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Submission on background paper

Introduction

In principle, attaching a price to carbon emissions is an essential element of any effective greenhouse response strategy. However, this does not automatically mean emissions trading is the best way of doing this, although it seems to make sense for large emitters. In reality, the vast majority of Australian businesses and households (who are small emitters) will see price signals associated with emissions trading simply as a levy on their energy bills, and a small increase in the prices of the goods and services they buy. For them, a carbon levy or tax could actually provide a more stable price signal, and the revenue raised could be allocated to supporting emission mitigation measures and adjustment support schemes.

An emissions trading scheme focusing on large emitters has great potential to distort the form of greenhouse response, because they will choose to emphasise the forms of response that most suit their own strategic circumstances. For example, energy market signals at present undervalue energy efficiency and distributed generation, and reward energy suppliers for increased sales and higher utilisation of infrastructure. So large energy sector emitters will prefer to invest in measures that reduce the greenhouse intensity of electricity (ie emissions per unit of energy sold) in preference to encouraging improved end-use efficiency and distributed generation, which undermine their future business prospects (by reducing profits and sales volumes). Further reform of energy markets to support demand-side options could solve this problem. However, the fifteen years of reform has so far failed abysmally to achieve this, so relying on it at this point would indeed be courageous, and would risk even more distortion of investment towards the supply-side.

So any emissions trading scheme must be viewed as just one element of the response, and clear mechanisms should be put in place to use revenues from initial sale of permits and/or levies or taxes to fund programs that balance this distortion by supporting demand-side action where it is more cost-effective from a societal perspective (not a private perspective) than proposed supply side responses.

There is a clear need for certainty with regard to carbon pricing as a matter of urgency. At present, business seems to be delaying response in the belief that early action would mean it may miss out on benefits. Introduction of a levy or tax could be done much more quickly than development of emissions trading, and would provide certainty while limiting risk in the early stages of carbon pricing. It could be phased out as emissions trading is introduced.

Further recommendations relating to the propositions in the Background paper are included in the body of this submission.

Comments on Background Paper

Comments are structured under the headings used in the Background Paper.

Issues for consideration

An additional criterion should be that any scheme "supports the adoption of energy efficiency and distributed generation where, from a societal perspective, it is as cost-effective as supply-side actions proposed by emitters".

A specific issue in the list of issues on page 3 is "Capacity to minimise adverse sectoral impacts…" This terminology should be replaced by 'manage'. The reality is that many greenhouse emitting facilities in Australia are very old, and appropriate policies would see them upgraded, replaced or relocated, not protected. This issue is discussed further later in this submission.

The 'capacity to promote investment certainty' is a challenging criterion, as evolving understanding of greenhouse science seems likely to create a need to accelerate response. So, unless very aggressive targets are set, certainty regarding the scale of action may be difficult to achieve. Nevertheless, it is possible to limit the up-side risk of carbon prices exceeding certain values in the early stages of a carbon pricing scheme.

As noted in my introductory comments, the capacity of any scheme to encourage early action is a key requirement. Indeed, certainty of fair consideration of any well-documented emission mitigation action taken from now should be announced as a fundamental element of any scheme to be developed.

Design Propositions and Other Issues for Further Investigation

The issues raised in this discussion will be incorporated in my responses to the rest of the Background Paper.

Proposition 1: Cap and trade scheme

In principle, a cap and trade approach has many advantages over a baseline and credit scheme. In particular, a pure cap and trade scheme avoids judgements about baseline emission trajectories, and ensures there are large numbers of permits to be traded (ie a liquid market).

Introducing grandfathering or allocation of free permits introduces risk of political manipulation or gaming of the system by firms misleading system administrators.

In the long term, a pure cap and trade scheme seems the logical approach. The challenge is to deal with issues of transition, recognising that some sectors may gain and others may lose. A phased introduction therefore seems desirable. This can be achieved in a number of ways, such as combinations of:

- Early introduction of a relatively small levy or tax on carbon emissions, with the revenue to be used to finance adjustment and emission mitigation activities. This would be replaced by the trading regime when it is developed.
- Financial incentives and training programs for firms that introduce in-house emissions trading or emission pricing systems for their cost centres. Such schemes prepare firms

for the broader trading scheme and also provide a mechanism for them to aggregate internal funds and allocate them to early emission mitigation activity, as the revenue from the scheme remains within the firm and can be spent in any way the firm wishes. Governments could provide leadership by introducing such schemes within their own operations and as a factor influencing selection of suppliers as a matter of urgency.

- When trading is introduced, inclusion of a price cap that progressively increases over time (eg maximum $5/tonne for say the first two years, then $10, then $15, etc) means that the risk of extreme volatility or high sustained prices is managed until the participants develop some skills. This cap could be either a price limit at which government makes more permits available, or a fine or penalty (as used for MRET). Business would probably prefer the additional permits, as incurring a fine has business reputation implications. On the other hand, fines may encourage businesses to act more quickly to protect their reputations!
- The issue of allocation of free permits or grandfathering is discussed under *Proposition 6* below

With regard to international compatibility, there are some separate issues. It seems obvious that the measurement systems used for an Australian scheme should be internationally compatible so that, at any time in the future, it could be integrated into international systems.

The difficult question is to what extent interaction with other schemes should be allowed. On one hand, economic modelling shows that the broader the scheme, the greater the chances of achieving minimum overall costs through trading. But each country or region will be using different transition strategies in the early years, so there is scope for gaming. A 'single desk' scheme is one way of dealing with this. Alternatively, government could formally specify the terms of interaction between the Australian scheme and other individual schemes, taking into account their characteristics.

Also, a 'one way' approach could be applied, where permits from other schemes (that meet minimum criteria) could be surrendered for compliance with Australian obligations, but permits generated in Australia could not be exported: this would help reduce compliance costs in Australia. Then Australian participants could take advantage of lower carbon prices elsewhere, but we would not face upward price pressure if prices elsewhere were high, creating incentives for Australians to sell permits offshore and creating a shortage here. Such an approach could probably not be maintained for a long period, but could be a useful phase-in mechanism. And it could be progressively opened up over time, as suggested above. Of course, if other schemes rigorously applied the same criteria, there might be no international trading.

