

Taxation and the Environment

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Summary

This report considers how the tax system in Australia contributes to environmental degradation (or helps protect the environment). The structure of the tax system can play an important role in either protecting or causing harm to the natural environment. If resources are to be used efficiently and the natural environment protected, an important first step is to ensure that the tax system does not provide either incentives to conduct environmentally damaging activities or disincentives to act in ways beneficial to the environment. There is a large body of research on the desirability of 'green taxes' and proper natural resource pricing. In recent times, the OECD has signalled its support for the use of taxes and other economic instruments to improve environmental outcomes throughout the 1990s, as has the IMF.

This report examines existing taxes, charges and related incentives that encourage either environmental protection or degradation in each of the areas of transport, stationary energy, land, water, forests and waste. For each of these sectors, the report identifies the key environmental issues and offers some recommendations for correcting some of the perverse incentives that already exist and other recommendations to ensure environmental costs are brought into financial decision-making. Each sector is discussed below. The study also considers international developments that may be of assistance to Australian policy makers. It is important to note that where an additional charge, tax or levy is recommended, it is proposed that in most cases these form part of a package where any additional revenue is recycled to protect those most disadvantaged by the policy by removing regressive taxes and charges or providing rebates.

International

In recent years throughout the OECD there has been a proliferation of taxes and charges designed to solve environmental problems. For the most part, the development and implementation of these measures has not been based on systematic collection of quantitative information on environmental damage but on a broad consensus as to the critical areas that need to be addressed. In general, Western European countries are more advanced than the USA in the implementation of environmental taxes and charges. Yet, while progress at the national level has been slow in the USA, several states of the USA are implementing quite sophisticated suites of measures.

The main targets of environmental taxes and charges in the OECD have been transportation and waste disposal. There is little doubt that transport systems have been the principal focus of government use of economic instruments. At the broadest level they have included carbon and energy taxes, but have also embraced a range of measures to reduce congestion and to encourage alternative fuels.

In comparison, Australia lags behind most other OECD countries in the development of policies, particularly the application of taxes and charges, to deal with environmental problems associated with transportation, stationary energy emissions and wastes.

Transport

In Australia as elsewhere, transport imposes significant social costs, in the form of accidents, air and noise pollution, greenhouse gas emissions, loss of amenity for other road users and pedestrians, opportunity cost of land used for transport, damage to wildlife and so on. Congestion also imposes major social costs, consuming valuable productive time. The financial subsidy to road transport is estimated to be up to \$20 billion per annum, excluding the cost of greenhouse gas emissions. The current system of vehicle and travel charges is inefficient and leaves major externalities unpriced, leading to a general over-consumption of travel. Further, different transport modes do not receive similar treatment, with rail-based transport covering a larger proportion of its total costs, compared to road-based transport. Consequently, all evidence suggests that there is over-consumption of road transport.

Recent changes to the tax system in Australia have exacerbated inequities in transport pricing, while existing tax regimes, such as that for fringe benefits, include direct incentives for additional travel.

Recommendations

- Implement a more cost-reflective system of road-user charges for heavy vehicles and investigate area-based congestion charging for all vehicles in congested areas.
- Promote fuel efficiency through graduated stamp duty on new vehicles and graduated registration fees that reward fuel-efficient vehicles. In addition, introduce pay-by-kilometre third party insurance and registration charges. The changes could be revenue neutral.
- To tackle congestion and air pollution in major urban centres, introduce a system of cap and trade for parking spaces.
- Commonwealth reforms to FBT provisions so that employer-provided vehicles and parking no longer receive concessional treatment.

Stationary energy

While there are a number of anomalies in the system of taxes and charges for stationary energy, they are, with the exception of the transmission charging issue and underpricing of electricity for aluminium smelting, secondary. The major problem in the stationary energy sector is the absence of taxes on pollutants, notably greenhouse gases, which encourages the growth of coal-fired electricity, the most polluting form of electricity. Other OECD countries are beginning to address this problem through the implementation of taxes on emissions. Australia is lagging in this area with successive governments relying on voluntary measures that are largely ineffective.

The Commonwealth Government's Mandatory Renewable Energy Target, although providing incentives to renewable energy generation and encouraging retailers to incorporate into their prices the externalities associated with conventional electricity generation, covers such a small proportion of Australia's electricity generation that it will fail to produce the most economically desirable outcome.

Recommendations

- Eliminate electricity price subsidies to aluminium smelters and other subsidised users. The savings, in the order of \$300 million per annum could be used to promote low-emission energy sources.
- Remove cross-subsidies that disadvantage electricity supply from gas and renewable sources, including transmission and distribution charges.
- Investigate the introduction of a greenhouse gas emissions trading system for retailers selling into the National Electricity Market, or
- Apply a small levy to all electricity sales with the revenue used to overcome the price disadvantage for electricity from renewable sources.

Water, Land and Forests

In the case of land, the tax system needs to treat consistently conservation activities on land regardless of whether a business is being operated. Addressing this should remove some incentives to exploit, rather than protect, high-conservation value areas. Access to accelerated depreciation for water and land conservation activities also needs to be tightened to ensure only genuine conservation activities receive these benefits. In addition, there may be some need to provide additional incentives to undertake conservation activities in those areas with highest environmental value, perhaps through an additional rebate.

In the case of urban water consumption, water conservation requires a more rapid transition to a two-part tariff in which a volumetric charge can encourage water saving. For irrigation water, there are no major tax issues influencing the environmental impact of irrigation water use, except for the availability of accelerated depreciation for investments in irrigation and water storage. However, faster progress is needed towards an efficient system of water charges, or equivalent pricing through water trading after allocation of adequate environmental flows.

There do not appear to be major tax issues associated with forest operations, although some attention could be given to investigating the comparative level of royalties between logs from native forests and plantations. The charging and pricing practices of state forest management agencies may be contrary to the principles of competitive neutrality thereby disadvantaging plantation timber.

Overall, in the case of forests, issues of environmental protection are best dealt with through regulation (including legislated reservation) than by the use of economic instruments. This holds for publicly owned forests. There is a stronger case for the use of economic instruments to bring about a higher level of protection of high conservation value native forests on private land.

Recommendations

Urban water use

- Hasten shift to full user charging with a two-part tariff and consider raising the user charge to send stronger conservation signals.
- Introduce a price wedge between fresh and recycled water to encourage recycling such as a resource rent tax on fresh water.

Rural water use

- Rapid extension to full water rights trading for all commercial users, with a reducing cap on total extractions aimed at achieving an adequate level of environmental flows.
- Consider extension of salinity and other pollutant trading schemes for discharges into waterways.

Land

- The Commonwealth should consider the introduction of a 1 per cent income tax levy to fund large-scale investments in land conservation based on the principle of mutual obligation.
- Tighten those sections of the Income Tax Assessment Act that deal with land and water conservation.

Forests

- Investigate through the competition policy framework means to ensure royalties, land-use charges and profits and taxes paid by suppliers of native forest logs are competitively neutral with respect to plantation timber.

Waste

To date, governments have established per capita targets for waste reduction, introduced load-based licensing schemes, waste charges and kerb-side recycling and, in the case of South Australia, maintained deposit-refund schemes. However, other work suggests that waste can be reduced further by focusing on reducing quantities of materials used and reducing overall consumption. In this case, taxes and deposit-refund schemes on various materials are worth expanding.

Industrial waste should be addressed by continuation and expansion of load-based licensing schemes, and the introduction of tradable permit schemes where appropriate. Over the long-term, clearly-defined targets for future licensing charges and reducing caps need to be established. These should be coupled with cleaner production initiatives, which could potentially be encouraged through a life-cycle pollution trading scheme.

For hazardous wastes and materials, there may be some scope for the extension of deposit-refund schemes, or the introduction of hazardous material taxes. Such approaches may also be appropriate for dealing with those wastes prone to illegal dumping or difficult to collect in recycling schemes.

Recommendations

- Extend load-based licensing and introduce tradable permit schemes for pollutants where appropriate. Determine the level of load-based charges or the capped quantities required to meet stringent community standards into the future.
- To promote cleaner production, investigate a system of life-cycle pollution trading that allows producers to meet licensing requirements through improvements in product design and manufacturing processes.
- Introduce measures designed to improve the relative cost of using recycled building materials compared to virgin materials.
- Consider extensive system of product taxes and/or deposit refunds, including tyres, batteries, car bodies, beverage containers, packaging, white goods, computers, office equipment and pesticides with revenue earmarked for clean-up and disposal or recycling of resource-intensive, long-lived and dangerous goods.

1. Introduction

The objective of this report is to examine how the tax system in Australia contributes to environmental degradation (or helps protect the environment). The study covers taxes, tax concessions and user charges at the local, state and Commonwealth levels. Where called for, brief references are made to other economic instruments, such as water and salinity trading, but does not consider subsidies to resource use.

