

# House of Representatives Standing Committee on Environment, Recreation and the Arts

## Inquiry into the Regulatory Arrangements for Trading in Greenhouse Gas Emissions

### Submission by the Queensland Government

#### 1. Preamble

Following the agreement at Kyoto Conference of Parties to the Framework Convention on Climate Change (FCCC) in December 1997, the Commonwealth Government is committed to reducing Australia's greenhouse gas emissions to 8% above the 1990 level by 2008-2012. It is estimated that emissions are currently about 8% above 1990 levels. In practice, therefore, Australia's emissions at the end of the adjustment period will need to be no higher than current levels.

A major question for all Australian Governments is how to attain this target at least economic cost or cost to the community. This is a complex question, which is likely to involve solutions for which there is little precedent and therefore little experience.

The Queensland Government therefore considers that it is important that possible solutions be rigorously researched and, where possible, tested before widespread implementation. This submission should be taken as an input to the process of finding viable and efficient solutions, rather than representing a definitive long-term position of the Government.

#### *A possible approach*

The best solution to this question might contain the following elements.

- Emissions should be assessed in terms of their contribution to the problem (global warming), not by their nature, source or geographic location.
  - That is, emissions would be assessed on a common basis, such as CO<sub>2</sub> equivalent.
  - In respect of the most efficient solution, it is irrelevant whether the emission is CO<sub>2</sub> or methane, whether it arises from manufacturing industry or agriculture or whether it originates in Victoria or Western Australia.
- Pricing mechanisms would be designed to allow emissions targets to be achieved most efficiently.
  - That is, permits would be concentrated in those activities which generate most wealth while meeting the emissions target.
  - Again, the type of emission, activity and location would be irrelevant.
- The regulatory, allocation and pricing systems would be designed to allow emissions permits to flow freely between types of emission, activity and location.

This submission suggests that the best method of achieving this within Australia might involve:

- a system of CO<sub>2</sub>-equivalent emissions permits;
- initial allocation of permits by a national auction to the highest bidders, concurrent with the establishment of a permit trading market;
  - this might include permits for differing time periods, as well as permits without time limits;
- use of revenue from sale of permits to lower business costs;
  - this might involve, for example, reduced tax rates, or adjustment assistance for industries or regions most adversely affected.
  - the main aim would be to offset increased costs for industries purchasing permits by equivalent across-the-board cost reductions to all industries. This would enhance cost-competitiveness in a non-distorting way and encourage structural adjustment towards less-polluting activities.

The above approach is likely to be most efficient and effective at a national level. It would, however, lead to an uneven requirement for adjustment: it is likely that more of the burden would fall on States with higher proportions of minerals processing and agriculture, as well as on the most emissions-intensive industries.

- The overall adjustment task should not be overstated: modelling of national economic impacts by ABARE and of Queensland impacts by Queensland Treasury shows that substantial economic growth is likely to occur by 2010 even with emissions restrictions. The impact of measures to reduce emissions would be to reduce rates of growth below what would otherwise have occurred, and to induce structural changes in the economy.
- In order to achieve the outcome which is most efficient at the national level, it would be necessary for the Commonwealth Government to adopt policies to enable adversely affected regions to adjust. These might include provision of compensatory payments to States most adversely affected, perhaps through the Commonwealth Grants Commission, and provision of adjustment assistance to areas worst affected.
- The adjustment costs can be reduced by phasing reductions carefully over the next 10-14 years, and by accelerated microeconomic reform which increases alternative opportunities.
- Adjustment costs can be further reduced by introduction of an international scheme for tradable emissions permits.

The following sections of the submission consider in more detail the issues relating to trading in greenhouse gas emissions, including alternatives to the above model and questions relating to the feasibility and implementation of different approaches.

## 2. Executive Summary

The Queensland Government considers that the Committee's examination of the regulatory arrangements for trading in greenhouse emissions is particularly timely for the following reasons:

- the support for international emissions trading in the protocol to the Framework Convention on Climate Change (FCCC) agreed at the Kyoto Conference of Parties to the FCCC in December 1997;
- the need to achieve an equitable sharing among Australian States of the costs of meeting the target for Australia agreed at the Kyoto conference;
- the likely benefits of developing national markets in greenhouse emissions to allow Australia to integrate with an international emissions trading system; and
- the benefits that Australia would obtain from the use of tradable permits to achieve environmental objectives, including encouraging industry to develop low-cost or innovative approaches to reducing emissions, and establishing internationally competitive businesses and technologies to meet greenhouse reduction targets.

The Queensland Government recognises that a number of issues need to be addressed before a tradable permit system is established, but considers that investigation by Australian governments of the adoption of a tradable permit system is a priority, as negotiations are proceeding this year on the design of an international tradable permit system, and it is important that such a system would serve Australia's interests. The following key issues in the design of an emissions trading system need to be considered:

1. The coverage of sources and sinks for greenhouse emissions should be as comprehensive as possible, to allow for the most efficient methods of achieving emissions reduction to be adopted. However, in practical terms, those emissions sources which can be most readily verified will be most amenable to the use of tradable permits.
2. The basis for trading in particular greenhouse gas emissions is a clear aggregate limit for the emissions covered by the trading system (expressed as CO<sub>2</sub> equivalent). To ensure Australia's compliance with the Protocol to the Framework Convention on Climate Change, the limits applicable for greenhouse gas emissions should be set at a national level.
3. If emissions restrictions are set at a national level, it would also be desirable to have a national market for trading in greenhouse emissions. This would allow for trading between producers in different regions, and therefore allow for growth in industrial activity in particular regions.
4. The initial distribution of permits among industries will play a significant part in the effectiveness of a tradable permits system in limiting emissions at the lowest economic cost. If established operators receive a free initial allocation of permits while new entrants are required to purchase permits, this could discourage competition or industry expansion. Therefore, the most efficient system of allocation would involve both existing and new participants purchasing permits either through auctions or through market trading.