Proposition 2. National, Sector-based Scheme

In this context, 'sector' is presumably intended to mean categories under the NGGI, such as non-transport energy, transport energy, agriculture, etc. A NGGI sectoral approach may not be the most effective approach, particularly in the early years of a scheme. For example, it may be economically less risky if carbon pricing were introduced first for small to medium sized energy consumers (very few of whom are trade-exposed, and for whom energy costs are a small proportion of total costs), passenger car petrol use and large scale organic waste management.

This issue of targeting raises some interesting issues regarding preconceptions. On one hand, advocates of emission trading want to focus on large emitters because it is administratively simple, and they are likely to experience significant cost signals. Yet it is widely (and incorrectly) believed among policy makers that large, energy intensive industry (which comprises most of the big emitters) is already as energy-efficient as it is economic to be – so increasing the effective cost of energy for them will just drive up their costs, because there will

be little scope for emission reduction within their operations. Following this logic, they may just move offshore. Large emitters are also politically powerful, and will undoubtedly negotiate grandfathering or other mechanisms that will undermine the effectiveness of the market signal resulting from pricing carbon, particularly in its early years. Also, within the electricity generation sector, it seems that it will require a significant carbon price before the merit order would switch from coal to gas. With the likely level of grandfathering or equivalent, it may be some time before a trading scheme achieves this price level.

So it is important to ask who an emission trading scheme is likely to be able to influence to cut emissions, and exactly what actions they are likely to take to achieve reductions. It may well be that the target groups with most potential to drive cost-effective emission reduction may not be easily influenced by emissions trading. If so, then the main benefit of an emissions trading scheme may be to raise money for government to finance incentives and other programs that target the best opportunities, and to change attitudes within business so that they consider carbon emissions carefully in all their ongoing investment decisions.

In previous papers (see attachment), I have already pointed out that many key influences on emissions, such as appliance and equipment manufacturers and importers, builders, plumbers, design consultants, etc do not pay for the energy their customers use. So emissions trading will only influence their behaviour to the extent that their customers express concern about the costs of emissions to them. If the effective price of carbon is kept relatively low to minimise impacts on energy intensive industry, small business and households will generally see little impact, so there may be little response from many energy users in the short term. For example, the average Australian household, according to ABS, spends around $23 per week on electricity and gas. A carbon price of $20 per tonne would increase this by around $3 per week – a cup of coffee. Likewise, a household spending $50 per week on petrol would experience a cost increase of $2 per week at this carbon price. Will this provoke them to change their priorities towards emission reduction? I wouldn't hold my breath.

Based on the above, it is my view that emissions trading is, over the long term, an important element that builds the price greenhouse response into society's costs. But it will not be a big driver of behavioural change in the short term. However, the revenue it raises can be used to drive attitudinal and behavioural change, and to help business to put in place systems that will help it reduce its emissions.

For this reason, a flexible approach that gets things moving and is compatible with key principles likely to underpin long term trading schemes is more important than intellectual purity in the short term. As noted earlier, incentives for businesses to establish internal emissions pricing, such as BP used to great effect, and incentives for market intermediaries (trades, product manufacturers etc) to improve energy efficiency could be more useful than several more years' debate about how to introduce emissions trading.

The issue of whether a scheme could run with just a few states involved can be more easily solved if expectations are not too high, if it is accepted that there will be a transition period, and if appropriate mechanisms are installed. For example, any state could independently:

- introduce a small levy on carbon content of energy (say $3-5/tonne) used by small and dispersed customers
- use the revenue from that levy to provide incentives to firms to introduce in-house emissions accounting and pricing, and to suppliers of energy-consuming products and equipment to develop and promote low emission options
- apply emissions trading to large emitters within that state with a relatively low cap on the maximum price (say $5/tonne), an option allowing emitters to buy permits from emission reductions in other non-participating states where they met accounting and reporting

standards, and with transitional provision for grandfathering or adjustment assistance to emitters that could demonstrate hardship and meet criteria (see below)
- Apply a licence condition to retailers requiring them to pay a levy on net electricity imports into the state and allowing them to pass this cost through to customers as a charge per unit of electricity purchased. This allows the state government to manage impacts on generators within the state.
- The price cap and other elements could be progressively increased dependent on circumstances.

Proposition 3. Setting of Caps

The more comprehensive the scheme, the fewer the problems in setting an emissions cap. Also, if a price cap is applied in the early years, the exact target set will not be critical during that period.

In setting an emissions cap, a number of issues need to be considered:

- During the first few years, many emitters will have to manage existing plant and equipment. This may limit their ability to capture large emission reductions – although based on experience of programs such as Energy Efficiency Best Practice, there may be some pleasant surprises. In the longer term, the investment cycle will allow them to achieve larger savings through appropriate investment choices
- The potential for emission reductions in different emission sectors varies widely. For example, as we move towards zero land-clearing, potential for further emission cuts in that area will be very limited. In contrast, energy-related emissions now comprise over two-thirds of total emissions and the potential for reductions is very large

One option would be to limit the scheme to specific emission sectors, but create a mechanism for recognition of emission reductions in other sectors that meet government-specified accounting standards. Over time, as measurement improves, the scope could widen.

Given the above, the following trajectory of targets for energy related emissions (including transport, non-transport and fugitive emissions) could apply:

- Target for 2012 – aim for a 5% reduction in energy-related emissions, although in reality the outcome may be more like a stabilisation of all energy-related emissions at 2003 level (30.8% above 1990 level: if considered separately, transport 2003 emissions were 28.8% above 1990, while non-transport and fugitive emissions were 31.4% higher). Use of a price cap in the early years, described elsewhere in this submission, makes the actual outcome in early years uncertain, but is important to manage perceived risk.
- Beyond 2012, reduce by 2% of 1990 energy-related emissions each year as a preliminary trajectory – leading to an emissions level half of 1990 energy-related emissions by 2050. More aggressive reductions may actually be required.
- An outline of factors that may lead to change in the target should be prepared, so that each business can make its own judgements about future likely variations.

