familiarity of participants with trading procedures is important as it would minimise transaction costs and increase compliance. To the maximum extent possible, ET should be governed by existing trading and reporting systems, and laws covering trading in other financial instruments.

Acquittal of Permits

Entities covered by an ETS would be required to acquit to the NRA a sufficient number of permits to cover their assessed aggregate emissions during the relevant acquittal period. An ETS's reporting, acquittal and reconciliation cycles would need to be linked to those ultimately agreed under the Protocol - the critical accounting cycle being from 1 January 2008 to 31 December 2012. It would be desirable if each acquittal period under an ETS was 12 months in duration, from 1 July to 30 June in each year:

- to enable the government to monitor the economy wide impacts of the ETS and have sufficient time to develop policy responses to sectors experiencing particular adjustment pressures, rather than waiting until the conclusion of the first five year commitment period;
- to minimise the risk to the government of non-compliance by participants; and
- to ensure consistency with the current financial year reporting cycles of companies.[73]

Monitoring and Reporting of GHG Emissions

An efficient ETS would need to be underpinned by an internationally credible, widely accepted regime of GHG emission monitoring and reporting, that minimised administrative costs for participants and as far as possible utilised existing institutional and administrative structures. If high transaction costs are too high, the whole objective of an ETS would be undermined[74].

(as is the case with trading other financial instruments), the acceptance of which would be a prerequisite for listing and trading.

[73] So as to enable annual production information upon which some emissions estimates may be based to be used. Financial year, rather than calendar year acquittal cycles would be preferable as permit costs are likely to represent a significant business expenditure, which will need to be disclosed to shareholders and the ATO.

[74] Monitoring costs form part of the total cost of operating the ETS and are a measure of its efficiency.

A significant degree of uncertainty is likely to continue to be associated with GHG emission monitoring into the future, due to the nature of biological systems and the need to use proxies in estimating many emissions rather than direct measurement[75]. However, refinement of emission estimation methodologies will be an ongoing process[76]. The monitoring requirements under a domestic ETS at any point in time will largely be determined by emission estimation methodology rules and guidelines established by the IPCC under the Protocol[77] based upon a pragmatic approach of balancing the benefits of more accurate emission data against the costs to participants (both capital and operational) associated with increasing levels of precision. IPCC compliant monitoring of national GHG emission sources is likely to be a condition precedent to trading on the IET market and would enable the Commonwealth Government to consolidate enterprise level emission data for the purpose of its reporting obligations under the Protocol.

There is industry support for a domestic ETS to be based on self assessment and reporting of GHG emissions by emitters[78]. A national ETS could borrow on the institutional and administrative regime supporting the tax system and require entities covered by the ETS to lodge an annual emission assessment return with the NRA (showing GHG emissions on a plant by plant basis). Under a self-assessment and reporting system, emission assessment returns would not be subject to individual examination and would be taken as lodged by the NRA, with the responsibility for ensuring that the return was complete and accurate resting on the company. The

[75] A direct relationship often exists between inputs (particularly fossil fuels) to a production process and the CO_2 emitted. In such cases, estimating emissions by monitoring inputs is cheaper than installing continuous measuring equipment (which can range from A$50,000 to A$200,000 for each discharge point). The choice between direct and indirect estimation techniques comes down to a trade off between cost and precision. Levels of accuracy in emission estimates for particular gases and activities can vary greatly, reflecting differences in the quality of information available and the natural variability of some emission relationships, op cit n 21, p 33. In relation to sequestration from plantations, there is considerable disagreement about when a net accumulation of carbon occurs. Turner J. and Lambert M. claim that it does not occur for some 10-20 years after establishment, "Change in Organic Carbon in Forest Plantation Soils in Eastern Australia", *Australian Financial Review*, 3 September 1999.

[76] Commercial incentives within the multi billion dollar IET market are likely to quickly spur more accurate emission estimation techniques, building upon current IPPC measurement methodologies.

[77] Article 5(2).