5. A prerequisite for successful adoption of a tradable permits system is an effective basis for monitoring emissions levels. A monitoring system should be able to measure, or produce a reliable estimate of, relevant emissions on a regular (at least annual) basis.
6. Monitoring would need to be accompanied by effective enforcement, including setting penalties for non-compliance by a participant in the trading system with the level of emissions covered by tradable permits.
7. The design of a tradable permits system and the use of revenue that the Commonwealth Government would obtain from the sale of permits needs to recognise that adoption of measures to restrict emissions will have differential impacts on States and regions. Therefore, the scope of the trading system should include all sources and sinks (so that reductions are not concentrated on particular industries or regions). The system should be accompanied or preceded by measures to assist adjustment by regions that suffer larger impacts.
8. If a system of trading in permits to clear vegetation is established, this should be linked to the greenhouse emissions trading system, so that producers would have an incentive to reduce vegetation clearance to enhance sinks for greenhouse emissions.

In the negotiations on an international greenhouse emissions trading system, the Commonwealth Government should seek a system that incorporates these features (except for those addressing specifically domestic issues). In particular, the international trading system should be as comprehensive as possible in its coverage of sources and sinks, be based on regular monitoring and reporting of emissions by participating countries and be designed to ensure the greatest economic benefits from those emissions which are produced. It would be desirable for international trading to occur on a commercial market basis, with the role of governments and international bodies limited to monitoring and regulating, rather than conduct, trading.

### **3. Background**

The use of tradable emissions permits to achieve environmental objectives has received support even in advance of the international negotiations to reduce emissions of greenhouse gases. This interest in the adoption of tradable permits reflects the balance that policy-makers are aiming to strike between environmental and other economic and social objectives. One way in which these potentially competing objectives can be achieved is to make increased use of *economic instruments* to achieve environmental objectives.

The options open to governments to achieve environmental objectives are:

- to use environmental regulations that specify the permissible activities and levels of emissions, and may also require certain production processes; and
- to use economic instruments that ensure that environmental costs of economic activities are incorporated in the costs to producers and consumers, encouraging them to reduce environmentally damaging activities or find less polluting modes of production.

These options are not mutually exclusive, as economic instruments can supplement (and may rely on) environmental regulations that set permissible emissions levels.

*The Choice of Instruments:* The use of environmental regulations, different types of economic instruments or a combination of these measures will depend on the costs and benefits of using

each type of instrument. The advantages and disadvantages of different types of instruments (drawing on analysis in the Industry Commission's paper, *Role of Economic Instruments in Managing the Environment*, July 1997), are set out below:

Environmental Regulations: The use of regulations that set permissible emissions levels can produce greater certainty about emissions levels, but can also be inflexible and limit innovation. If they are to be effective in restricting emissions, regulations may involve high compliance and administrative costs, and significant economic costs.

Education and Promotional Activities: These measures rely on increasing public awareness of environmental problems and alternative actions, and seek to promote voluntary action by producers and consumers. Educational and promotional activities can complement regulatory and economic instruments and assist in making these instruments more effective.

Voluntary Action by Industry and Consumers: These programs involve encouraging, and giving recognition to, voluntary action by industry and consumers to reduce energy use, waste or emissions. The Greenhouse Challenge program is an example of the promotion of voluntary activity by industry.

Charges and Taxes: The application of taxes and charges can make emitters take account of the cost of environmental damage resulting from their production and consumption decisions. Charges and taxes can assist in achieving environmental goals in an economically efficient manner. Producers who can introduce new technologies and cleaner production processes at a lower cost than the taxation rate have an incentive to do so. However, the impact on emissions of taxes and charges can be uncertain, leading to adjustments in the rate of taxation once the charges are introduced.

The other major concern about taxes and charges is that governments will use them as general revenue-raising measures, with tax rates not closely related to the costs of environmental damage.

Subsidies and Tax Concessions: These measures are intended to encourage producers and consumers to undertake measures which lead to social or environmental benefits that may not be reflected in normal market prices for goods and services. The advantage of subsidies or tax concessions is that they give producers more flexibility than traditional environmental regulations, and may promote innovation. The approach of the US Government to greenhouse emissions reduction relies on tax concessions for research and development of new technologies which increase energy efficiency and reduce emissions.

The disadvantages of subsidies and tax concessions are that they may reward producers who previously had been poor environmental performers, or provide funding to activities that would have taken place in their absence. They may also increase distortions in the taxation system.

Financial Enforcement Incentives: These measures are used in conjunction with a regulatory standard to provide an added incentive for compliance. The two types of enforcement incentives are performance bonds (which have been used in the Queensland and New South Wales mining industries to promote mine site rehabilitation) and non-compliance fees, which set a variable penalty linked to the extent to which prescribed limits are exceeded. The latter measure may be used in conjunction with a tradable permits system, to ensure that permit-holders are not exceeding the level of emissions for which they hold permits.