The factors proposed in the Background Paper, projected future sectoral emissions and the share of residual emissions abatement required of the stationary energy sector seem less than central to the issue. These criteria rely heavily upon the validity of present projections of energy use, which are open to serious doubt. It is much more useful to focus on what needs to be done, and to create appropriate incentives to deliver that.

Proposition 4. Scheme Initially to Cover Stationary Energy Only

The initial scope of the scheme reflects a need to balance, on one hand, the political and administrative difficulties of wider coverage against, on the other hand, the greater potential for lower cost abatement of wider coverage.

The rationale presented for focusing initially on the non-transport energy sector is that it includes half of all emissions, and is growing rapidly.

It is not obvious why transport energy use has been excluded. It comprises almost 15% of emissions and has been growing almost as fast as non-transport energy emissions. And when the diversity of issues in the non-transport sector is considered, adding transport energy seems like a minor addition in terms of complexity. And a relatively small number of transport fuel suppliers would need to be involved if permits were managed upstream. Further, the likely wider use of traditionally non-transport energy sources such as natural gas and electricity for transport means it may be increasingly difficult to isolate transport energy from non-transport.

A key issue that needs further consideration is the proposal to make electricity generators the liable parties for trading. As discussed in the introduction of this submission, under present energy market frameworks, this is very likely to lead to over-investment in supply-side abatement relative to more cost-effective demand-side action. A fundamental issue here is that energy suppliers only need to generate electricity or supply other fuels in response to demand created by energy consumers. This means conscious action will be needed to engage energy users and market intermediaries that influence energy use.

Strategies might include some of:

- Allowing large downstream users to take responsibility for emissions resulting from their own use, as proposed in the Background Paper
- Allowing brokers for large numbers of small energy users to play a similar role
- Introducing mechanisms that create clear incentives for end users and market intermediaries to capture financial benefits from abatement, such as:
    - a secondary market, possibly based on an improved NSW GGAS approach
    - specific incentives aimed at market intermediaries and, where possible, linked to the lifetime abatement resulting from each purchase or investment decision (with funding from revenue raised via carbon pricing – see Attachment)

Proposition 5. Include all 6 Kyoto Gases

In principle, it is preferable to include all relevant gases. As long as accounting standards are adequate, this should be practicable.

Proposition 6. Allocation of Permits and Short and Long-term permits

Long-term permits should not be included in the scheme. In other markets, business has been able to develop a variety of mechanisms to cover long-term risk, and they should be capable of doing the same in this market. There is a risk that application of long-term permits would create scepticism across the community as to the fairness of the scheme. Further, where a business owns a long-term permit (especially if it had been administratively allocated) there is potential for windfall profits from closure of Australian operations, a very perverse outcome – unless permits must be forfeited on closure or significant reduction in local activity.

In principle, the administrative allocation of permits may be justified on two different criteria:

- First, businesses that have made previous investments on the basis that abatement would not be necessary would lose profitability or be left with stranded assets due to the change in their cost structure. A key question here is at what date did it become unreasonable for a responsible business to ignore future emission abatement costs in its investment decisions: some might say from the date of the Kyoto COP in late 1997, while others might argue that the situation is still not clear. A second question is for what period it is reasonable to compensate a business for the impacts on its profitability. This is discussed below.
- Second, the social impacts of sudden or premature closure of some facilities due to the increased costs of compliance with emissions trading could be significant in some regions. This is an economic development issue that should be treated separately from provision of emission permits, although revenue from permits might provide some or all of the funding for assistance measures. In a sense, this situation parallels the present problem of urban-rural energy subsidies: governments are implored by economists and sustainable energy advocates to shift from subsidising the price of energy to other forms of subsidy or assistance to reduce the distortion of energy markets. Using amelioration of regional economic impacts as a rationale for favourable treatment under emissions trading is effectively the same thing – it distorts energy price signals. Alternative mechanisms should be used.

With regard to the second point, those most likely to suffer adverse impact from closure of a regionally significant business are the employees, who do not have the diversification of most shareholders: they either have a job or not. So it could be argued that it is more equitable to auction permits and use the revenues to assist affected employees, rather than giving businesses a benefit.

These impacts need to be compared with other factors businesses must deal with, such as fluctuations in currency exchange rates, impacts of changes in tariff structures both within Australia and in countries we trade with, and changes in insurance premiums. Over-emphasis on protecting business from the impacts of emissions trading could create a precedent for assistance in other circumstances, and could hinder effective response. There may be a case for the Productivity Commission to conduct a study of the extent of risk businesses in different sectors of the economy already deal with as a result of tariff reform, market forces, and exchange rates, to put emissions trading risks into perspective.

The issue of administrative permit allocation can be avoided if government implements an appropriate mechanism of adjustment assistance for emitters that can demonstrate adverse business impacts of significance.

Alternatively, any system of administrative allocation should be designed to phase down following a transparent trajectory. For example, it could be argued that business makes investments typically with an expectation of a rate of return of at least 8% pa. This is consistent with typical taxation depreciation rates. On this basis, any 'grandfathered' or allocated entitlements should be discounted *from the date of the investment* at a rate of 8% per annum. For example, if a plant were built three years before the trigger date, its entitlement to allocated emission permits would be reduced to 78% of the standard allocation (or 76% if a simpler linear discounting approach is used). Each year, its entitlement would further decline by 8%. Failure to include such a mechanism runs the risk of 'locking in' judgements about likely projected baseline greenhouse gas emissions and potentially creating windfall gains for some businesses - effectively rewarding their previous failure to abate emissions, another potentially perverse outcome. Where there has been progressive investment in a facility over time, the investments should be time-weighted to calculate the overall discount.

Projections of future emissions should *not* be used as a basis for allocation of permits. The scope for dramatic emission reductions due to rapid change in technology and other factors is such that any projection is very likely to be wrong. Application of a discounting approach to allocation based on emissions in a base year (preferably 2005 or earlier, so that disincentives for early action from now on are avoided), and adjusted to reflect 'best practice' seems to be almost the only fair and practical approach.

A key feature of any allocation system should be that each business claiming allocation benefits must make its own case, and there should be substantial public disclosure of their justification. Where such disclosure would create confidentiality problems, an independent panel of people respected in the community should review the case on behalf of the community. In reality, many businesses will find it is simply not worth the effort, especially if there is a relatively low price cap in the first five years of the scheme's operation.