The study also considers international developments that may be of assistance to Australian policy makers. The international literature covering environmental taxes is vast and we have relied on a number of review papers concentrating on environmental taxes and charges in Europe and the USA.

The Australian literature on taxation and the environment is desultory but extensive, especially when all major economic sectors are considered. The reference section of this report gives an indication of its extent. It is not possible within the scope of this study to provide a comprehensive review of all relevant studies or instances of environmental taxes and charges in Australia, but we have selected those that are most relevant. More recent overviews that provide detail on the operation of selected economic instruments are DEST (1996a), DEST (1996b), Hamilton, Hundloe and Quiggin (1997), Industry Commission (1997b), James (1997) and ABARE (2001).

The major objective of this study is to review the evidence on taxes and the environment to illustrate both the range of adverse impacts and, where feasible, determine the value of the impacts that the tax system has on the natural environment. However, quantitative information is limited as there have been few studies that have attempted to estimate the scale of environmental impact. A notable exception is the study by Turton and Hamilton (1998) on the expected effects of Australia's new indirect tax system on atmospheric pollution.

The report is structured as follows. The next section provides an introduction to understanding how market forces can damage or help protect the natural environment. It also discusses the role of green taxes, an area that is the subject of a very large number of studies abroad, but only a handful in Australia. Section 3 reviews the international experience. The subsequent four sections review the state of environmental taxes and charges across key sectors in Australia: transport; stationary energy; forests, land and water; and wastes. Section 8 offers some conclusions and considers the priority areas for reform.

2. Market forces and the environment

Market forces will generate efficient outcomes only when market conditions approximate the conditions of the competitive market model.¹ A number of important environmental problems arise from simple market failures such as the existence of externalities and public goods and imperfect information. While policies can be designed to overcome these market failures, other environmental problems are caused by direct *policy* failure, such as granting of subsidies to activities that do harm to the natural environment and distortions in the tax system that provide financial incentives to behave in ways that are harmful to the environment.

There is a large body of research on the desirability of green taxes and proper natural resource pricing.² In recent times, the OECD has signalled its support for the use of taxes and other economic instruments to improve environmental outcomes³ as has the IMF. A paper published by the IMF entitled ‘The IMF and the Environment’ declared:

The Board concluded that IMF staff should develop a greater understanding of the interplay between economic policies, economic activity, and environmental change. This would help to avoid the possibility that the IMF might recommend policies that could have undesirable environmental consequences, while ensuring that the thrust of its actions – promoting sustainable growth and reducing poverty – also helps mitigate environmental concerns (Ghandi, 1998).

The IMF has also published a large number of reports concerned with the desirability of relying on green taxes and other economic instruments to protect the environment.⁴ The World Bank also advocates reliance on green taxes and market mechanisms in order to overcome environmental degradation.⁵

While taxes are obviously an important source of revenue for governments, it is their capacity to influence the *relative* prices of different goods and services that makes them so useful in improving environmental outcomes and increasing allocative efficiency. That is, in a market system it is the relative prices that are used to signal relative abundance to consumers. Market prices will perform the signalling function poorly when ‘externalities’ are present. An externality is a cost associated with the production or consumption of a good or services that, while important to society, has not been taken into account by either the producers or consumers. An environmental tax therefore puts pressure on producers to change their behaviour (and implement measures that, while designed to reduce their tax payments, serve to reduce harm to the environment). It also induces consumers to shift their consumption patterns away from goods and services whose production causes significant environmental damage.

¹ See, for example, Tisdell 1982.

² For an overview, see Hamilton, Schlegelmilch, Hoerner and Milne 2000

³ See the various OECD publications listed in the reference section.

⁴ See for example Norregaard and Reppelin-Hill (2000), Norregaard and Reppelin-Hill (2001), McMorran and Levin (1993).

⁵ World Bank 1996, 1999, 2000a, 2000b

It is important to stress that the reliance on taxes is by its very design not a ‘win-win’ approach to environmental reform. Some producers will face higher costs or consumers will pay higher prices after the introduction of a tax designed to overcome the existence of market failures. The existence of a small, identifiable, group of people who will lose out following the introduction of a particular reform is likely to result in opposition. As the beneficiaries of reform are likely to be more diffuse it is unlikely that supporters will be as highly vocal. The political difficulties of implementing reforms will be discussed in Section 8.

The capacity of producers to adjust to the imposition of green taxes varies between the short and long term. Over the long term, producers have more options either to expand their production capacity, employ new production techniques or to exit from one market and enter another that is considered to offer higher returns. This process of change is ongoing in a capitalist economy, and the introduction of green taxes has the capacity to increase the rate of change and influence the direction of changes adopted by profit-seeking firms. Given that a firm’s capacity to adjust is more constrained in the short run it may be necessary to consider the transition phase when policy instruments are being designed.

Finally, it is important to consider the link between environmental damage and the level of economic activity. While tax reform could, for example, shift the source of energy away from more harmful fuels (such as coal) and towards less harmful ones, the total demand for energy, which is influenced by the total amount of economic activity, will also play an important role in determining the final impact on the natural environment. It has been shown (by, for example, Hamilton and Turton (2002)) that economic growth is the most powerful factor driving up levels of greenhouse gas emissions. In the absence of countervailing measures, tax reforms that improve the growth rate of the economy will increase the rate of environmental degradation. This is a powerful reason for ensuring that countervailing measures are built into any tax reform proposals.⁶ In the case of energy, measures to restrict and then reduce the growth in demand for energy are a crucial part of any long-term strategy.⁷

⁶ Something that was manifestly missing from the original GST Package – see Turton and Hamilton (1998) – and which had to be rectified before it won parliamentary support.

⁷ See, for example, the proposals for cutting Britain’s greenhouse gas emissions by 60 per cent contained in Royal Commission on Environmental Pollution (2000).

3. International experience

This section reviews the situation with regard to environmental taxation abroad. It begins with an overview of the OECD and then provides more detail on the European Union and the USA. While European countries are generally more advanced in this area, experience in the USA has particular relevance to Australia because of cultural and political similarities. In particular, many resource management issues fall within the jurisdiction of state governments in both the USA and Australia. The literature we review takes the form of overviews. With a few exceptions, it is not feasible to separate the discussion by area of impact within the scope of this study.

Experience with environmental taxation is by no means confined to Western Europe and North America. Economic instruments are also in use in the transitional economies in Eastern Europe and in some are well advanced. In countries such as Poland, Hungary and Estonia environmental charges and taxes have been seen as a promising mechanism to integrate economic and environmental policies. Slovenia introduced a carbon tax in 1997 and tripled the rate in 1998. The Czech Republic, Poland and Hungary have plans to take similar actions in 2001 and beyond. In Poland, taxes on fuels have been increased substantially and may soon catch up with those in neighbouring Germany (Schlegelmilch 1999a). Governments in fast-growing Asian economies, such as Taiwan, Korea, Malaysia, Thailand and Singapore, have frequently applied market-based instruments over the last five years, alongside traditional command-and-control regulations (Schlegelmilch 1999a).

3.1 Studies of the OECD

The OECD's first review of the use of environmental economic instruments in 1989 identified about 150 instruments in use in member countries, or 100 if subsidies, purely administrative charges and liabilities are excluded. However, the significance of these instruments was not very great. Only about a third may have had some incentive impact. By 1994 the number of instruments had increased by over 50 per cent, with highest growth in product charges and deposit-refund systems (OECD 1995). Moreover, five OECD member countries had introduced carbon or carbon-energy taxes (Denmark, The Netherlands, Norway, Finland and Sweden); four countries had conducted a limited environmental tax reform (those previously mentioned except Finland); eight had set up official task forces or commissions to explore further opportunities for such reform, or for implementing environmental taxes in general; and a further six had announced an intention of making increased use of economic instruments in environmental policy.

The most recent review of environmental taxation in the OECD reveals that a number of other members have followed the lead of the Scandinavian countries and the Netherlands by introducing energy and carbon taxes (OECD 2001). For example, Austria introduced energy taxes in 1996 and has recently increased the rate on electricity. The United Kingdom introduced a climate change levy in April 2001 (although this followed abandonment of the road fuel duty escalator).⁸ Italy adopted a carbon tax on mineral fuels in 1998 with a phase-in period. Similarly, Germany has

⁸ The UK is planning to implement other environmental taxation reforms such as introducing of taxes on virgin materials including sand, gravel and rock.

increased charges on mineral oil and electricity. However, the largest increase in environmental taxation revenue in the OECD has come from waste taxes. In general, over 12 OECD countries levy environmental taxes that raise revenue equivalent to 3 per cent or more of GDP (OECD 2001, Figure 3) and Denmark raises an average of around US\$1600 per capita from environmental taxes (OECD 2001, Figure 5).