Tradable Emissions Permits: Tradable permits operate by first establishing a limit on total pollution, emissions of a substance or use of a resource. This limit is allocated among the participants in an industry or range of activities, who are free to trade permits with each other or other interested parties. Firms with a high cost of emissions abatement will buy permits from other firms who can reduce emissions at a lower cost, as long as the price of permits remains below the cost of emissions abatement. An effective tradable permits system is likely to meet emissions targets at the least economic cost.

An example of tradable permits operating in Australia is the salt credits scheme managed by the Murray-Darling Basin Commission, which aims to reduce salinity in the Murray-Darling river system. Participants in the scheme are from the irrigation districts of New South Wales, Victoria and South Australia.

The benefits of tradable permits are that they increase the flexibility of the measures that can be used to achieve an overall environmental objective, and allow producers the choice of either paying for additional permits or reducing emissions or resource use, whichever has the lower cost.

### ***3.1 Application of Tradable Permits to Reducing Greenhouse Gas Emissions***

Once governments have decided the aggregate limit on greenhouse emissions either nationally or for a particular industry, emitters who wish to emit greenhouse gases would need to acquire the required number of emissions permits or reduce their emissions to comply with their permit allocation.

The two major options for economic instruments to reduce greenhouse gas emissions are carbon taxes and tradable permits. The advantages of tradable permits are:

- they can be applied to a wider range of gases and activities than a carbon tax; the scope for achieving the most cost-effective solutions through permit trading;
- once the aggregate level of permissible emissions has been set, any changes in the price of tradable permits can be set by trading, whereas governments may need to vary the rates of carbon tax regularly to achieve emissions targets;
- the transparency of compliance may be greater with a tradable permits scheme; and the scope for organisations to reduce the total level of emissions by obtaining permits but not generating emissions.

A third alternative would be to impose a tax on all greenhouse emissions, although the implementation of this option would be extremely difficult due to the uncertainties in the measurement of different types of greenhouse emissions.

### **The Protocol to the Framework Convention on Climate Change**

The third Conference of Parties to the FCCC, held in Kyoto in December 1997, agreed to include in the Protocol to the FCCC a provision that countries bound by targets included in the Protocol could engage in international emissions trading to supplement domestic measures they were taking to meet their obligations to limit and reduce emissions levels. Article 16 bis of the Protocol notes that “The Conference of the Parties shall define the relevant principles, modalities, rules and guidelines, in particular for verification, reporting and accountability for emissions trading.”

One of the issues for the fourth Conference of Parties (due to be held in Argentina in November 1998) is to determine the design of an international tradable permits system. In preparation for this meeting, the first meeting of officials to discuss an international tradable permit system takes place in June. While this timetable is ambitious, given the range of issues to be considered, it strengthens the case for Australia giving consideration to the design of a domestic trading system.

The Protocol set an overall target for members of Annex 1 (industrialised countries) of a 5% reduction in greenhouse gas emissions from 1990 levels by 2008 to 2012 (on average). The targets for emissions reduction vary for individual countries or regions, with the European Union (EU) having a collective target of a reduction in emissions of 8%, the United States a reduction of 7%, Japan a reduction of 6% and Australia an *increase* of 8%. (As the target for the EU is a collective target, some members of the EU would be able to increase their emissions, provided that this is offset by sufficient reductions in other countries.)

The challenge that these targets present for each country will depend on how its emissions levels have changed since 1990, its estimated future population and economic growth, the greenhouse intensity of the economic base, and how readily it could utilise new technology or substitute fuel sources and reduce energy use. For example, Australia's greenhouse gas emissions have already increased by approximately since 1990, so the target set at Kyoto would allow for no further increase in greenhouse emissions.

At the same time as Australia will be containing greenhouse emissions, economic output is likely to increase at a higher rate than other many other Annex 1 countries. In recent years, growth in real gross domestic product (GDP) of more than 3% per year has been required to reduce unemployment. This suggests that Australia's average real GDP in the 2008 to 2012 period would need to be approximately 50% higher than in 1997 if Australia is to achieve a sustained reduction in unemployment. Achieving these goals will require significant changes in energy efficiency, fuel sources and the allocation of resources among different industries.

Australia could make the adjustment process easier by participating in global emissions trading, which could allow industries which are likely to have significant emissions growth to purchase permits from other countries, where industries may be able to reduce emissions at lower costs. However, the global emissions trading system may not commence until 2008, while parties to the FCCC are required to show demonstrable progress towards meeting their commitments by 2005 (Article 3 of the Protocol). This suggests that Australia may benefit from establishing domestic emissions trading arrangements in advance of the commencement of the international emissions trading system.

## **4. Responses to the Committee's Terms of Reference**

### ***4.1 Mechanisms for measuring, verifying and monitoring emissions and the compliance with contracted arrangements***

An emissions trading system can only be effective if the level of emissions from industries in total and from individual permit-holders can be monitored and verified on a regular basis. The emissions trading system for sulphur dioxide (SO<sub>2</sub>) in the United States requires industry participants to have installed Continuous Emissions Monitoring (CEM) systems, which can provide, sample, analyse and record data on emissions levels every 15 minutes.