Where assistance is provided to a firm, there is a case to provide it as an up-front payment based on a calculation of Present Value over a period of years, using a public sector discount rate. Since business typically uses much higher discount rates for evaluation of emission abatement projects, this approach increases the impact of a given amount of funds on decisionmaking. That is, an up-front payment from government for five year's assistance would incur, at most, an interest cost of around 5% pa nominal. But if the same payments were made yearly (saving the government the interest), most businesses would discount the value of the future benefits by at least 10% pa, meaning that the Present Value of the future benefits was much lower than that of an up-front payment that cost the government the same amount.

Proposition 7. Penalties and Price Ceilings

These issues have been discussed earlier. Such approaches will be important during the initial stages of the scheme.

Proposition 8. Allow Offsets

In principle, allowing offsets should reduce the cost of compliance, while creating an incentive for other forms of abatement. Offsets should only be allowed where there is an internationally accepted methodology and a high standard of accounting can be ensured.

With regard to tree planting, the relevant project proponent should carry insurance to cover risk. It may be useful for governments to facilitate development of suitable insurance products.

Proposition 9. Mechanisms to Address Adverse Effects and Structural Adjustment

As discussed earlier in this submission, there is a strong case to separate assistance for structural adjustment from the core operation of an emissions trading scheme, on the grounds that this would introduce distortions. There is extensive experience in management of structural adjustment issues in relation to tariff reform and other structural adjustment, and these mechanisms should be applied here, possibly using some funding from sale of emission permits. It should be possible to compare the impacts on a business of emissions trading by looking at impact on profitability and business sector development, in the same way as has been done for tariff reform.

At the same time, the long standing claims of some industries of the significance of their contribution to the Australian economy and the likely adverse impact on them of greenhouse response need to be independently evaluated. For example, the Australia Institute and others have questioned the net benefit to Australia of aluminium smelting, and their arguments do not seem to have been adequately answered in any publicly accountable process. It is also difficult to reconcile the opposition of the paper and pulp industry to strong greenhouse response when the best practice pulp mill in Australia, Visy's Tumut mill, is close to greenhouse neutral and world best practice for some technologies involves net export of green electricity.

The issue of adverse impacts on individual business profitability due to a claimed unforeseen increase in input costs due to emissions trading should be addressed as proposed earlier: each firm must make its case under public accountability requirements, and the scale of assistance should decline over time to reflect the amortisation of the capital involved.

In general, firms that receive assistance should be required to demonstrate that they are pursuing all cost-effective abatement action, including implementation of in-house emission pricing and other mechanisms intended to focus attention on abatement. As noted earlier, using a price cap to manage the transition cost will also limit impacts.

A key issue facing Australian business is the bias of the tax system towards maintenance in preference to investment in upgrades and new equipment due to the large difference between tax deduction rates for maintenance and depreciation rates. Some options for response to this issue include:

- Specific schemes to make abatement investment more attractive
- Revision of Taxation Department interpretation of the definition of maintenance to include upgrading efficiency/greenhouse performance to demonstrated 'best practice' standards or levels of performance in present day Australian Standards, regulations or other requirements
- Revision of depreciation rates for investment in plant and equipment: I note that the Business Council of Australia rates this issue in its top four priorities for tax reform.

In considering impacts on businesses, the benefits of actions should also be considered. For example, limiting climate change may reduce insurance costs for facilities in the north-west of Australia, while a public commitment to action on climate change may increase shareholder value of a firm.

For low income households, mechanisms such as home buyer grants for houses smaller than a specified size linked to greenhouse performance could apply. Indeed, the present first home buyer grant scheme could be restructured to more effectively target more modest homes and greenhouse performance.

It is undesirable to offer low income households assistance in the form of discounts or rebates on energy bills: they should receive separate grants, or assistance should be in the form of advice and assistance with building and appliance upgrades where high bills are incurred. Charities and financial counsellors also provide mechanisms for the effective targeting of assistance to households with energy problems. Some programs could usefully target landlords to upgrade rental properties, too.

Proposition 10. Transition Mechanisms for Recognition of Early Action and New Entrants

If all permits were auctioned each year, there would be no problems for these participants. Early action would be rewarded by a need to buy fewer permits. And new entrants would just have to buy enough permits to cover their emissions, like other participants.

Mechanisms recommended earlier, including discounting of allocated permits over time and use of a relatively low price cap, particularly over the first five years or so of the scheme, would reduce the impacts on early adopters and new entrants. However, it may still be justified to allocate some assistance. First, each firm would be expected to make a case. Second, the payment should be an up-front payment linked to deemed abatement over a period of time. This approach maximises the impact on project economics of a given amount of funds (see earlier discussion).

Proposed Next Steps

There is no excuse for delay. A small carbon levy should be introduced immediately. And any abatement action that is adequately documented from, say, July 1 2005 should be eligible under any scheme that is developed. Incentives should be offered immediately for individual firms to introduce internal emission pricing/trading and funding of cost-effective abatement action.

It is absolutely clear that emissions trading will only be one part of an effective response. In particular, measures that encourage non-energy market intermediaries (eg builders, designers, installers, manufacturers of equipment and appliances, etc) to promote abatement will be needed to complement emissions trading.

To date, there has been a lack of broad community involvement over emissions trading and other policy issues. A panel of community representatives with access to appropriate expertise is needed to represent community views and engage effectively on its behalf on this important issue. The Brunswick-Richmond Powerline Review in Victoria in the late 1980s is the only example of adequate community involvement that I know of in the energy/greenhouse area. It could provide a useful model.

ATTACHMENT 1

USING EMISSIONS TRADING TO CREATE INCENTIVES FOR DEMAND-SIDE MANAGEMENT

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Abstract

Emissions trading aims to minimise the cost of limiting emissions of pollutants to a specified level by allowing emitters who can reduce their emissions cheaply to trade with those for whom it is cheaper to pay others to cut emissions than to do it themselves. Although enthusiasm for early introduction has waned, it still seems likely that schemes will be introduced later this decade. Emissions trading schemes now proposed do not adequately facilitate demand-side emission reduction: this paper proposes a mechanism that would overcome this weakness. Nevertheless, the sustainable energy industry can use emissions trading as a means of increasing client interest in demand-side action, and increased rates of adoption of sustainable energy solutions. This paper outlines a number of strategies that can be applied.