An earlier study by the OECD (1997) listed 40 different types of environmentally related taxes and charges in OECD countries and recorded 338 applications in the 28 OECD countries. Among the taxes or charges that apply to several OECD countries but not Australia are:

- diesel fuel taxes that apply differentially according to quality including sulphur content (this is expected to change soon in Australia);
- taxes on the carbon content of fuels;
- differential taxes and registration charges on vehicles according to their emission levels;
- taxes on pesticides;
- taxes or charges on aircraft (other than noise charges); and
- environmental charges on batteries, tyres and disposable containers (OECD 1997, Annex Table 1).

Road transport is a particular focus of environmental taxes and charges in the OECD, since it generates major externalities only part of which are covered by various excises, taxes and charges. Total external costs of road transport as a percentage of GDP for selected countries in the early 1990s are shown in Table 1. The shares of total costs attributable to various modes of transport are also shown. In 1995, revenue from environmental taxes and charges on transport accounted for 90% of total environmental tax revenue (OECD 2001, p. 55).

Table 1 Estimates of the total external costs of road transport

Country	Share of mode in total external costs				Total as % GDP
	Cars	Buses	M/cycles	Freight	
Europe 17	.65	.04	.08	.23	4.2
France	.56	.03	.04	.37	4.2
Greece	.53	.10	.06	.31	5.6
Norway	.70	.04	.09	.17	2.7
UK	.69	.04	.04	.23	4.7
USA					12.3 ^a

a. This figure is much higher because more externalities were taken into account. Source: Adapted from European Environment Agency 1996, Table 2

Table 2 Some environmentally detrimental tax provisions in the transport sector

Provision	Explanation
Parking space	Free (or reduced cost) parking space provided by employers is often not included in taxable income (benefit in kind).
Company cars	The use of company cars for commuting is not considered a taxable benefit in some countries.
Deductibility of commuting expenses	The costs of commuting may be deductible from taxable income and in many countries no distinction is made between the use of public transport and private cars.
Tax-free reimbursement of commuting expenses	In a number of OECD Member countries, employer reimbursements of employee commuting expenses, for cars or for public transport, are free of income taxation.

Source: OECD 1997, Box 4

It was estimated that in 1991 road transportation in the USA paid only 79 per cent of the total cost of road infrastructure and services through road-related taxes and charges, and that if tax concessions for employer-funded parking are included then the subsidy approximately doubles (OECD 1997, p. 19). However, according to the OECD, net subsidies to road use are much lower in Europe, due mainly to much higher petrol and diesel taxes (OECD 1997, p. 19). Some examples provided by the OECD of transport sector tax provisions that damage the environment are listed in Table 2.

A number of countries are experimenting with innovative instruments, such as congestion charging, as a means of addressing transport externalities. The US Federal Highway Administration defines congestion pricing as ‘charging drivers a fee that varies with the level of traffic demand on a roadway’ (Schiller 1998). Although this is not directly an *environmental* tax, a congestion charge should result in improved traffic flow, enabling vehicles to operate more efficiently and thereby produce less pollution. However, it must be recognised that congestion pricing will also shift traffic to different roadways or to different times, and may only have a small impact on total travel.

Congestion pricing initiatives fall into two categories: variable-priced tollways running adjacent to public roads, and area-based toll systems. In the former, drivers have the option of avoiding congestion charges if they are willing to travel on a congested public road, whereas area-based toll systems require all vehicles entering a particular area to pay congestion charges. The former predominate in North America (and are not dissimilar to conventional tollways operating in Australia and overseas) and the latter in Europe and developed Asia.

In Orange County, California, the California Private Transportation Company operates a tollway built parallel to a congested State highway. The toll ranges from US\$2.95 during peak hours down to US\$0.75 during off-peak periods. Vehicles carrying three or more passengers pay half the toll amount (Schiller 1998). The 407 Express Toll Route in Canada charges C\$0.11 per kilometre during the period from 6

am to 11 pm and C\$0.06 per km the rest of the time.⁹ Again, this congestion-priced road runs adjacent to congested public roads.

The above are two examples of optional congestion charge for those who place a high value on their time and have the capacity to pay. Singapore, on the other hand, has employed some form of area-based pricing since 1975. This method of congestion pricing deters those drivers who place a lower value on their need to travel during peak periods.¹⁰ Singapore now has an automated Electronic Road Pricing scheme that combines both tollway- and area-based systems, charging S\$2.50 to enter the central business district during peak periods (SLTA 2001). Norway has implemented similar area-based schemes in Oslo, Bergen and Trondheim. In Trondheim a toll ring surrounding the city centre has been established with drivers charged between US\$0.62 and US\$1.56 depending on time of day (Schiller 1998).

The congestion-pricing scheme proposed by the Greater London Authority is similar to that operated in Singapore and Norway. It is proposed that those wishing to use the central London area between 7 am and 7 pm on weekdays would be required to pay £5.¹¹

3.2 Studies of the European Union

During the 1990s the focus of the environment debate in Europe shifted from 'end-of-pipe' solutions to tackling pollution at source. The Delors *White Paper on Growth, Competitiveness and Employment* published by the European Commission in 1993 was a milestone in a widespread discussion of market-based instruments not only among environmentalists but also across all sectors of society. This understanding has been reinforced by the growth of information on the true extent of the costs of environmental damage and the burden of unpriced externalities. According to one analysis, the degree of internalisation of externalities in the energy sector (electricity and household fuels) ranges from 0 to 36 per cent. The results are shown in Table 3.

The use of economic instruments to protect the environment is now widespread in a number of European countries, notably the Nordic countries and the Netherlands, but also to some extent in the Germany, UK, France, Italy, Austria and Belgium.

In the United Kingdom, the 1999 budget was seen to be the greenest ever with the announcement of a tax on industrial energy consumption (but not households) aimed explicitly at environmental goals. This so-called 'climate change levy' is an example of ecological tax reform (ETR) as the revenue is to be used to reduce employers' social security contributions and to fund support for renewable energy development. The climate change levy augmented Britain's 'fuel tax escalator' that has seen petrol and diesel prices rise in the past. The 1999 budget also cut vehicle taxes on small cars and introduced a special allowance to be paid to low-polluting lorries and buses (see Hamilton, Schlegelmilch, Hoerner and Milne 2000).

⁹ For more information see http://www.407etr.com/html/tolls_exp.html

¹⁰ But also restricts travel by those without the capacity to pay. This may raise concerns that congestion pricing effectively prices the poor off the road. However, if revenues from congestion pricing eliminate other regressive taxes/charges or are spent in a way that improve facilities used predominantly by poorer citizens – eg. public transport – then the net effect will improve equity.

¹¹ Alternatively fuelled vehicles would be eligible for a 100 per cent discount.

http://www.streetmanagement.org.uk/initiatives/congest_charge/cc_index_full.htm

Table 3 Degree of internalisation of external costs in the energy sector (electricity and coal) 1996

	External costs (Euro/MWh)	Energy taxes (Euro/MWh)	Degree of internal- isation (%)
Belgium	109	1.4	1
Denmark	79	1.4	2
Finland	44	5	12
France	84	0.2	0
Germany	65	0	0
Ireland	70	0	0
Netherlands	42	13	32
Portugal	60	0	0
Spain	77	0.9	1
Sweden	42	15	36
UK	67	1	2

Source: European Environment Agency (2000)

The UK reforms reflect a general shift in Europe towards the adoption of environmental taxes and charges. According to the European Environment Agency:

By 2001, most EU Member States (eight) will apply carbon taxes, up from only four in 1996. Nine Member States now apply taxes on waste disposal, up from just two in the early 1990s. The number of product tax schemes is also increasing on products such as batteries, packaging and car tyres (European Environment Agency 2000, pp. 1-2).

In 1999 Italy became the first southern European country to embark on ecological tax reform. Over the period to 2004 tax rates on petrol, diesel, coal and fuel oil will rise very substantially, and the revenue will be returned through reductions in indirect labour costs. In France there are plans to introduce a small energy tax this year to finance reductions in employers' social security contributions and cuts in income taxes for low-wage workers.

In Germany, ETR formed a central part of the agreement between the Social Democrats and the Greens to form a government in 1998. Through tax increases, the prices of petrol, diesel, heating oil, natural gas and electricity were increased by around 4-10 per cent in the first year. The revenue will be used to reduce both employers' contributions to pension schemes, thereby reducing labour costs, and employees' contributions, thereby increasing take-home incomes. Renewable energy sources receive financial support from electricity tax revenue.

Schlegelmilch (1999a) provides a summary evaluation of a large number of environmental taxes in Europe divided into three categories – cost-covering charges, fiscal environmental taxes and incentive charges (1999a, Table 0) although no details are given with respect to amounts of revenue collected. Schlegelmilch (1999b) provides detailed accounts of the development of energy taxation in key European countries as well as an overview of the extensive incidence of environmental taxes and charges in central and eastern European states (Schlegelmilch 1999b, Appendix II).