[78] The majority of industry groups advocate a self assessment and reporting system for GHG emissions and recognise the need for government involvement to provide a legislative framework for monitoring and verification and a single national authority to oversee the ETS, op cit n 10, p 58.

advantages of self assessment and reporting over administrative assessment by a NRA would be:

- a reduced administrative cost burden on the NRA (it is more cost efficient for a NRA to carry out verification on a pre-programmed or random basis than to conduct individual reviews or continuous monitoring) augmented by the recovery of fines and penalties;
- both industry and administrators would be familiar with the operation of such a system and their obligations;
- arguably there would be greater compliance as emitters would be co-opted to monitor rather than have the NRA intervene; and
- emission assessment returns would be processed more quickly.

Verification and Enforcement

Prior to the Protocol entering into force, the Commonwealth Government would need to enact domestic ET legislation:

- requiring emitters to monitor and report their GHG emissions and to acquit sufficient permits to cover those emissions; and
- imposing legal sanctions on emitters who failed to meet their obligations, that were consistent with those in other Annex B countries to prevent "compliance shopping"[79].

The integrity of monitoring, reporting and acquittal obligations under ET legislation would need to be ensured so that an ETS remained environmentally effective, efficient and credible. Accordingly, it would be necessary for an ETS to be self-reporting in the sense that the tax system is self reporting. That is, backed up by a strong verification and enforcement regime which should include:

1. random audits[80] and site inspections by the NRA or a mutually agreed third party. Audits would promote voluntary compliance and assist the NRA identify areas of the ET legislation that required clarification. ET legislation would need to:

[79] ET legislation would also need to establish: rules for participants in a national ETS that were consistent with rules in the IET market; and the national Emissions Trading Registry.
[80] Based upon current statistical models, "class" auditing, or audits of repeat offenders or high risk operations.

- empower the NRA to issue guidelines;
- amend assessments where fraud or evasion was detected (subject to rights of objection and appeal);
- make provision for defences where the emitter could demonstrate they exercised reasonable care and the rationale for their honest (although incorrect) assessment; and
- oblige emitters to keep records for a reasonable period of time; and

2. Sufficiently severe penalty regime[81]. Penalties could either be:
   - administrative - for example, fines for late return lodgement, misreporting, breach of trading rules, or the failure to acquit sufficient permits to cover emissions); or
   - quasi-criminal[82] - for example, fines indexed to the degree of culpability with respect to the understatement of emissions or the overstatement of GHG emission reductions/sequestration activities[83]. The extension of liability in such circumstances to directors and company officers would also be desirable[84].

The NRA would only have to take enforcement action occasionally and effectively so as to ensure that it is perceived as a credible external threat.

---

[81] A robust penalty structure would protect the value of permits, for if non-compliance went unchecked the demand for permits, and consequently their price, would fall imposing a capital loss on those participants holding permits. Few companies would be prepared to incur the costs and undertake the necessary structural adjustment to their operations unless they could be sure others would be so obliged. Penalties must be set at such a level (and be capable of being easily adjusted) that participants perceive the costs of legal sanctions, adjusted for the probability of being found in breach of ET legislation, as greater than the costs involved in complying with the ET legislation. Penalties should be sufficiently high to involve banks and insurance companies and thus harness these entities as quasi-regulators.

[82] Under the *Crimes Act 1914* (Cth) it is a crime to defraud the Commonwealth. Accordingly, Commonwealth ET legislation could provide that the intentional understatement of GHG emissions constituted a fraud against the Commonwealth.

[83] Like the Commonwealth income tax legislation, the concept of culpability should be enshrined in the self assessment and penalty provisions of ET legislation. Culpability would be judged by reference to the emitter's overall approach to their assessment and acquittal obligations (ie whether they have used reasonable care in the preparation of returns) or by reference to the merits of their interpretation of the ET legislation. When an acquittal shortfall (ie the difference between the permits that are required to be acquitted by an emitter in accordance with the requirements of the ET legislation and the permits that would have been acquitted by the emitter for a financial year assessed on the basis of emission returns made by the emitter, after allowing for credits claimed) was detected, the NRA would conduct an examination of the circumstances of the breach.