Emissions Trading Overview

Trading of emission permits is a widely supported way of managing the level of emissions of any pollutant in an economically efficient manner. The theory is simple. Each emitter must buy enough permits to match the amount of pollutant (s)he emits in a given period. The total number of permits available is limited by a market manager to the number meeting environmental (or other) objectives. If emitters in total wish to emit more units of pollution than there are permits, the conditions for a market are created.

Emitters who can reduce their level of emissions cheaply can fund their pollution reduction actions by selling excess permits to those for whom pollution reduction would be more costly. In this way, the overall emission target is met through implementation of the lowest cost emission reduction actions. If fewer permits are available than are needed, the value of those permits will rise until some polluters find it worth their while to reduce emissions so they can sell their permits to others.

Extra permits can be created in several ways:

- By creating ‘sinks’, that remove carbon from the atmosphere
- By reducing greenhouse gas emissions in other countries under arrangements approved under the market rules. For example, under the Kyoto Protocol, countries required to comply with emission limits may work with other countries under schemes such as the Clean Development Mechanism. Reductions in emissions achieved may be counted by the country that carries out the action

It is widely considered that emissions trading is more economically efficient than traditional regulation, where each polluter would be required to meet a specified target, which may be easy for some but expensive for others.

Emissions trading is seen as an important mechanism for management of greenhouse gas emissions, and many attempts are being made to establish trading systems around the world. For greenhouse gases, a permit would be required for the release of each unit of carbon dioxide (or equivalent) released into the atmosphere. In many schemes, a 'permit' (sometimes called a 'credit') may be gained by removing a unit of CO_2 from the atmosphere for the long term, for example by reforestation. Under the Kyoto Protocol, there are also arrangements such as the Clean Development Mechanism and Joint Implementation, whereby an organisation or country can implement emission reduction actions in other countries, and gain recognition for emission reductions achieved. So an emitter of greenhouse gases will have several options:

1. Buy enough emission permits to match the quantity of greenhouse gas emissions generated (keeping in mind that it may be cheaper to reduce emissions than to buy more permits)
2. Buy enough permits from carbon storage to offset the emissions
3. Participate in arrangements such as the Clean Development Mechanism or Joint Implementation to gain access to more permits
4. Or some combination of the above

The issues surrounding emissions trading are discussed in detail in a number of very good discussion papers published in the Australian Greenhouse Office website at www.greenhouse.gov.au .

Some Practical Problems

The theory of emissions trading is elegant. But there are some practical problems.

It would be complicated and expensive for every individual emitter to be involved in trading, so most market models suggest that only large emitters (eg power stations and large industrial plants) and distributors of fossil fuels (such as petroleum distributors, gas suppliers, etc) should trade. All electricity users and small emitters would then see a price signal that reflected the cost of purchasing permits, but would not be directly involved in emission trading unless they consciously chose to trade. But many market intermediaries that influence levels of emissions (such as appliance manufacturers) will see no signals – see Figure 1. This is a serious limitation, as around 60% of energy-related greenhouse gas emissions are generated by small emitters, who may only see small energy price signals. And market intermediaries exert powerful influence on energy use, but will not see any price signals. So emissions trading, as now proposed, may only influence a modest proportion of emissions.

If all emitters must purchase permits for all their emissions from the start of the scheme, there could be serious transient impacts on some industries, but if existing emitters were given free permits (called 'grandfathering') new market entrants would be disadvantaged. The industries most affected would be those that pay low energy prices. For example, for a light manufacturing or service business for whom energy costs comprise 2% of total costs, and who pay 8 cents/ kWh for electricity, a $20/tonne of CO_2 permit cost would increase total input costs by 0.5% - and this could be easily offset by energy efficiency improvements. But for aluminium smelters, for whom energy costs may exceed 25% of total input costs, and who pay 1.5 to 2.5 cents/ kWh for electricity, the same permit cost would add 20 to 33% to total input costs. The realisation by energy intensive industries that emissions trading could seriously affect them has

been a major factor behind the decision of the Australian government to delay any mandatory emissions trading scheme until after an international scheme is introduced.

Where the market includes permits for storage of carbon, there are many issues regarding protection of that stored carbon, monitoring rates of carbon storage, etc. Intensive work is being done to address these issues, but there are still many uncertainties. Green groups and European countries have argued that trading schemes should be simple, focusing on CO_2 and energy to begin with. But forestry and rural interests have seen potentially profitable opportunities from carbon storage activities, and have lobbied strongly for their inclusion. And Australian business groups, who do not recognise the enormous potential to profitably reduce emissions through sustainable energy solutions, see carbon storage as a potentially cheap and easy way of meeting emission targets.

The future price of permits is very uncertain. If large sustainable energy opportunities are exploited, the value of permits could be near zero. On the other hand, economic modellers have predicted a range of prices between $7 and $50/tonne of CO_2 or even higher. And the prices could change over time, as technology changes and structural change affect the cost of emission reduction or storage. So emitters face extreme uncertainty, and will find it difficult to decide how to respond: recognition of this uncertainty has also been a factor in the loss of enthusiasm for emission trading within some sectors of business. To address this problem, some experts (eg Allen Consulting, 2000) have suggested that a small carbon tax should be introduced first to provide a clear and predictable price signal for early response, then trading phased in once the market has stabilised.

In recognition of the complexities, and because the politically powerful resource industries believe they would be adversely impacted by emissions trading, the Australian Government has signalled that it will not introduce a mandatory trading scheme until an international framework exists. But this does not mean emissions trading is not a useful tool, or that we should withdraw from the debate about the structure and operation of emissions trading schemes.

The remainder of this paper considers two issues. First, how national (and international) emissions trading schemes could be adapted to encourage sustainable energy more effectively. Second, how emissions trading and similar mechanisms could be used within organisations to encourage greater take-up of sustainable energy.