Several EU countries also apply differential rates of value-added tax (VAT) on either environmental or equity grounds. For example, the Netherlands and Portugal levy a much lower rate on renewable electricity.

3.3 Studies of the USA

In some respects, experience in the US is especially germane to Australia because of the similarities of their federal systems and the fact that state governments levy many environmental taxes and charges.¹² In the USA, the use of taxation for environmental protection is not uncommon at both federal and state levels. The more important measures adopted by the federal government include:

- enacting in 1989 a significant excise on ozone-depleting chemicals according to their levels of environmental damage;
- imposing a special income tax on large corporations and excises on certain chemicals and fuels in order to finance the ‘Superfund’ program designed to clean up toxic waste disposal sites; and
- implementing a ‘gas guzzler tax’ that rises as high as US\$7,700 per vehicle for very low mileage vehicles (although this does not apply to sports utility vehicles).

In its early days, the Clinton administration proposed a major new energy tax that would have increased overall energy prices by 4 to 6 per cent. The ‘BTU tax’, which was driven by a strong need to reduce the deficit, was passed by the House of Representatives but was defeated in a Senate Committee.

State governments have been more active using a wide array of environmental tax instruments. The most comprehensive review of state environmental taxes and charges in the USA has been conducted by Hoerner (1998). Hoerner identified 462 environmental provisions implemented by State governments.

Milne and Hasson (1996) provided a detailed account of environmental taxes and charges in the New England states. Their summary is reproduced (in slightly abridged form) in Table 4. It is not feasible to provide details of each of these measures, but some illustrations will help provide a better picture (all taken from Milne and Hasson 1996).

¹² In Australia, State governments are not permitted to levy taxes; but they impose charges that operate like taxes eg. load-based licensing for industrial pollution.

Maine and Rhode Island impose taxes on a range of items that are hard to dispose of, and have established special funds to provide for better disposal facilities. The rates of tax in Maine are recorded as follows:

New tires	\$1 per tire
New lead-acid batteries	\$1 per battery
New major appliances	\$5 per appliance
New major furniture items	\$5 per furniture piece/set
New mattresses and bathtubs	\$5 per mattress/bathtub

Connecticut and Rhode Island impose a \$5 deposit on new car batteries, which is refunded by the retailer if the customer returns within 30 days with an old battery. A similar scheme operates in Rhode Island for car tyres. Five States have deposit refund systems for glass, metal and plastic beverage containers. Retailers refund 5 cents for each returned container. Maine has provided for an increase in the deposit to 25 cents if the return rate is less than 60 per cent.

In the transport sector, state governments levy taxes on gasoline in addition to the federal tax of 18.4 cents/gallon (1996 figures). In the New England states the tax rates range from 4 cents in New York to 35 cents in Connecticut. Connecticut refunds gasoline taxes paid by owners of high-occupancy commuter vehicles (the vehicles must carry at least 9 people to and from work). Some states exempt from sales tax vehicles that run on alternative fuels. There does not appear to be any systematic information on the environmental effectiveness of these measures.

3.4 Overview and implications for Australia

Several broad conclusions may be drawn from the international literature. Firstly, in recent years throughout the OECD there has been a proliferation of taxes and charges designed to solve environmental problems. For the most part, the development and implementation of these measures has not been based on systematic collection of quantitative information on environmental damage but on a wide consensus as to the critical areas that need to be addressed. Given the difficulty of measurement of environment damage, and the contribution of distorted price systems to the problem, many jurisdictions have not felt the need to wait for 'more information' before acting.

In general, Western European countries are more advanced than the USA in the implementation of environmental taxes and charges. Yet, while progress at the national level has been slow in the USA, several states of the USA are implementing quite sophisticated suites of measures.

The main targets of environmental taxes and charges in the OECD have been transportation and waste disposal, where the latter includes taxes and charges on hard-to-dispose-of products. There is little doubt that transport systems have been the principal focus of government use of economic instruments. At the broadest level they have included carbon and energy taxes, but have also embraced a range of measures to reduce congestion and to encourage alternative fuels. Measures designed to encourage a shift to more fuel-efficient vehicles are not widespread.

Australia lags behind most other OECD countries in the development of policies to deal with environmental problems associated with transportation. Australia also lags behind many jurisdictions in the application of taxes and charges to wastes, other than generic fees on waste disposal. Some Australian states, however, have well-developed systems of differential charges on industrial pollution. The adoption of the flat-rate GST in Australia has probably set back environmental taxation in Australia as Federal governments will be more reluctant to vary rates of indirect taxation despite the presence of major externalities from the production and consumption of some goods.

Table 4 Overview of environmental taxes and charges in New England states, USA

Environmental Tax Measures	Connecticut	Maine	Massachusetts	New Hampshire	New York	Rhode Island	Vermont
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Reducing point source pollution: Air/Water/Industrial waste Facilities

Tax incentives							
<i>Tax Credit</i>	•				•		
<i>Amortization</i>			•			•	
<i>Property Tax Exemption</i>	•	•	•	•	•	•	•
<i>Sales Tax Exemption</i>	•	•					
<i>Air Contaminant Fees</i>	♦	♦			♦		♦
<i>Water Discharge Fees</i>							•

Managing Hazardous Waste

Property Tax Relief for Recycling Facilities						•	
Fees on Waste Generators	♦			♦	♦		♦
Fees on Waste Facilities	•				•		
Property Tax Charge for Polluted Land	•						

Managing Solid Waste

Fees on Treatment/Disposal Facilities	♦		•	♦			•
Tax on New Vehicle Tyres	•					♦	
Tax on Hard-to-Dispose Materials		♦				♦	
Deposit-Refund for Batteries	•					•	
Deposit-Refund for Tires						•	
Deposit-Refund for Beverage Containers	•	•	•		•		•
Tax on Beverage Containers					♦	♦	
Fines for Newsprint Nonrecycling	♦						
Bonus for Waste Management Proposals						•	

	Connecticut	Maine	Massachusetts	New Hampshire	New York	Rhode Island	Vermont
Environmental Tax Measures							

Reducing Fossil Fuel Use in the Transport Sector

Traditional Motor Vehicle Fuel Taxes	•	•	•	•	•	•	•
Van Pool Vehicle Tax Incentives	•		•				
Alternative Fuel Vehicle Incentives							
Sales tax exemption for Vehicles and Refueling Equipment	•				•		
Tax Credit for Filling Stations	•						
Tax Credit for Converting Vehicles	•						
Franchise Tax Exemption for Alt Fuel Vehicle Companies	•						

Reducing Fossil Fuel Use in the Energy Sector

Renewable Energy Investment Incentives							
Property Tax Exemption	•		•		•	•	
Accelerated depreciation			•				
Sales Tax Exemption			•				
Income Tax Credit			•				
Franchise Tax Exemption	•		•				
Income Tax Deduction for Patent Revenue			•				
Tax Credit for Investments in Conservation	•						

Maintaining Undeveloped Land

Property Tax Relief	•	•	•	•	•	•	•
Tax Credit for Forest Management		•					
Property Taxation of land Under Easement		•		•			
Farmland Gift Tax Exemption	•						
Charitable Transfer Tax Exemption		•					
Tax on Speculative Gains							•

Protecting Marine Resources

Seed Oyster Assessment	♦						
Sardine Tax		♦					
Quahog Tax		♦					

♦ Indicates that the revenues generated by the tax are earmarked.

Source: Milne and Hasson (1996).

4. Transport

4.1 External costs of transport

A complete list of environmental pollutants from transport related emissions, along with a summary of their environmental impacts can be found in BTCE (1995). Major environmental impacts include:

- air pollution, including emissions of carbon monoxide, nitrogen oxide and particulate pollution;
- greenhouse gas emissions;
- noise pollution;
- habitat and wildlife destruction from road and rail; and
- water pollution and the cost of marine accidents

A significant amount of research into the extent of some of the externalities that should be priced into the transport market has been conducted both in Australia and internationally (see for example Cobb 1998, Inter-State Commission 1990, BTCE 1992, BTCE 1996a, BTCE 1996b, OECD 1992).

In their construction of the Genuine Progress Indicator, Hamilton and Denniss (2000) made estimates of the dollar values of some of the damage associated with transportation. Drawing on a range of Australian studies they arrived at the following estimates for the year 2000.

- The travel time costs of commuting are estimated at \$7.4 billion.
- The costs of noise pollution (due mainly to road and air traffic) are estimated at \$2.29 billion.
- The costs of transport accidents (other than those costs reflected in the national accounts) are estimated at \$5.26 billion.
- The costs of urban air pollution (due predominantly to transportation) are estimated at \$13.22 billion.
- The costs of greenhouse gas emissions are estimated at \$29.59 billion. Transport accounts for 16.1 per cent of total emissions, and on this basis account for \$4.73 billion of this damage.¹³

Clearly, the external costs associated with transportation are enormous, and this explains why transport has been the principal focus of green tax reform in many countries. The external costs of transport using Hamilton and Denniss's estimates is in the order of \$30 billion per annum, or around 6 per cent of GDP.