[84] Establishing personal liability of directors for misstatement of emissions and/or insufficient permits would improve the effectiveness of ET as it would accord the issue a high status at Board level and

In accordance with Australia's obligations under the Protocol, an essential design feature of a national ETS would be a National ET Registry (administered by the NRA or a private organisation contracted to the government) which would record by serial number in real time:

- every permit denominated by the government and the legal entity authorised to hold each permit;
- any transfers of permits through trading;
- the number of permits acquitted; and
- any permit acquitted as part of the national reconciliation process.

The National ET Registry's records should be publicly accessible on the internet to promote transparency and confidence in the market and to empower public interest groups, competitors (who would have more self interest in policing the ETS than the NRA), consumers and financial markets to act as surrogate regulators. To that end, ET legislation should make provision for third parties to commence enforcement action against alleged non-compliant operators.

It is apparent from the preceding discussion that an ETS would need to be underpinned by a broad regulatory framework. A regulatory safety net would also be required to prevent "hotspots" (that is geographical areas with very high emissions that may be unacceptable for health reasons) from occurring[85].

Timeframe for Introduction

Assuming the current uncertainties (both scientific and legal) surrounding the use of sinks, IET, CMD and JI by Annex B countries to meet their Assigned Amounts are significantly progressed (if not resolved) at COP6, the Commonwealth government should, as a matter of urgency, draft ET legislation to establish a mandatory ETS commencing in 2008. The enactment of domestic ET legislation by early 2002[86], would:

---

would allow the risks to be transferred to insurance companies. Insurance premiums would reflect the adequacy of the company's ET monitoring and reporting systems and the risk of insufficient permits.

[85] Existing regulations prescribing maximum emissions concentrations and plant's current licence conditions could be maintained.

[86] ET legislation would be more likely to be passed by the Federal government in 2002, than if it was introduced into parliament in the lead up to the commencement of a mandatory ETS in 2008.

- send a positive message to the international and national community that the Commonwealth government was serious about reducing GHG emissions (ie moving beyond voluntary "no regrets" measures such as the Greenhouse Challenge, to legally binding commitments), which may give Australia greater influence in shaping the development of an IET regime;
- provide business with certainty about the regulatory environment they would face in 2008 and thus certainty upon which to base strategic GHG emission reduction strategies (eg the use of innovative technologies to reduce energy consumption and diversification of energy sources and products), plan for the physical infrastructure necessary to ensure compliance with the ETS (eg monitoring and calibration equipment) and position themselves to take advantage of forcasted shifts in markets and consumer demand (eg the emerging GHG abatement export market);
- provide the certainty required for increased investment in domestic sequestration[87] and new and renewable energy projects (in particular, wind[88] and solar power), which would have spin-off environmental, economic and social benefits;
- facilitate the development of a futures trading market in permits; and
- provide sufficient lead time for the Commonwealth government to establish the institutional and administrative (NRA and National ET Registry) framework necessary to support an ETS.

In addition, the Commonwealth Government should establish a voluntary ETS, operating in accordance with the ET legislation, during the five year period from 2003 until the introduction of a mandatory ETS in 2008[89]. Creating incentives to encourage voluntary participation in a trial ETS would be critical, however, benefits could include:

[87] Companies such as Pacific Power have begun pilot programs to establish carbon sinks in Australia and Japanese companies have acquired the rights to sequestered carbon in sections of State forest in NSW and Tasmania. The enactment of a mandatory ETS would put in place the financial incentives needed for the establishment of plantations now. Planting must be undertaken now in order for the maximum number of carbon credits to be available in 2008.

[88] High capital costs and competition from domestic fossil fuel producers have combined to mean that commercial scale wind power has not been viable - a commitment to introduce a domestic ETS could make the difference.