National or State-level Policy Action to Encourage Demand-side Action

A key weakness in proposals for emissions trading is that small emitters and market intermediaries will receive limited or no financial signals to take action to reduce greenhouse gas emissions, as shown in Figure 1. Indeed, emissions trading could even distort greenhouse response away from the most cost-effective solutions. For example, a coal-fired power station is much more likely to respond to emissions trading by reducing the greenhouse intensity of the electricity it generates than by financing end-use consumers to reduce their electricity consumption. The former preserves their revenue stream, while the latter would reduce sales of their core product – kilowatt-hours of electricity. Yet it will often be more cost-effective to save energy or switch fuels at the point of use.

SEIA has developed and circulated a proposal for a ‘reverse carbon tax’ to encourage emission reduction by small emitters, electricity consumers and market intermediaries (SEIA, 2000). The approach is simple. Manufacturers or suppliers of products or services that achieve demonstrable emission reductions would receive rebates linked to the amount of greenhouse

gas avoided over the life of the product/measure at a specified price per tonne of CO_2 avoided. The rebates for larger projects such as cogeneration projects, etc would be paid on an annual basis, and would reflect actual emission savings from a specified baseline.

Funding for these rebates would come from either revenue from sale of emission permits, or a small carbon levy. In the short term, they could be funded from GGAP funds (The Greenhouse Gas Abatement Program negotiated between the Democrats and the Government in relation to the GST).

Some examples of the rebates that might apply if a price of $10/tonne of CO_2 avoided are:

- A refrigerator saves 300 kilowatt-hours per annum compared with the baseline appliance using the Australian Standard test, and a life of 15 years is assumed, it will save 4,500 kWh over its life. At an Australian average greenhouse intensity of 1.0 kg CO2/kWh, this equates to 4.5 tonnes, and the manufacturer is eligible for a rebate of $45.
- A solar hot water service which replaces an electric HWS and saves 3,000 kWh per annum according to standard tests for 15 years would attract a rebate for the manufacturer of $450 (similar to the rebates now offered by NSW and Queensland governments at the retail level)
- A 20 Watt compact fluorescent lamp with a life of 8,000 hours would save 640 kWh and gain a rebate of $6.40.
- A commercial building that saved 100 kWh/square metre per annum would be eligible for a rebate of $1/sqm pa if paid annually, or $15 if paid up-front
- A cogeneration plant that supplied electricity at a third of the greenhouse intensity of conventional electricity would receive a rebate of $6.70 per megawatt-hour (or an equivalent up-front payment for, say, five years' operation)

Rebates such as these would provide direct incentives for market intermediaries and small energy users to invest in demand-side action. This is needed to complement the signals to large emitters provided by emissions trading or carbon taxes. It is important to recognise that most of these rebates will stimulate investment in actions that are cost-effective, but would not otherwise have been implemented. As such, they will have a net negative cost, and will therefore enhance Australia's economic success.

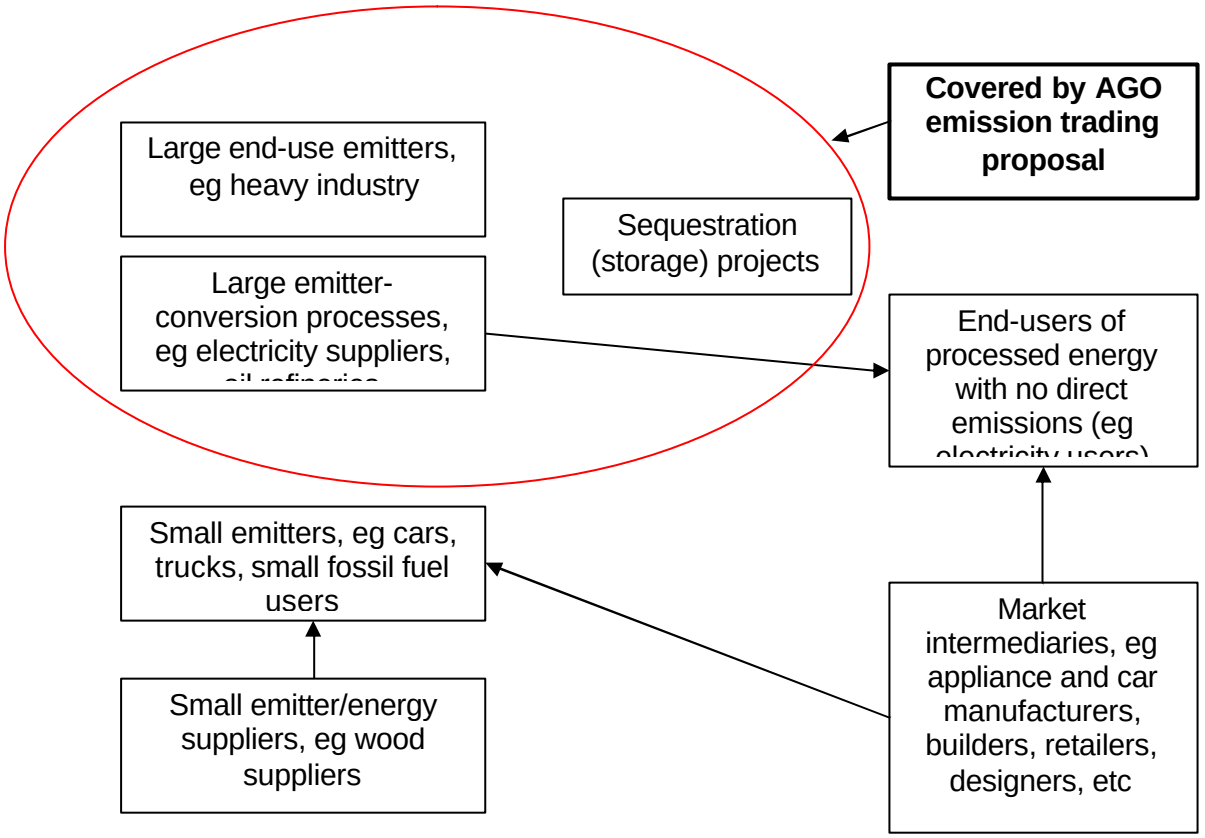
Opportunities for Sustainable Energy through Emissions Trading

The question arises: how could emissions trading encourage adoption of sustainable energy? There are several obvious ways:

- A large emitter may choose to improve energy efficiency and/or switch to lower greenhouse intensity fuels within its own operations to reduce the number of emission permits it must buy. In theory, it would do this if such actions were cheaper than buying permits from others
- Emitters themselves or third parties could implement sustainable energy solutions after negotiating rights regarding ownership of the permits thus made available: sale of these permits (in addition to other revenue or savings from the measures) would then finance the sustainable energy projects
- Electricity consumers and small users of gas and oil would experience higher energy costs, as their suppliers would have to charge more per unit of energy to cover purchase of the necessary emission permits (or to pay for the cost of emission reduction measures). In response to higher energy prices, these consumers could be expected to adopt energy saving measures or switch to lower greenhouse impact

energy sources. But, as noted earlier, these price signals would be quite small factors for most businesses and households.