Every three months, permit holders report hourly emissions data to the US Environmental Protection Agency (EPA). Facilities participating in the trading system had installed and operated their CEM systems for several years before the emissions trading system commenced operating. (The Clean Air Act 1990 set the aggregate emissions limit for SO<sub>2</sub> and authorised the emissions trading system.) The frequent monitoring of emissions levels facilitates compliance with both the aggregate emissions limit and the emissions limits for individual market participants.

The SO<sub>2</sub> trading system in the US has concentrated on relatively large utilities which could afford to install CEMs to comply with the Clean Air Act and emissions trading requirements. If smaller production units participate in a trading system, a less rigorous or less frequent measurement of greenhouse emissions may need to be adopted. For greenhouse emissions, regulators may need to rely on estimates of greenhouse emissions from particular sources, where these estimates are reliable.

Researchers from the Organisation for Economic Co-operation and Development (OECD) have suggested that the national inventories of greenhouse emissions prepared under the FCCC could provide the basis for determining whether nations are complying with their obligations to reduce emissions. As methodologies for estimating emissions are refined, traders could use these estimates with increased confidence.

For domestic emissions trading, more accurate recording or estimation of emissions by industry will be essential. Several existing inventories of emissions could be modified or extended to produce the required information on emissions levels, including the National Greenhouse Gas Inventory and the surveys for the South-East Queensland Regional Air Quality Strategy. The frequency of reporting of emissions would need to be at least annual to ensure that emitters were complying with the requirement that they hold sufficient permits to cover their emissions.

Another existing monitoring mechanism that could be adapted for monitoring greenhouse emissions is the New South Wales Environmental Protection Agency's (EPA) system of monitoring air and water pollutants for its load-based licensing system. The pollutants covered by this monitoring are sulphur oxides, nitrogen oxides and particulates in the air, and nitrogen, phosphorus and salinity in water. The New South Wales EPA collects compliance returns from licence-holders setting out monitoring they have undertaken and the results of that monitoring. The EPA may conduct audits on these returns.

Suitable penalties for non-compliance with agreed emissions levels would be essential for the emissions trading system to operate. The level of the penalty could vary depending on the



degree to which emissions exceed the volume of permits held. In the US SO<sub>2</sub> trading system, fines for excess emissions equal 20 to 30 times the market price of permits.

#### ***4.2 Mechanisms to integrate emissions trading with the development of carbon sinks, including the science, measurement and security of such arrangements***

The incorporation of greenhouse sinks into a national or international emissions trading system will rely on accurate estimates of the storage and release of carbon from changes in land use. In Queensland, the Statewide Landcover and Trees Study (SLATS) uses satellite imagery to determine the rates of land clearing. The interim SLATS report (October 1997) indicates that approximately 50% of Queensland's estimated greenhouse emissions result from Land Use Change and Forestry.

If woodland thickening is included in the estimate of net emissions for this sector, it would reduce Australia's baseline emissions level in 1990, but would not contribute significantly to future emissions reductions. (The Intergovernmental Panel on Climate Change has not yet confirmed that woodland thickening would be offset against greenhouse emissions for the purpose of meeting national emissions targets.) However, the development of farm forestry and improved land management practices could contribute to greenhouse emissions reduction objectives. In addition, a trading system involving carbon sequestration activities could lead to improved protection of biodiversity and positive effects on water quality and soil salinity.

The confidence about the accuracy of estimates of land clearing rates has increased. The interim SLATS report indicated that the average rate of land clearing in Queensland was 262,000 hectares per year (+ or - 10%) between 1991 and 1995, compared with earlier estimates of 308,000 hectares per year (+ or - 25%). With increased confidence in the accuracy of land clearing estimates, it may be possible to incorporate greenhouse emissions sinks into an emissions trading system.

A trading system could operate by allowing producers who wished to clear land or enhance sinks to purchase permits, and producers willing to reduce grazing capacity could sell permits. The ability of producers to receive income from the sale of permits would act as an incentive to convert grazing land into alternative uses that may involve a carbon sink (e.g. revegetation and farm forestry activities).

The Greenhouse Challenge Office has prepared a workbook on quantifying the greenhouse benefits of vegetation management, to assist companies to obtain credit for carbon sequestration. If reliable quantification of sequestration can be developed, this will provide an additional incentive for sequestration projects to be included in the trading system, contributing to achieving reductions in net greenhouse emissions at the minimum cost.

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### ***4.3 The allocation of the right to emit greenhouse gases***

One of the most important aspects of a tradable permits system from Queensland's perspective is the system for the allocation of permits. The way in which permits are allocated among participants in the relevant markets will affect the ease of entry of new suppliers, the ability of existing suppliers to expand capacity and the costs of remaining within the aggregate emissions ceiling for suppliers meeting growing demand. The practical issues in the design of a tradable permit system are examined below.

#### The Nature of the Product

The first issue to determine is what type of emissions each permit covers. As noted in the Preamble, the ideal would be to have a common CO<sub>2</sub> equivalent for all emissions, to facilitate trading by all producers. Initially, tradable permits may need to be limited to those greenhouse gases that can be most readily measured and verified (carbon dioxide and the halogenated greenhouse gases). In particular, trading in carbon dioxide would be important, as it is the largest source of greenhouse emissions in Australia (accounting for 72% of total greenhouse emissions). However, concentrating solely on CO<sub>2</sub> emissions may lead to a failure to take more cost-effective measures to reduce emissions of other greenhouse gas emissions.