¹³ These figures should be compared to estimates by Laird *et al.* reported in the next section.

In the early 1990s, the Victorian EPA published a major study of the external costs associated with transportation in that state. The study concluded as follows.

- ‘Estimating the monetary value of externalities is complex and involves considerable uncertainty at each stage of the estimation process. Because of the uncertainties, any estimates of the costs of externalities ... are best regarded as indicative rather than definitive.’
- ‘Despite the uncertainties, transport externalities represent a significant cost to the Victorian community.’
- ‘Intervention to reduce external costs will not necessarily involve a trade-off with the economic objectives of government. Indeed, the assessment of the strategies for greenhouse gas emissions suggest that significant reductions can be achieved at a *net benefit* to the community’ (Victorian EPA 1994, p. 1).

In summarising the international literature on the total impact of noise, emissions (excluding greenhouse gases), accident and congestion externalities from the transport sector, the Victorian EPA (1994) concluded that the value of these externalities was in the range of 2.28–3.09 per cent of GDP in the countries examined. The estimate for Australia was around 2 per cent of GDP. The US EPA (1997) has estimated that for every \$1 spent on reducing transport emissions the community benefits by around \$44 in saved health and other costs.

Apelbaum Consulting Group (1997) conducted an analysis of energy consumption and greenhouse emissions associated with the Australian transport task. The report found that buses are the most energy efficient form of passenger transport, followed by monorail, heavy rail, trams, motorcycles, passenger vehicles and ferries. For freight movements, pipelines were found to be the most efficient form of transport, followed by international shipping, non-government rail, government rail, trucks and international air. Light commercial vehicles were the least efficient form of freight transport. The report provides a large amount of detailed information useful for policy determination purposes.

4.2 Financial costs of transport

A great deal of research has been conducted in Australia in recent years on the operation of the transport system. While the majority of studies have focussed on the performance of individual modes of transport,¹⁴ a number of studies have also explicitly examined the interrelationship between different forms of transport.¹⁵

Several studies have concluded that implementation of full-cost user charges for roads would be the best way forward. If the transport system is to operate efficiently all costs associated with all forms of transport should be covered by user charges. That is, if market forces are to be relied upon to determine the modal mix of Australia’s transport task then it is essential that competitive neutrality, including the removal of all environmental subsidies, prevails. The extent to which one form of transport imposes greater external costs on society than another acts as an implicit subsidy that

¹⁴ See Productivity Commission 2000, National Road Transport Commission 1993, Austroads 1999, BTCE 1996a, BTCE 1996c.

¹⁵ See for example BTCE 1997a, Dobes 1998 and Turton and Hamilton 1998.

must be removed if resources are to be efficiently allocated. A large number of the externalities covered in the literature, such as congestion and noise pollution, are concerned with human impacts more than environmental impacts *per se*. Most studies, including the Productivity Commission's study of rail reform (2000), explicitly exclude externalities such as greenhouse emissions (perhaps because conservative organisations like the Productivity Commission are not ready to fully acknowledge environmental effects).

In addition to the external costs of road use described above and below, the costs of road construction and maintenance should be captured by user charges along with an adequate return on investment. Abrams *et al.* (1998) estimate that Australia has over 800,000 km of roads, which are worth in excess of \$100 billion. The land on which roads are constructed also has significant opportunity costs, especially in metropolitan and CBD areas, which should generate a commercial rate of return if resources are to be allocated efficiently.

Australian governments levy a number of taxes and charges on transportation. The bulk of the revenue arises from petrol and diesel excises levied by the Commonwealth government. The primary reason for the existence of fuel excise is to raise revenue to fund general government expenditure. In 2000-01 motor vehicle taxes and charges raised over \$13 billion. The amounts raised from taxes and charges on motor vehicles for 1997-98 are summarised in Table 5. Table 6 shows the distribution of road spending between the three levels of government. While the Commonwealth raises most revenue, State and local governments spend it.

Table 5 Motor vehicle taxes and charges 1997-98 (\$ billion)

Tax or charge	\$ billion
<i>Federal government</i>	
Petroleum products excise	8.54
Federal interstate registration scheme	0.02
Sub-total	8.55
<i>State and Territory governments</i>	
Vehicle registration fees	2.29
Stamp duty for vehicle registration	1.26
Driver licence fees	0.13
Fuel franchise tax/fees	1.25
Road transport and maintenance taxes	0.12
Tolls	0.15
Sub-total	5.20
Total revenue	13.75

Source: BTE 1999

A large proportion of the potential excise raised from diesel fuel is returned to users through the Diesel Fuel Rebate Scheme (DFRS). As a result of recent tax reform, excise was reduced from about 43 cents/litre to 20 cents/litre for all heavy vehicles with a gross mass of 20 tonnes or more and to trucks over 4.5 tonnes operating outside major metropolitan centres. The payments under the Diesel Fuel Rebate Scheme are shown in Table 7. The increased payments in 2000-01 reflect the extension of the scheme following tax reform.

Table 6 Government funding of road-related expenditure 1997-98 (\$ billion)

Jurisdiction	Spending (\$ billion)
Commonwealth	1.63
State	3.38
Local	2.00
Total	7.01

Source: BTE 1999

Table 7 Diesel Fuel Rebate Scheme payments (\$ million)

Year	Total cost (\$ million)
1994-95	1253.5
1995-96	1314.9
1996-97	1587.6
1997-98	1407.9
1998-99	1456.5
1999-00	1560.0 [#]
2000-01	1991.6 [#]

Source : Webb 2000 (# estimates by Webb)

IMPACT OF TAX REFORM

Tax reform introduced a number of other important changes to taxes on transport in Australia. Of particular relevance to the environmental impact were the following changes.

- Reductions in the rates of fuel excise resulting in a 9.1 per cent fall in the price of petrol and diesel for all business vehicles.

- The abolition of the 22 per cent wholesale sales tax on cars, and the introduction of the 10 per cent GST on the purchase price of new cars was expected to result in a reduction in the price of new vehicles for business users of 16.6 per cent and 8.3 per cent for final consumers (Turton and Hamilton 1998).
- The extension of a full rebate under the Diesel Fuel Rebate Scheme to existing eligible activities (such as forestry and fishing) that had received only a partial rebate in the past.
- The extension of the Diesel Fuel Rebate Scheme to additional activities that had not previously received any rebate, including the use of diesel fuel in railways and for maritime purposes.
- The imposition of a 10 per cent GST on public transport.

Several studies have examined the expected environmental impacts of tax reform. For example, Turton and Hamilton (1998) projected that reductions in fuel excise would increase the number of freight movements and cause a modal shift from rail to road transport. Similarly, by increasing the relative price of natural gas and LPG they predicted a decline in the use of those fuels. They concluded that: 'The proposed tax changes will increase atmospheric emissions and result in increased health and other costs. Greenhouse emissions will increase by around 2% above the levels they would otherwise reach.... While some contributors to urban air pollution are expected to fall slightly, the most damaging ones will increase, notably particulates ... and oxides of sulphur'. Other groups identified similar outcomes, including the Bureau of Transport Economics (BTE 1999, p. 2), Australasian Natural Gas Vehicle Council (1998) and Austroads (1999).

The health impacts of increasing diesel use were discussed in Australia Institute, ACF, AMA (1999) where it was argued that air pollution is associated with increases in mortality, increased incidence of respiratory illness, hypertension, strokes, heart disease and damage to the IQs of children. It estimates the expected increase in fine particle pollution in Australian cities due to the GST Package 'could be expected to increase the costs of health damage by something in the order of \$300 million per year' (Australia Institute *et al.* 1999, p. 3).

Projections of environmental damage from the proposed GST Package led to some offsetting measures negotiated in the final package, including bringing forward tighter vehicle emission and fuel standards and new greenhouse gas abatement programs. However, the Australia Institute (1999a) estimated that even after these changes, the tax reform package would increase carbon dioxide emissions by 3 per cent, sulphur dioxide by 3 per cent and particulate pollution by 5 per cent.

It might be noted that the tax reform resulted no change to one of the more anomalous aspects of transport taxation in Australia. Four-wheel drive vehicles (all of which are imported) enjoy a lower tariff rate than other imported vehicles. Apparently designed to assist primary producers, the effect of the tax concession is to give a price advantage to one of the most polluting and dangerous forms of passenger transport.