Figure 1. Emitters and sequesterers of greenhouse gases, and coverage by AGO trading proposals



So the sustainable energy industry could expect to gain opportunities in several ways:

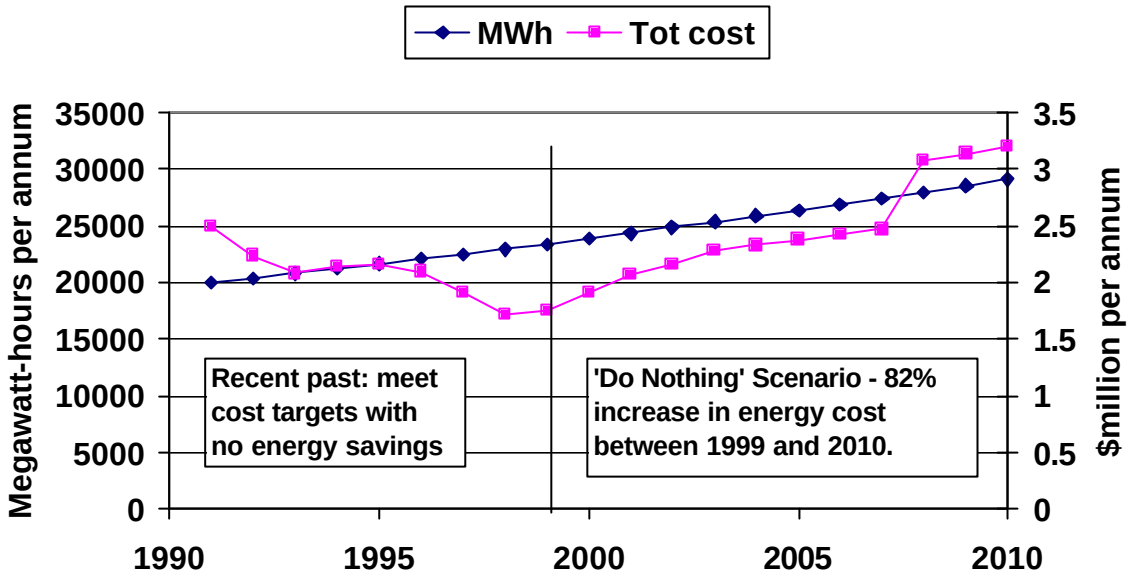
- For large emitters, actions that reduce their emissions at low (or negative) cost, or allow them to buy emission permits from others at low cost will be attractive – once they are convinced that pressure for action on global warming will not evaporate and that they will gain recognition for their actions
- For small energy users, energy prices can be expected to increase as power stations, gas and oil suppliers pass on the cost of buying permits to cover their emissions: this will improve the economics of sustainable energy options: typically, for each $10/tonne of CO_2, the cost of electricity will increase by around 1c/kWh on the mainland, gas will increase by 60 c/GJ, petrol by 2.5 c/Litre and diesel by 2.9 c/Litre.
- Some small energy users or other industries may wish to trade in permits, store carbon or pursue other actions that involve them in the trading system.

The likelihood that emissions trading will be introduced later this decade offers an opportunity for the sustainable energy industry to promote its products and services.

An energy advisor can now show clients that, in addition to increases in wholesale energy prices after the unsustainably low bargains of the past few years, the price of carbon will further increase their energy costs. In the recent past, many businesses have met their energy cost targets through negotiating lower energy prices, so this area has received little management attention. But many businesses could face increases in total energy costs of 50-

100% by 2010 under a 'do nothing' scenario, so there is a much better opportunity to attract management attention now. And the higher cost per unit of energy improves the economics of sustainable energy initiatives. See Figure 2 for an example.

Figure 2. Example of energy use and cost trends for a business. The graph assumes cost/kWh declines from 12.5c/kWh in 1991 to 7.5 c/kWh in 1999, then increases to 9 c/kWh by 2003 and emission permits are purchased at $20/t CO_2 (2 c/kWh) from 2008. Energy consumption grows at 2% pa from 1991 to 2010.



There is also an opportunity to highlight to clients the financial value of sustainable energy options relative to the cost of buying emission permits. Table 1 shows the cost of a range of emission reduction measures for a company that usually gains a 15% annual rate of return on its investments. Investment in sustainable energy options gives the most attractive financial outcomes. Indeed, even investing in a sustainable energy measure with a seven-year simple payback period costs less than other emission reduction options. And if the client expected only a 10% pa IRR, the seven-year payback measure would have a negative cost per tonne of CO_2 avoided. This is a great marketing story!

A Micro-level Strategy to encourage Early Action: In-house emission trading/carbon levies

Given the complexity of the situation, there is an obvious need for organisations that want to be in a position to benefit from emissions trading to act early. Those with experience are best placed to exploit opportunity. Introduction of in-house emission trading or carbon levies can create a mechanism to drive emission reduction, energy efficiency improvement and demand for carbon credits.

In-house emission trading or carbon levies provide an exciting opportunity for the sustainable energy industry to focus additional resources within organisations on emission reduction actions such as energy efficiency improvement and fuel switching.

The strategy is straightforward. Business units within the organisation should either pay a carbon levy on their energy use to a central fund, or should be required to buy and trade emission permits through a trading system within the organisation.