- credit for early action - the Commonwealth government could provide financial incentives (in the form of attractive tax concessions for investment in abatement equipment, sequestration and renewable energy activities or R&D, or higher permit remissions when a mandatory ETS is introduced)[90];
- first mover advantages - participants could gain valuable trading contacts and experience. For example, early engagement of CMD partners may help establish Australia's credentials as a preferred investor, strengthening trade links with developing countries and increasing industry's potential to participate in the most attractive CMD opportunities[91]. With the IET market expected to dwarf the NYMEX Light Sweet Crude (the world's largest energy market with an annual turnover of approximately US$700 billion) financial markets are also positioning themselves for strategic advantages. For example, the Sydney Futures Exchange plans to commence forward trading in carbon in 2001 and the International Petroleum Exchange in the UK plans to pilot an ETS in April 2001[92];
- "learning by doing" - a voluntary ETS could enable participants (as well as the NRA and financial markets) to gain experience in both monitoring and trading, and increased awareness of abatement options and costs. The International Energy Agency in Paris is currently organising a simulation of ET (on the internet) among some 20 countries including the US, Russia and many European nations. Perth-based company, EcoCarbon in association with the Australian Emissions Trading Forum is co-ordinating the participation of a number of Australian companies[93]; and
- enhanced corporate image - companies that take a lead in ET initiatives could expect to be viewed favourably by governments, stakeholders, the public and trading partners. For example, BP Amoco, and Royal Dutch/Shell regard GHG abatement as a serious business issue in terms of profitability and image and have internal GHG ETSs in place to capture market opportunities and to gain

---

[89] A voluntary ETS should include a specified minimum permit price, Centre for International Economics, 1999, *Early Greenhouse Action*, Australian Greenhouse Office, Canberra. A pilot domestic ETS ("GERT") is currently operating in Canada on a voluntary basis, op cit n 10, p 60.

[90] If the government establishes domestic incentives (eg taxation, hypothecation of permit revenues) which foster R&D, its uptake and commercialisation, Australian business can partner government in a win-win situation.

[91] Op cit n 21, p 21.

[92] Planet Art, 7 April 2000.

business efficiencies with improved environmental performance and reduced energy consumption.

If the enactment of ET legislation is delayed until 2008, there is a real danger the Protocol commitment will not be met, or that it will be met at an unnecessarily high economic and social cost, as the optimal path of adjustment will be lost and a rapid and dramatic reduction in GHG emissions below BAU will be required.

CONCLUSION

This paper has attempted to canvass some of the major issues confronting policy makers in designing an ETS and has concluded that a domestically administered, internationally integrated, mandatory ETS based upon a cap and trade, auction-style model, that initially covered fossil fuel suppliers and forestry activities (both sinks and harvesting) and which was self-reporting, regulated largely by existing financial market mechanisms, and open to all legal entities, would be the most environmentally effective, cost effective, equitable and potentially politically acceptable.

[93] Planet Ark, 12 June 2000.

BIBLIOGRAPHY

Australian Bureau of Agricultural and Research Economics, (1998), *Emissions Trading: Proceedings of the International Conference on Greenhouse Gas Emissions Trading,* Sydney, 21-22 May 1998, ABARE, Canberra.

Australian Greenhouse Office 1999a, *National Emissions Trading: Establishing the Boundaries*, Discussion Paper No.1, Commonwealth of Australia, Canberra.

Australian Greenhouse Office 1999b, *National Emissions Trading: Issuing the Permits,* Discussion Paper No.2, Commonwealth of Australia, Canberra.

Australian Greenhouse Office 1999c, *National Emissions Trading: Crediting the Carbon*, Discussion Paper No.3, Commonwealth of Australia, Canberra.

Australian Greenhouse Office 1999d, *National Emissions Trading: Designing the Market*, Discussion Paper No.4, Commonwealth of Australia, Canberra.

Bureau of Industry Economics (1992), *Environmental Regulation: the Economics of Tradeable Permits: A Survey of Theory and Practice*, Research Report 42, AGPS, Canberra.

Brown, C. (1997), "Facilitating Joint Implementation Under the Framework Convention on Climate Change: Toward a Greenhouse Gas Emission Reduction Protocol", 14(4) *Planning and Environmental Law Journal*, 356.