4.3 The road deficit

Motoring organisations often argue that taxes and charges on road transport greatly exceed the amount of money spent on roads (in 1997-98 around \$12.4 billion compared to \$7 billion spent on roads) and that more should be earmarked for new roads and upgrading. However, Laird *et al.* (2001) argue that if full account is taken of the costs of road transport then there is a large and growing 'road deficit' and a 'road freight deficit'. These other factors include:¹⁶

- the road crash deficit of \$7 billion – road crashes are estimated to cost some \$15 billion per annum yet motor vehicle insurance premiums amounting to only \$8 billion in 1999;
- costs of health damage from transport-related air and noise pollution amounting to at least \$3 billion each year;
- net losses of revenue to government arising from a number of vehicle-related tax concession – the tax deductions claimed exceed revenues from fringe benefits taxes on vehicles to the tune of \$10 billion per annum and this translates into a loss of revenue of \$2.8 billion; and
- congestion in major cities estimated to impose social costs of \$11 billion per annum.

Laird *et al.*'s (2001) summary of the road deficit is reproduced in Table 8. They conclude that the road deficit each year in Australia is \$8 billion not counting congestion, and \$19 billion including congestion. The estimates by Laird *et al.* (2001) do not take account of a number of environmental externalities, the most notable of which is greenhouse gas emissions. Road transport emissions amounted to 66.6 Mt of CO₂-e in 1999 (AGO 2001) which, valued at the AGO's best estimate of \$30 per tonne, amounts to an additional external cost of \$2 billion per annum.

Using Victorian EPA (1994), estimates Gabbitas and Eldrige (1998, p. 242) concluded that the external costs of transport (excluding the costs of global warming):

could be in the order of \$20 billion per year. In addition, Australian governments spent \$6369 million on road construction and maintenance in 1995-96... Thus the national estimate of the infrastructure and external costs of road transport would be in the order of \$25-\$30 billion per year – about twice as high as the revenue raised from taxes on motor vehicles in 1995-96.

This can be compared with the estimate of the annual external costs of transport of around \$30 billion based on Hamilton and Denniss (2000) made in the previous section.

¹⁶ None of the studies include estimates of the loss of amenity values due to road construction. Given the intensity of community opposition to certain road proposals (such as the proposed freeway through koala habitat in Southeast Queensland that is widely believed to have caused the Goss Labor Government to lose office), the amenity costs could be substantial.

Table 8 Australia's road deficit (\$ billion)

Costs and revenues	Amount (\$ billion)
Costs	
Road system costs	7.0
Road crash costs	15.0
Other health impacts	3.0
Net tax refunds for motor vehicle use	2.8
Queensland fuel subsidy	0.5
Total costs	28.3
Revenues	
Federal fuel excise from road vehicles	8.5
Annual registration fees, etc	3.8
Insurance premiums for road crashes	8.0
Total revenue	20.3
<i>Net road deficit, without congestion</i>	<i>8.0</i>
Road congestion in major cities	11.0
<i>Net road deficit, with congestion</i>	<i>19.0</i>

Laird *et al.* 2001, Table 4.3.

4.4 Policy responses

A number of studies have recommended a more rational road pricing system, one that sets taxes and charges at levels designed to cover all costs including externalities. Webb describes the nature of fuel taxation in Australia as 'piecemeal'. He points out that 'two activities may use the same amount of diesel and so be equally polluting yet pay different amounts of excise because one activity is eligible for a rebate of excise paid under the Diesel Fuel Rebate Scheme but the other is not' (Webb 2000, p. 3). He goes on to say that the Diesel Fuel Rebate Scheme's 'main purpose seems to be to subsidise selected industries, especially the agriculture and mining industries. As such the DFRS is inconsistent with the concept of a 'level playing field' as it discriminates among Australian industries and even among activities within those industries.'

A decade ago, the Inter-State Commission called for road charging based on vehicle mass and distance travelled where fuel and load-based charges were used to recover all costs, including the external costs, of transport. 'The Commission is convinced that in the near future such charges will be demanded by society and as a consequence become commonplace' (Inter-State Commission 1990, Vol. 1, p. 166).

BTCE (1997) provides an extensive catalogue of taxes, fees and charges that apply to all modes of transport and concludes that:

- the current regime of taxes and charges is not applied coherently or consistently across modes;
- it is now technically feasible to employ electronic monitoring devices to effectively charge for infrastructure use by heavy vehicles, noise and congestion; and
- a detailed review is necessary to identify opportunities for increasing the efficiency of the system of taxes and charges in the transport sector.

BTE (1999, p. 21) estimated that, in order to achieve competitive neutrality between road and rail, road freight should be charged 0.01 cents per tonne/km to cover (non-greenhouse) pollution costs and 0.033 cents per tonne/km to cover noise pollution. The respective charges for rail were estimated to be 0.004 cents per tonne/km and 0.02 cents per tonne/km. The report went on to conclude that: 'Current road use charges for heavy vehicles are inefficient in that they do not accurately reflect the costs of road wear' (BTE 1999, p. 55). Even a report funded by the Australian Automobile Association (but not released, see Cox and Meyrick 1997 in Austroads 1999, p. 55) suggested that metropolitan petrol charges should be around 20 cents/litre above present excise levels in order to cover some externality costs.

VEHICLE TAXES AND CHARGES

BTCE (1992) estimated the impact of a system whereby the most fuel-efficient vehicles paid zero sales tax and the least fuel-efficient vehicles paid 100 per cent tax. It concluded that such a measure could reduce total fuel consumption by 6.3 per cent, or more if increased demand for fuel-efficient vehicles encouraged manufacturers to improve vehicle design. Fuel-efficient vehicles impose fewer external costs on the community. An efficient policy response to such a situation is to ensure that the social costs associated with car use are internalised by new car buyers at the point of purchase. One mechanism for doing so is the introduction of a skewed regime of taxes and charges so that more fuel-efficient cars benefit. It is important to note that given that all emissions impose some costs on the broader community, the most fuel-efficient vehicles should still be taxed.

State governments impose annual registration and third-party insurance charges for all vehicles using public roads. The charges generally increase with the weight of the vehicle. According to Webb (2000, p. 7): 'This charge is deficient (as a cost recovery mechanism) in that it does not vary with distance travelled and hence damage to road pavements. Nor does this charge address the cost of externalities associated with road use.' Accordingly, it has been proposed in the literature that these charges be shifted from an annual basis and instead be levied by the kilometre or, where this is impractical, per litre of fuel consumed.¹⁷

¹⁷ This has a number of other benefits including: eliminating any financial advantage from failing to register or obtain third-party insurance; and, charging insurance on a more equitable basis.

FRINGE BENEFITS TAX

Current Commonwealth rules for fringe benefits taxation (FBT) also provide incentives for excessive road travel, while provide no incentives for employer-provided public transport. Further, the current design of the FBT system provides few incentives to purchase fuel-efficient vehicles because the purchaser often has no responsibility for vehicle running costs. This has major implications for the characteristics of the entire Australian fleet because company vehicle purchases make up the bulk of new car sales (up to 60 per cent, SECITA 2000, p. 224) and these are then on-sold. In other situations, drivers do not pay for fuel, thereby discouraging efficient trip-planning or driving practises.

One of the most perverse incentives, however, is provided by the statutory formula method of calculating FBT for vehicles. Under this method, the taxable value for FBT purposes is based on the value of the vehicle multiplied by a statutory tax rate. This taxable value is then 'grossed up' and it is to this amount that the FBT tax rate (of 48.5 per cent) is applied. The statutory percentage used to determine the taxable value of the vehicle decreases with increasing vehicle travel distance (see ATO 2000). Table 9 provides an illustration of FBT payable for a vehicle worth \$30,000 that is available for private use 100 per cent of the year.

For a vehicle that travels less than 15,000 km in the tax year (which for FBT ends on 31 March), the taxable value of the \$30,000 vehicle is \$7,800. This is grossed up to \$15,146 before the FBT rate of 48.5 per cent is applied to give FBT payable of \$7,345.

Table 9 Fringe benefits tax on vehicles

Distance	Statutory rate	Taxable value on \$30,000 vehicle	Grossed-up value	FBT payable
Up to 15,000 km	26%	\$7,800	\$15,146	\$7,345
15,000 km to 24,999 km	20%	\$6,000	\$11,650	\$5,650
25,000 km to 40,000 km	11%	\$3,300	\$6,408	\$3,108
Above 40,000 km	7%	\$2,100	\$4,078	\$1,978

Source: ATO 2000

Average annual vehicle travel in Australia is around 15,500-16,000 km (BTCE 1996d). On this basis, most vehicles would probably fall into the 20 per cent rate category. However, the largest decrease in taxable value occurs at 25,000 km, where taxable value decreases by \$2,700 (\$6,000 – 3,300) under the simplified situation described above, equivalent to a \$2,542 reduction in FBT payable (\$5,650 – 3,108). There is anecdotal evidence that employers will remind staff with company vehicles to clock up additional kilometres (sometimes known as the 'March Rally') in order to reach the next threshold, thereby reducing FBT (SECITA 2000, p. 224). Even in an extreme case where an additional 10,000 km is travelled (to bring total travel from 15,000 to 25,000 km), the cost of additional fuel and maintenance would probably be around \$1,000 less than the reduction in FBT. Accordingly, the statutory method

provides an incentive for excessive travel, and the further a car travels, the less attractive alternative forms of travel become.