The next step is to define the period for which a tradable permit would apply. A longer duration for permits will assist the development of the market, as they would be a more valuable property right. Firms possessing longer duration permits would have more confidence in conducting forward planning. The disadvantages of longer duration permits is that they provide governments with less opportunity to change aggregate permissible emissions levels either to allow for industry growth or to gradually tighten emissions limits, and may discourage new entry. To address these issues, governments may need to issue both shorter and longer duration permits.

Industry groups have also advocated that tradable permits should be a property right, so that the permit could not be withdrawn or removed from the permit-holder while they remain current unless the Government offered compensation on just terms.

#### Setting an Aggregate Emissions Limit

In Australia, the Commonwealth and State Governments would need to agree on the aggregate level of emissions to be covered by tradable permits. This would be derived from the limit on greenhouse emissions set in the Protocol to the FCCC, which is an increase of 8% over 1990 levels. The actual limit on emissions will depend on the initial coverage of greenhouse gases and sources of emissions in the initial tradable permit system.

Limits may need to be set as an annual average to be achieved over a longer period, to allow for adjustment time. For example, an initial period for an emissions ceiling in Australia could be 2001-2005, with a second period in which the limit may be varied, in 2006-2010.

To allow for expansion of industry and the entry of new participants, the volume of permits that governments issue initially may be less than the national limit. This would add to the incentive for existing participants to increase efficiency. Alternatively, the Government could issue permits of varying time periods. If all permits were allocated initially, then new entrants would need to purchase them at market prices.

## Systems of Allocation

Governments have the following options for allocating permits among market participants:

- i. To allocate tradable emissions permits at no charge to current industry participants, and then allow trading in the market to determine prices.
- ii. To allocate some permits free of charge, and then auction the remainder of permits to establish market prices.
- iii. To auction all tradable permits, so that existing producers and new entrants bear the cost of emissions from the start.
- iv. To sell permits at a fixed price to both existing and new participants.

These allocation systems have advantages and disadvantages. For example, allocating permits at no charge to existing participants provides recognition of existing industrial practices, and allows the market in tradable permits to be established gradually. However, adopting such a system requires complex decisions on how permits are allocated. If permits are distributed according to current or recent emissions levels, this would tend to reward market participants with high emissions levels and could work to the disadvantage of producers serving States or regions with high rates of population growth or future energy demand. This type of distribution could disadvantage producers who have taken measures to reduce emissions immediately before the trading system starts (and would receive a lower allocation of permits than producers who have not taken abatement action) and could also act as a barrier to entry to new suppliers.

The US sulphur dioxide trading system is an example of having the majority of permits issued free to existing participants, but with auctions of additional permits to stimulate trade. However, this system also demonstrates the potential complexity of the initial allocation of permits. The Clean Air Act 1990 includes a number of formulae for taking account of specific factors in each State. These factors included whether a utility would increase capacity utilisation, was located in a State with high population growth rates, was installing scrubbers to remove emissions and was located in regions with high-sulphur coal.

The disadvantage of the US sulphur dioxide allocation system is that it involves 29 allocation formulae, and the US Environmental Protection Agency estimates that the complexity of the allocation system has accounted for approximately one third of the costs of developing and supporting the emissions trading system in its first five years. These costs should reduce once the trading system has been operating for a longer period.

In electricity generation, Australia is moving to a national market, and therefore the characteristics of production in each State may be less relevant in permit allocation.

If all tradable permits are auctioned to producers, governments do not need to be concerned about the formula for allocating permits among participants, as this will be determined in the bidding process. Governments may wish to maintain some reserves of permits to allow for industry expansion or could issue permits of different durations, which would facilitate purchases of permits by new entrants. Auctioning all permits would produce a flow of revenues to Government at the time of their issue, which could be used to reduce other taxes. If the reductions are made in company taxes or other taxes on industry inputs (e.g. payroll taxes), the adoption of tradable permits will not increase overall industry costs, and may lead to net benefits to industries.

However, this revenue would be largely short-term, as the government would only receive additional auction revenue when it increased the volume of permits on the market or issued new permits to replace expired permits. Therefore, governments would need to be cautious about committing to on-going tax reductions or commitments to additional expenditure based on auction revenues.

The Australian Industry Greenhouse Network has indicated it would not favour the use of emissions trading as a revenue-raising exercise, as this could make Australian industries less competitive, especially with producers in non-Annex 1 countries that are not subject to current emissions limits. **However, by incorporating true resource costs into production costs, emissions trading should lead to more efficient resource use. In addition, the payments for tradable permits may be offset by avoiding other environmental regulations that would add to costs, and also through using the revenue from the sale of permits to reduce other taxes or charges.**

A related concern about auctioning all permits at the commencement of a tradable permit system is that the additional costs for current emitters and for new entrants of purchasing permits will create a sudden structural adjustment for the more emission-intensive industries. An alternative approach that could produce less disruption for current producers would be to issue some permits free of charge initially and auction the remainder. The auctioning process would allow for new entrants and would require current producers to purchase at least some of the permits they would require to cover emissions. Once the permits allocated reach their expiry date, auctions of new permits would be held to replace them.

This approach still requires consideration by governments of how the initial free allocation of permits should be distributed among producers. As noted above using current or recent emissions levels as the basis for distribution may have the effect of rewarding current emitters.