Brown, S., Kennedy, D., Polidano, C., Woffenden, K., Jakeman, G., Graham., Jotzo, F., and Fisher, B.S. (1999), *Economic Impacts of the Kyoto Protocol: Accounting for Three Major Greenhouse Gases*, ABARE Research Report 99.6, Canberra.

Bubna-Litic, K. and De Leeuw, D. (1999), "Can Our Taxation System Support "New" Sustainable Industries? The Argument for Ecotaxes" 16(2) *Environmental and Planning Law Journal*, 140.

Buna-Litic, K. (1998), Environmental Taxes: a Gapping Hole in the Tax Reform Debate, 13(11) *Australian Environment Review*, 7.

Centre for International Economics, 1999, *Early Greenhouse Action,* Australian Greenhouse Office, Canberra.

Cusack, V. (1999), "Perceived Costs versus benefits of meeting the Kyoto target for greenhouse gas emission reduction: the Australian perspective, 16(1) *Environmental and Planning Law Journal*, 53.

Department of Foreign Affairs and Trade, The Honourable Alexander Downer, MP, Minister for Foreign Affairs, *Emissions Trading: Harnessing the Power of the Market,* Address to the ABARE International Conference on Greenhouse Gas Emission Trading, Sydney, 21 May 1998.

Elliot, E. D. “Toward Ecological Law and Policy” in *Thinking Ecologically*, Chertow and Esty, D. (eds) *Thinking Ecologically*, Yale University Press (1997).

Ferguson, A. “The trade in clean air”, 20 (34) *Business Review Weekly*, 7 September 1998, 46.

Gunningham, N. and Grabosky, P. *Smart Regulation: Designing Environmental Policy* OUP, UK (1998) pp5-19.

Gunningham, N. and Sinclair, D., “Designing Smart Regulation” in Hutter, B. (ed) *The Environmental Regulation Reader*, OUP, UK, 1999.

Hillman, R. Australian Ambassador for the Environment, “*Climate Change and Emissions Trading: Implementing the Kyoto Protocol – An Update on International Negotiations*”, speech to the Committee for Economic Development in Australia, Sydney 6 July 1999.

Industry Commission (1991), *Costs and Benefits of Reducing Greenhouse Gas Emissions*, vol. 1, Report No. 15, 15 November, AGPS, Canberra.

Jacobs, M. *The Green Economy*, Pluto Press (1992).

Jaffe (1995), “Dynamic Incentive for Environmental Regulation, 29 *Journal of Environmental Economics and Management*, 1.

National Greenhouse Gas Inventory Committee, (1999), *National Greenhouse Gas Inventory 1997*, Commonwealth of Australia, Canberra.

Moulis, D. (1998), 13(6) *Australian Environmental Review*, 10.

Organisation for Economic Cooperation and Development, (1994), *Managing the Environment: The Role of Economic Instruments*, OECD, Paris.

OECD, (1998), *Lessons from Existing Trading Systems for International Greenhouse Gas Emission Trading*, OECD, Paris.

Parker, C. (1999), “The Greenhouse Challenge”, 16(1) *Environmental and Planning Law Journal*, 63.

Pearce K and Turner K, (1990) *Economics of Natural Resources and the Environment*, Harvester Wheatsheaf, London.

Pisauczyk, R. (1995), Business Council Position Paper on Domestic Greenhouse Policy, 116 *Business Council Bulletin*, 22.

Prime Minister’s Science, Engineering and Innovation Council Work Group, *From Defence to Attack: Australia’s Response to the Greenhouse Effect*, 25 June 1999.

Repetto, R. “Pollution and Energy Taxes: Their Environmental and Economic Benefits in Boer, Fowler and Gunningham (eds) *Environmental Outlook: Law and Policy*, Federation Press (1994) 282-291.

Stavins, R. and Whitehed, B. “Market-based environmental policies” in Chertow and Esty, D. (eds) *Thinking Ecologically*, Yale University Press (1998).

Swanson, T. (1995), “Economic Instruments and Environmental Regulation: A Critical Introduction” 14 *RECEIL*, 287.

Swift, B. (1997), “The Acid Rain Test”, *Environmental Forum*, 17.