An employer is also able to provide each employee with up to around \$1,300 per annum in tax-free car-parking benefits. Parking up to a cost of \$5.46 per day (for the tax year commencing 1 April 2000) is not classified as a fringe benefit, and is accordingly tax-free. Public transport receives no equivalent treatment.

A further issue is that of congestion. Studies of externalities consistently show that, of all externalities associated with transport, congestion is most costly (eg. Victorian EPA 1994). In Australia, governments have made some attempts to relieve congestion by encouraging the development of toll roads, restricting the availability of parking and improving public transport. However, the traditional method remains most popular – building new and bigger roads. More innovative and effective approaches have been attempted abroad, including congestion pricing (see discussion in Section 3).

PARKING

A novel suggestion to deal with inner-city congestion is the imposition of a cap-and-trade system for parking spaces.¹⁸ Parking spaces in central business districts take a number of forms – publicly provided spaces in streets and in parking stations, privately provided spaces for sale to the public, and privately provided spaces for private tenants of office buildings, residences etc. Planning laws permit authorities to specify upper and lower limits on the number of parking spaces provided in new buildings, and increasingly the growth of parking spaces will need to be restricted if problems of further congestion are to be avoided.

Under a cap-and-trade system, a limit would firstly be imposed on the number of parking spaces available at present and into the future in designated areas in and near the CBD. This would include limiting the number of new spaces made available for private use in new developments, since the growth of private parking imposes congestion costs on all travellers in the CBD. The pool of available parking spaces would then be auctioned and a market would develop for parking spaces. The price of parking spaces would be influenced by the overall demand for parking and the value of parking spaces for other purposes (such as conversion to office or retail space), as opposed to the alternatives such as public transport or parking outside of the CBD, as well as by the individual characteristics of each space (its distance from places of work, whether it is under cover, and so on).

4.5 Summary and conclusions

Transport imposes significant social costs, in the form of accidents, air and noise pollution, greenhouse gas emissions, loss of amenity for other road users and pedestrians, opportunity cost of land used for transport and damage to wildlife. Congestion also imposes major social costs, consuming valuable productive time. The financial subsidy to road transport is estimated to be up to \$20 billion per annum, excluding the cost of greenhouse gas emissions. The current system of vehicle and travel charges is inefficient and leaves major externalities unpriced, leading to a

¹⁸ The suggestion has been made by Frank Muller, NSW Cabinet Office.

general overconsumption of travel. Further, different transport modes do not receive similar treatment, with rail-based transport covering a larger proportion of its total costs, compared to road-based transport. Consequently, all evidence suggests that there is overconsumption of road transport.

Recent changes to the tax system in Australia have exacerbated inequities in transport pricing, while existing tax regimes, such as that for fringe benefits, include direct incentives for additional travel.

5. Stationary energy

5.1 Taxes and charges on stationary energy

Stationary energy is energy used for non-transport purposes and consists of electricity generation, gas supply, other fossil-based energy (petroleum, coal and biomass) and renewable energy. It is also influenced by measures to promote energy efficiency. A range of taxing and charging issues affect the mix of energy sources and therefore the environmental impact of stationary energy. In Australia, the principal environmental problem associated with stationary energy is the emission of greenhouse gases from combustion of fossil fuels. In 1999, stationary energy was responsible for 259.8 Mt of greenhouse gases, or 57 per cent of Australia's total (excluding land-use change) (AGO 2001, Table S1). If the damage caused by the emission of a tonne of carbon dioxide is valued at \$30, the AGO's best estimate of the expected price of a tradable emission permit (AGO 1999b), then the environmental damage is valued at \$7.8 billion per annum. Electricity accounts for 66 per cent of these emissions, or \$5.2 billion of damage.

Since the major environmental problem in stationary energy is the external effects of greenhouse gas emissions, the primary policy issue is the imposition of a tax or permit system that begins to internalise the costs. As we have seen, some progress has been made in this direction in Europe, but Australia lags behind. There are a number of additional tax and related issues that need to be considered. As a result of the Coalition Government's tax reform, wholesale sales tax has been eliminated and replaced by a 10 per cent goods and services tax (GST) levied on nearly all transactions. Businesses can claim rebates for any GST paid on inputs including electricity and gas, effectively reducing the price of these products.¹⁹

Some states impose levies and taxes on electricity. For example, NSW imposes an Electricity Distributors Levy (EDL) of 0.52 cents/kWh on contestable customers, although customers consuming less than 40 MWh per annum are to be exempted (Integral Energy 2001, p. 24). In South Australia, a 5 per cent tax is levied on gross sales revenue from electricity production (OECD 1995, pp. 82, 85). Most electricity used in Australia is generated by coal combustion and coal is subject to a resource royalty and freight taxes (IEA 1993, pp. 34-35).

States levy resource royalties on coal production and excess coal freight rates. For example, NSW levies a royalty of \$1.70/tonne plus an additional \$0.50/saleable tonne from certain open cut mines (DMR NSW 2001). NSW also levies an excise on coal to fund repair of mine subsidence damage. Queensland levies a royalty of 7 per cent on the value of coal for export from new mines and 7 per cent on all coal for domestic use (DME QLD 2001). Queensland also collects royalties on petroleum and coal-seam methane at a rate of 10 per cent of wellhead value (DME QLD 2001).

RENEWABLE ENERGY

Renewable energy sources include solar, wind, hydro, biomass, geothermal, wave and tidal power. Prior to tax reform, equipment used for renewable energy generation was

¹⁹ For more information, see Turton and Hamilton (1998).

exempt from wholesale sales tax (WST), whereas it is now subject to a 10 per cent GST. Accordingly, renewable energy generators and residential consumers purchasing renewable energy generation equipment have benefited less from the shift from WST to GST. One example is the treatment of solar hot water systems compared to electric or gas systems. Previously, solar collection panels for hot water systems were exempt from WST, but they are now subject to GST. Consequently, proportionally more tax is now collected from the sale of solar hot water systems compared to electric or gas systems.²⁰

The decreased costs associated with lower transport and input prices under the new tax system also provide less benefit to renewable generators. The price of renewable electricity for business customers (after GST rebates) was projected to fall less than for coal-fired electricity (around 0-2 per cent compared to 3.1 per cent) (Turton and Hamilton 1998, p. 14)

The Commonwealth Government's Mandatory Renewable Energy Target (MRET)²¹ is the single non-voluntary measure that recognises the externalities associated with conventional electricity generation and goes beyond 'no regrets' initiatives. Although MRET is designed to encourage the development of the renewable energy generation industry, it can also be viewed as a tax on electricity generated from conventional sources, although it only covers up to 9,500 GWh of annual output in 2010. It resembles a tax in that electricity retailers and large consumers can choose to pay the fine of \$40/MWh, or source electricity from renewable generation and thereby avoid the penalty.²² However, because this measure covers only around 4% of Australia's projected electricity generation of close to 240 TWh by 2010 (Bush *et al.* 1999, pp. 100,104), the environmental impact will be relatively small.²³

A number of states have rebate schemes for installation of solar hot water heaters. These rebates are complemented by the MRET,²⁴ through which additional funding is being directed to the installation of solar hot water heaters. For example, Victoria offers a rebate of up to \$1,500 per system, Queensland provides a rebate of \$750 for a two-panel system and \$450 for a single panel system and NSW a rebate of \$500 per system (in all States applicants are required to transfer MRET certificates to the government to obtain the rebate).²⁵

²⁰ According to the Commonwealth government's modelling, this was expected to result in an increase in the real price of a solar hot water system by approximately 2.1 per cent compared to a small real price decrease for a gas or electric hot water system (based on the predicted increase in the cost of household appliances (Commonwealth of Australia 1998, p. 171). This takes into account the removal of WST on water tanks.

²¹ For more information, see http://www.greenhouse.gov.au/markets/2percent_ren/index.html.

²² It is unlike a tax in that retailers do not avoid the penalty by reducing electricity consumption.

²³ The additional 9,500 GWh represents an increase in the share of renewables from 9.5% of total generation (including solar hot water) in 1996-97 to 11.3% in 2009-10 based on energy projections from ABARE (Bush *et al.* 1999, pp. 97, 104). Looking at electricity consumption, the measure increases the share of renewables from 11% in 1996-97 to 12.8% in 2009-10.