The option of selling permits at a price fixed within each country has been advanced by Professor Warwick McKibbin as a means for achieving international greenhouse restrictions. Each country would sell permits at a fixed price for any expansion of emissions by domestic producers. The advantages that this system would have is that the price is known to both industry and government, and producers can determine if their cost of emissions abatement is above or below the fixed permit price. The flow of revenue to the government is also more predictable.

However, this system provides less certainty of the level of emissions abatement than a system in which the number of permits is fixed, and might be less suitable where a country is attempting to reduce the volume of emissions. This could be addressed by the country initially setting a price which it estimates would lead to the targeted level of emissions, then varying the price in the light of actual emissions.

With any system of initial allocation of tradable permits, a desirable feature would be a facility to “bank” permits. This system allows participants to purchase permits in excess of their current level of emissions, to assist with limiting emissions in the future. This facility provides additional flexibility in meeting emissions targets over time. However, it does raise the danger of existing market participants hoarding permits, thereby increasing the price for new entrants. Having some permits of a shorter duration would limit opportunities for hoarding, and participants are also less likely to hoard permits if they are required to purchase all permits rather than receive a free allocation of permits.

Any adverse impacts of such a domestic system would be offset once an international system was in operation, as prices would converge internationally and domestic hoarding would not affect the world price.

The system that would provide the maximum incentive to reduce emissions, does not require the government to decide the initial allocation of permits, and would discriminate least against new entrants is to auction all permits from the commencement of the tradable emissions scheme. While this system would raise costs for existing producers, some of these costs could be offset through reductions in other taxes as a result of the revenue gained from tradable permits.

#### ***4.4 Regulatory mechanisms to support a national and potentially an international market in emissions trading***

##### National Trading System

The first requirement for an emissions trading system is the accurate measurement of emissions to establish a base-line against which future permissible emissions levels can be set, and to allow compliance with the trading system to be monitored and enforced.

Therefore, in Australia the Commonwealth Government would need to pass legislation setting out the requirement for the national level of relevant emissions to be no higher than the amount covered by tradable permits on issue.

The legislation would also need to specify the requirements for monitoring and reporting of emissions levels, and penalties for non-compliance. The responsibilities of State Governments in monitoring and enforcement would also be specified. The sectors of the economy that would be involved in trading should also be specified (possibly by regulation rather than in an Act, to allow for changes in industry coverage).

The provisions in legislation that set penalties may indicate that emissions may be permitted to increase above the level covered by permits under extreme or unusual circumstances (such as bushfires). Such an exemption may only be required if emissions are reported and monitored at frequent intervals. If the basis for compliance is annual average emissions, extreme events may have little impact on the capacity to comply.

If governments make a free allocation of permits initially, the basis for allocating permits among different producers should be specified by regulation (so that this is a transparent process).

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## International Trading System

The features of a domestic emissions trading system would need to be consistent with the features of the proposed international trading system to allow the domestic system to be integrated with the international system. The key factors to be determined in an international emissions trading system are:

- The countries that are permitted to take part in emissions trading (under the Protocol to the FCCC, this may be limited to the countries bound by an emissions limitation target).
- The greenhouse gases that would be incorporated in an international trading system, and whether separate markets should be established for different greenhouse gases
  - Having separate markets initially would have some advantages, as it would ensure that the greenhouse gas units traded by each country were comparable, and would also separate trading in gases where measurement is more accurate (such as CO<sub>2</sub>) from other gases.
  - As confidence in the measurement of other greenhouse gases increases, the preferred option would be to establish CO<sub>2</sub> equivalent as the standard unit of trading, so that producers in each country can pursue the least cost mix of emissions reduction, sink enhancement or purchases of permits.
- The range of entities that would take part in a trading system (i.e. would governments as well as private firms undertake trading?).
  - Increasing the number of traders in the market would reduce concerns about market power. The appropriate role for government would be in monitoring and reporting on trading by private companies, rather than in being an active trader, except to acquire permits for their own operations.
- The appropriate international body to monitor and regulate trading.
  - It may be possible for an existing international organisation, such as the Global Environment Facility (GEF) to monitor and regulate projects. However, a body that was also providing funding to environment projects (such as the GEF or the United Nations Environment Program) may not be sufficiently independent to undertake this task. Another alternative would be to have the World Trade Organisation manage the system, as its expertise is in trade issues. In any of these organisations, a separate division may need to be established to ensure the independence of the regulation and monitoring activities.

### **4.5 Possible emissions traders, administration and transaction costs**

An efficient trading system will need to minimise transaction costs and facilitate information flows. The most efficient system may have no restrictions on who can participate, and it is likely that commercial permit brokers will emerge. In practice, an initial scheme might be more limited, being freed up as trading becomes more established.

In selecting the range of potential emissions traders, governments would need to balance the benefits of having a comprehensive coverage of greenhouse gases and emitters, and ensuring that the costs of monitoring and administering a tradable permits system were below the benefits.

An initial focus of a trading system could be energy suppliers (e.g. power stations, petroleum refineries) rather than energy users (e.g. smaller firms, transport operators). However, a more complete coverage (and therefore a more competitive market) would be provided by also including major industrial energy users (which would be particularly relevant for producers of metal products, where production is energy-intensive).

It is easier to apply an emissions trading system to stationary sources of emissions rather than mobile sources, but in the long run it may be possible to extend emissions trading to large transport operators (e.g. airlines, road and rail freight companies), who may be able to partly offset the cost of purchasing more fuel-efficient vehicles by the sale of emissions permits.