Table 1. Relative costs of actions to meet emission reduction targets for a business that normally achieves 15% pa rate of return on investment

ACTION	COST/TONNE OF CO_2 AVOIDED OR STORED	COMMENTS
Buy 'credits' from tree plantations	$5-$30	Cost depends on many factors
Buy permits on market	$7-$50	Economic modelling shows a wide range of costs, depending on assumptions in the modelling
Buy *Green Power* or other zero emission renewable power at 3 c/ kWh premium	$30 to $40/tonne (Aust mainland ave - $22/t if it replaces Victorian average electricity, which gives a bigger CO_2 saving per kWh)	Use of energy involving capture of methane that would otherwise have been released into the atmosphere may have a lower cost/tonne of CO_2 equiv avoided, as the benefits of removing very greenhouse-active methane from the atmosphere may be counted
Buy low emission electricity at 1 c/kWh extra cost – eg hypothetical small scale cogeneration	$10 to $15	Assumes electricity at 1.0 kg CO_2/kWh replaced by electricity from cogeneration or combined cycle gas at 0.25 to 0.33 kg CO_2/kWh. If low emission energy purchased at same cost as BAU energy, cost/t CO_2 avoided is zero
Buy low emission electricity at 0.5c/kWh less – eg cogeneration	-$3 to -$$5	As for above
Invest in energy efficiency measure with 1 year payback	-$32 (yes, a negative cost!)	Assumes 10 year life of measure, 8 c/kWh and 1.0 kg CO_2/kWh for BAU electricity, and 15% pa discount rate to reflect 15% IRR threshold
Invest in energy efficiency measure with 5 year payback	-$4.50	Assumes 15 year life, 8 c/kWh and 1.0 kg CO_2/kWh for BAU electricity, and 15% pa discount rate to reflect 15% IRR threshold
Invest in energy efficiency measure with 7 year payback	$6.15	As above

This approach offers advantages for an organisation including:

- It provides in-house experience of the intricacies of the emerging frameworks, providing competitive advantage and minimising any dislocation and uncertainty from future introduction of national or international carbon levies or emission trading. In particular, it provides an opportunity to see how the value of carbon permits may be affected by pursuit of energy efficiency, renewable energy or changes in business activities
- It keeps revenue from levies or permit trading in-house, and directs their investment into cost-effective or cost-minimising actions
- It demonstrates public responsibility and shows shareholders the organisation is responding strategically to an important emerging issue

For a sustainable energy consultant, adviser or installer, this approach creates pools of funds available for investment, and management and staff awareness of the importance of emission reduction actions.

A number of models can be used.

Simple carbon levy

Each business unit can simply be charged an extra levy on its energy use (either all energy use, or energy use beyond a specified level - though the latter favours those who are most inefficient), to create a fund for energy efficiency improvement and greenhouse emission reduction. The levy could be ramped up over time, starting at, say, 0.5 cents/kWh for electricity, 30 cents/GJ of natural gas, and 1.25 cents/litre for petrol (equivalent to an emission permit price of $5/tonne of CO_2). The levy could be linked to the value of emission permits on external markets when they are established.

Revenue raised by this levy can then be allocated in one (or a combination) of several ways:

- Each business unit can choose to invest its levy funds in approved emission reduction actions (this is probably inefficient, as it could lead to unnecessary duplication of research, loss of economies of scale and coordination problems)
- A central unit could be established to provide expertise and emission reduction services: basic operating costs of this unit would be funded from the levy. Funds could be allocated to projects according to a range of possible criteria, such as:
    - All business units bid for funds for measures in their areas
    - The specialist emission reduction unit identifies the most cost-effective actions and implements them
    - Each business unit has first right to use its levy funds for measures in its area, but if they are not used within a specified period of time, they go into the central fund controlled by the specialist unit
    - The specialist unit develops emission reduction options for all business units and implements a mix of measures with two objectives: to save each unit at least as much as they pay in levies; and to use the rest of the funds to address the most cost-effective actions

In practice, many organisations do not have adequate accounting systems to go beyond a simple central approach in the immediate future. But the system could become more sophisticated over time.

Emissions trading

In this case, an emission permit trading mechanism is established within the organisation. Each business unit must purchase enough permits to match its emissions on an annual basis. Permits can be required for all emissions, or for emissions above specified levels (the latter approach has been introduced by BP AMOCO within its operations). A limit is placed on the total number of permits available, determined by the overall emission target set for the organisation. The value of permits is determined by the internal market. In reality, an upper price limit exists, in the form of the cost of Green Power, which is 3-4 cents/kWh - $30-40/tonne of CO_2. Alternatively, if there is an external emission permit market, the price on this market establishes an upper limit.

This approach, just like national and international emission trading, is much more complex and uncertain than a simple levy. It requires accurate allocation of energy usage (and other emissions) to each business unit, a market mechanism (which must be funded from permit trading revenues), and policy decisions on the total number of permits available and the way they will be allocated. Decisions must also be made as to how the revenue collected from sale of permits will be allocated (on the assumption that the organisation will continue to be a net emitter or, in the case of a 'grandfathered' approach, emissions will exceed the threshold limit).

Clearly, business units with high existing emissions and large scope for savings (and/or low predicted emission growth) will favour a requirement for permits only for emissions above existing levels (known as 'grandfathering'). Those with low emissions, or who have already implemented emission reductions, or who have predicted high emission growth will prefer that permits be required for all emissions. Of course, without grandfathering, the central management group, who will collect the revenue from sales of permits, could choose to rebate some or all of their payments to groups who are adversely affected. They could pay rewards to those who are doing well, simply use the money in ways that further reduce emissions, such as low cost loans for emission reduction, or just feed the money back into consolidated funds.

These issues reflect at the micro-level the issues that must be resolved at a national and international level if markets are to be established. But they also create an impetus for action.

Conclusion

Proposals for emissions trading provide opportunities and difficulties for the sustainable energy industry. It is desirable that a complementary ‘reverse carbon tax’ rebate scheme be introduced to create financial incentives for electricity consumers, small emitters, manufacturers and suppliers of equipment and infrastructure that influences levels of greenhouse gas emissions, and market intermediaries.

Even without such a scheme, the likelihood of introduction of emissions trading late this decade provides an opportunity for the sustainable energy industry to increase client interest in pursuit of sustainable energy solutions.

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