Market participants would not be restricted to large emitters. Other participants in the market would include:

- individuals or businesses that would have opportunities to earn credits through carbon sequestration;
- emissions brokers who would act as intermediaries between businesses seeking to buy or sell permits; and
- environmental groups which may purchase tradable permits to reduce the overall level of emissions.

If voluntary traders such as government regulatory agencies or environmental groups purchased permits, this may increase prices of permits and therefore raise costs for existing participants, changing the mix of emissions abatement and permit purchase to a level that may not be economically desirable. However, in practice these organisations would face financial constraints in becoming major market participants.

The participation of emissions brokers is likely to be a key factor in reducing transaction costs. Brokers can reduce search and negotiation costs by reducing the effort required by investors to find and contact other traders. A number of features of the US sulphur dioxide trading system limit transaction costs, including:

- brokers and information services reduce search costs for potential traders;
- the government is not involved in approving individual trades, as emissions from participants are reported on an annual basis, rather than for each trade;
- the adoption of continuous emissions monitoring gives participants confidence that emissions will be covered by permits; and
- the penalties for emissions in excess of the amount covered by permits are significant, which also increases confidence in trading.

Some of the features of the US model could be applied to trading in greenhouse emissions in Australia. In particular, if governments are not involved in approving individual trades, this should assist in reducing transaction costs for market participants. However, this would require a strong emissions monitoring system and clearly-defined penalties for non-compliance to be effective.

Governments should be able to restrict their administrative costs by issuing permits of a longer duration, limiting the application of the permits system to gases where emissions can be verified readily, applying the emissions ceiling to the more significant sources of emissions, adopting relatively simple mechanisms for the initial allocation of permits among market participants, and requiring regular reporting of emissions levels but not approving

individual trades. Electronic trading systems are likely to facilitate transactions and monitoring of trades.

#### ***4.6 Roles and responsibilities of governments and other stakeholders***

The level of government in Australia with the responsibility for establishing and operating a system of tradable emissions permits is the Commonwealth Government, for the following reasons:

- Australia's obligation to limit greenhouse gas emissions arises from an international agreement, which the Commonwealth Government is due to sign on Australia's behalf;
- Emissions of greenhouse gases constitute a national environmental issue, as the location of the activity producing greenhouse gas emissions does not affect their concentration in the atmosphere; and
- Establishing a market with a sufficient number of traders to operate effectively would require a national market.

Therefore, the Commonwealth's roles would be to enact legislation that set national limits for greenhouse emissions, and to establish the rules for a trading system and the penalties for non-compliance with the system. The Commonwealth would also collect revenue from the sale of tradable permits (initially), and would need to determine the allocation of this revenue (e.g. to reduce taxes, or make additional payments to State and Territory Governments). As the impact of reducing greenhouse emissions will be uneven across regions and industries, the revenue that the Commonwealth may obtain could be used in part to provide adjustment assistance to regions suffering adverse effects, and general assistance to States with the largest impacts through the allocation of Financial Assistance Grants.

The Commonwealth Government may also obtain revenue from penalties for emissions in excess of the amount covered by permits, although this flow of revenue would not be predictable and, if the deterrent of the penalties is sufficiently strong, would be low.

State, Territory and Local Governments would have a significant role in the development of monitoring and compliance mechanisms. For example, where State and Territory Governments are conducting emissions monitoring, these activities could be extended to include the relevant greenhouse emissions. State Governments also own a number of enterprises that are likely to be participants in greenhouse emissions trading, and would monitor their compliance with the limits set by the permits system.

Individual companies and government-owned corporations have a responsibility for ensuring their compliance with the emissions ceilings, whether by reducing emissions or by purchasing emissions permits. Businesses also are responsible for monitoring and supplying information on their emissions levels to State or Commonwealth Governments on a regular basis.

Industry associations would also have a role in the development of a tradable permits system, by educating members on their options for complying with emissions limits, and collecting and disseminating industry-wide information on emissions levels and use of tradable permits.

Environmental groups would have a role in reporting on trends in emissions from different industries and participating in the market for tradable permits, by purchasing permits to assist



in reducing total emissions (subject to financial constraints). Environmental groups may also promote the development of greenhouse sinks, and receive carbon credits for these activities.

#### ***4.7 The impact of emissions trading on the environment, industry and the economic and social welfare of the Australian community***

##### Environmental Impact

As tradable permits are a mechanism to achieve the specified reduction in emissions, the overall environmental impact within a country from the use of tradable permits is likely to be similar to the use of regulations or adoption of other economic instruments. However, if a national market in greenhouse emissions is established, the outcomes would be less certain for particular regions than with more specific regulations (as producers in a region may elect to purchase permits rather than undertake a higher level of emissions abatement). This issue is not relevant for greenhouse gas emissions, as the atmospheric impact is independent of the location of the emissions source.

It is likely that a tradable permits system would lead to better environmental outcomes than less flexible systems, as producers have an incentive to not only comply with emissions limits but to achieve lower emissions levels, and therefore receive income from selling tradable permits. In the US sulphur dioxide trading system, the aggregate SO<sub>2</sub> emissions levels have been well below the limit set in the Clean Air Act (in 1995, actual emissions were 5.3 million tons, compared with the limit of 8.7 million tons).

At the global level, the adoption of tradable permits is likely to produce better environmental outcomes than if that flexibility were not available. This results from those countries with low costs of emissions abatement having an incentive to undertake a higher level of emissions abatement, as they can obtain a financial benefit for doing so. Countries with higher emissions abatement costs will be able to purchase permits, and therefore achieve a higher level of economic activity. However, these countries will also have an incentive to make use of lower-cost emissions reduction methods over time, to avoid the cost of purchasing large volumes of permits.

The targets for emissions reduction in the Protocol to the FCCC agreed at Kyoto include only Annex 1 countries (industrialised countries and the former Soviet Union and Eastern Europe). This raises the prospect of industry relocating some activities to developing countries where production may be more emissions-intensive (carbon leakage). However, carbon leakage is likely to be reduced by adoption of tradable permits, which allow Annex 1 countries to reduce emissions at a lower cost. For example, the Australian Bureau of Agricultural and Resource Economics (ABARE), in research report No. 97.4, has estimated that increases in emissions in non-Annex 1 countries would offset approximately 12% of reductions in emissions in Annex 1 countries with a uniform abatement target, and approximately 5% of reductions in Annex 1 countries with a system of tradable permits.

Therefore, the use of tradable permits should allow for a significant improvement in the global environmental outcome, by encouraging a higher level of emissions abatement where the costs of doing so are lower than the price of permits, and encouraging developing countries to adopt less emissions-intensive production methods.

##### Industry and Economic Effects

The impact on particular industries of adoption of tradable permits depends on the design of the tradable permit system. It is likely that the pace of structural adjustment will be higher if all permits are auctioned than if some permits are allocated free of charge. If an industry with a high anticipated growth rate in demand can accommodate this growth at a relatively low cost through the purchase of permits, this should result in a lower sacrifice in output than if specific emissions limitations are applied.

Nevertheless, achieving overall emissions reductions with a tradable permit system will still require adjustment by industries with emissions-intensive production. For example, modelling by Queensland Treasury in 1997 on the impact of meeting a greenhouse reduction target on different sectors of the economy indicated that the non-ferrous metals sector would face a significant reduction in output (compared with the baseline business-as-usual assumption) even with the adoption of a tradable permit system.

(In interpreting modelling results on the impact of greenhouse emissions limitations on the economy overall and on particular industries, it is important to note that reductions in output are against a baseline assumption of significant output growth for many industries. Therefore, production may not fall from current levels.)

The aggregate economic impact of reducing greenhouse gas emissions is likely to be more favourable with tradable permits than with alternative approaches to reducing emissions. The Department of Foreign Affairs and Trade has indicated that modelling by both the OECD and ABARE indicate that the net economic cost to Australia of meeting an international greenhouse gas reduction target would be reduced by more than half with the adoption of tradable permits. Achieving a greenhouse emissions reduction target may still involve some sacrifice in economic output, but this should be much lower than with a less flexible system.

It will be important for the Commonwealth and State Governments to conduct consultation with industry groups and the community in advance of the introduction of a commencement of a tradable permit system, and to provide sufficient lead time for industry to adapt to any proposed system of permit allocation.

### Social Welfare Effects

The social welfare implications of adopting tradable emissions permits may arise from their impact on the prices of goods and services, on economic activity and employment in particular regions and on environmental conditions. A system of tradable permits would have some impact on consumer prices, but tradable permits would encourage producers to adopt low-cost measures to reduce emissions before they purchase permits, limiting the increase in industry costs. The use of revenue from auctions of permits to reduce other taxes would also limit the impact on consumer prices. Where producers do need to purchase significant numbers of permits, this would add to their costs and to consumer prices.

The impact on consumers also depends on the availability of substitutes. For example, the price of electricity for coal-fired power stations may increase with tradable permits, but consumers may be able to save by substituting their electricity supplier. Therefore, a competitive market in energy supply would complement tradable permits in promoting energy efficiency.

Restricting greenhouse emissions is likely to lead to reduced output by some industries, which could have an adverse impact on employment opportunities and economic activity in some

regions (where, for example, a power station or smelter is a major employer). The adoption of tradable permits, however, should reduce the negative impact on these industries of adjusting to lower aggregate emissions. If businesses adopt innovative approaches to reducing emissions, they may also be able to take advantage of new markets, or create demand for new supporting products (e.g. new energy suppliers).

Recognition of carbon sinks may also create opportunities for additional economic activity and employment in rural areas, including by expanding plantation forestry, other tree crops or horticulture on previously cleared land. This would offset possible adverse impacts of reduced activity by grazing industries, resulting from reduced land clearing.

Therefore, given a commitment to limit greenhouse emissions, the adoption of tradable permits is likely to have positive social welfare impacts compared with alternative approaches, as it should reduce the economic adjustment costs of reducing emissions.

Where adjustment to lower greenhouse emissions does have a disproportionately adverse impact on particular industries or regions, there is likely to be a role for adjustment assistance from the Commonwealth Government. One option would be for the Commonwealth Grants Commission to take this into account in recommending the relative share of financial assistance grants to each State and Territory. One of the criteria that the Grants Commission uses in determining relative grants is changes in economic conditions in each State and Territory, so those States and Territories that suffer a relatively large economic cost from emissions abatement would receive some additional payments. However, as major reviews of grant relativities are held only once every five years, this may not provide timely assistance to States or Territories experiencing significant adjustment pressures, and more specific measures might be needed.