²⁴ Under the measure, electricity retailers are required to purchase increasing amounts of electricity generated from renewable sources from 1 April 2001 and hold renewable energy certificates. The installation of solar water heaters is included as a source of renewable energy certificates.

²⁵ See the Sustainable Energy Authority of Victoria website, <http://www.seav.vic.gov.au/renewable/SHW/rebate/index.html>, Queensland Office of Sustainable Energy website, <http://www.env.qld.gov.au/cgi-bin/w3->

5.2 *The structure of the electricity market*

The introduction of the national electricity market (NEM) paid no regard to the potential environmental consequences. The structure of the electricity market embodies a regime of transmission charges that penalises low-emission fuel sources (Hamilton and Denniss 2001). The current regulatory arrangements do not allocate the full costs of transmission according to the location of generators and users. Rather, transmission losses are averaged, to the advantage of remote (i.e. coal-fired) generators and to the detriment of gas generators that can be located closer to loads. Such an approach prevents market pressures from ensuring that electricity generators are located near to their markets, which would reduce both the total cost of generation as well as carbon dioxide emissions (as less fuel needs to be burnt to deliver the same amount of energy to end users). It also fails to signal to remote users (i.e. those a long distance from generators) the economic value of more efficient use, or of switching from grid supply to alternatives such as renewables-based remote area power supply systems.

The Australian Cogeneration Association (2000) has called on the National Electricity Code Administrator to ensure that '[a]ll transmission costs avoided by the operation of the embedded generator must be passed through to the generator and its customers' (ACA 2000, p. 35). Not only would such an approach provide incentives to reduce transmission costs, and in turn CO₂ emissions, it would seem that the request is for the implementation of exactly the kind of regulation envisioned in the objectives of National Competition Policy. The only beneficiary of the current arrangements are the existing generators whose 'transport costs' for their 'product' are charged below the real cost of delivery.

5.3 *Electricity charges to aluminium smelting*

The aluminium smelting industry accounts for 16 per cent of greenhouse gas emissions from the electricity sector and 6.5 per cent of Australia's total emissions (excluding land-use change) (Hamilton and Turton 1999b). The prices paid for electricity by aluminium smelters are set in long-term contracts negotiated with State governments. The Australia Institute estimates that Australia's six smelters pay between \$15 and \$25/MWh for delivered electricity compared to around \$40-60/MWh paid by other large industrial users. The former Victorian Treasurer revealed that other high-voltage customers were paying up to three times the price paid by the two Victorian smelters. The Victorian Auditor-General estimates that in 1997-98 the Victorian Treasury paid \$180 million to the State Electricity Commission to subsidise the cost of electricity to the two smelters (Portland and Point Henry), indicating a subsidy of close to \$20/MWh. On the basis of the available evidence, the Australia Institute estimated that under-pricing of electricity to aluminium smelters in Australia amounts to subsidy of \$300 million per annum (Turton 2001).

5.4 *Accelerated depreciation*²⁶

The provision in the tax system for accelerated depreciation may have substantial environmental impacts, some positive and some negative. Many of the industries that

msql/sustainable_energy/msqlwelcome.html?page=index.htm and NSW SEDA website, http://www.seda.nsw.gov.au/images/hd_waterheating.gif

²⁶ This section draws on Hamilton and Turton (1999a).

benefit especially from depreciation allowances are also those responsible for environmental degradation. These industries include: electricity utilities; forestry and logging, cattle and other livestock farming; road passenger, air and rail transport; telecommunications; and, hotels and clubs.

However, accelerated depreciation encourages faster replacement of older equipment and makes the commercial application of new technology more viable. Many renewable energy sources and most pollution prevention equipment rely on such new technologies. Furthermore, accelerated depreciation makes investment in energy efficiency more attractive, a particularly important factor since such investments are seen as 'non-core' by many businesses and must therefore yield higher rates of return to be undertaken.

The ATO is considering extending the effective life of long-lived infrastructure projects, including gas pipelines, from 15 to 50 years, and the Australian Gas Association believes this will 'strongly discourage investment decisions on new gas infrastructure and the expansion of existing infrastructure'.²⁷ On the other hand, by allowing shorter write-down periods, the current depreciation regime is designed to favour certain resource-intensive activities such as fossil fuel electricity generation, mining and forestry thereby providing perverse incentives that contribute to environmental degradation.

5.5 Summary and conclusions

While there are a number of anomalies in the system of taxes and charges for stationary energy, they are, with the exception of the transmission charging issue and underpricing of electricity for aluminium smelting, secondary. The major problem in the stationary energy sector is the absence of taxes on pollutants, notably greenhouse gases, which encourages the growth of coal-fired electricity, the most polluting form of electricity. We have seen that other OECD countries are beginning to address this problem through the implementation of taxes on emissions. Australia is lagging in this area with successive governments relying on voluntary measures that are largely ineffective.

Denniss (2000) has argued that Green Power schemes have failed to make a significant impact on emissions from the electricity sector and are very unlikely to do so in the future. The Commonwealth government's MRET, although providing incentives to renewable energy generation and encouraging retailers to incorporate into their prices the externalities associated with conventional electricity generation, covers such a small proportion of Australia's electricity generation that it will fail to produce the most economically desirable outcome.

²⁷ *Australian Financial Review*, 27 June 2001

6. Water, land and forests

6.1 Urban water

Water use and water discharges can be heavily influenced by the level and type of charges levied. DEST (1996a) estimates that the financial subsidy to the water supply industry is around \$3 billion per annum, most of which is attributed to the fact that water supply authorities have not made commercial rates of return on their assets. In the early 1990s, real rates of return for metropolitan water utilities ranged from 4.4 per cent in Victoria to -0.5 per cent in the ACT. Returns were lower in non-metropolitan areas and especially low for irrigation water (DEST 1996a, Table 7, p. 65).

In addition to new investments, reductions in water consumption and improvements in water quality require an appropriate set of incentives for water users. Fixed charges based, for example, on property values do not allow users to save money by reducing consumption through more efficient use or through measures such as converting lawns to native gardens. There is consistent evidence that demand for water is sensitive to price increases. Thus price rises needed to fund investment will also reduce demand for water.

USER CHARGES

A shift to user charges for water is essential to a long-term conservation strategy. COAG advocates a two-part tariff comprising an access fee and a volumetric consumption charge. COAG has agreed that water prices should be set according to user pays principles, in part to encourage water conservation, and to ensure that prices reflect actual costs including the costs of maintaining high quality standards and protecting the environment (National Competition Council 2000). Water authorities are thus moving towards replacement of fixed charges with user charges (DEST 1996a, p. 67). This is appropriate and desirable, although there are some equity issues to be considered.

Currently a variety of water pricing methods prevail, including charges based on property values, fixed charges based on the nature of a property, fixed allocation of water units with uniform or rising block tariffs on excess consumption and one-part tariffs with no access charge. The system under which water services are funded by rates involves, in effect, a property tax whose proceeds are used to subsidise water consumption. A shift to full user charges means that this subsidy is removed. Hamilton, Hundloe and Quiggin (1997) argue that this does not necessarily imply that the previous property tax should be entirely removed as it may be desirable to maintain some portion of the rates and use the revenue for other purposes such as rebates to low-income households to offset any inequitable impacts of the shift to user charges and higher water prices. In other words, although property-based rates are replaced by user charges for water, some part of the rates could still be levied for other purposes.

Evidence indicates that when water is priced more appropriately, excessive consumption is curtailed. For example, the introduction of user charges in Queensland has led to falls in water consumption by up to 20 per cent in some areas in

the first year of implementation (National Competition Council 2000). When the Hunter Water Corporation introduced user charges, water consumption per household fell by around 30 per cent (Industry Commission 1992, p. 158; DEST 1996a, p. 67).²⁸ As one of the more advanced water providers, Hunter Water has argued that the two-part tariff applied in this way may not provide a sufficiently strong conservation signal unless the user charge is increased above its theoretical level, something it is doing in practice (Hunter Water 1999). It is concerned that a strict application of competition principles may see the conservation objective diluted and proposes that user charges be reduced only for large commercial water consumers.

FRESH AND RECYCLED WATER

Cost-reflective prices combined with regulated environmental flows and other provisions to protect the environment will encourage water conservation measures across the board. A good case can be made for introducing a price differential between fresh and recycled water as there are additional environmental benefits from use of recycled water. A resource rent tax may be the appropriate device. At present, water companies have an unhindered right to harvest a renewable raw material, water. A resource rent tax would fall on collections of fresh water but not on the re-use of water thereby improving the relative cost of recycling. The introduction of an Abstraction License Fee by the ACT Government at the end of 1999 may be seen as a move in this direction.

DEVELOPER CHARGES

Developer charges 'are levies on developers imposed to fund the infrastructure for urban development. Together with the fixed component of user charges, developer charges recover the capital costs of providing water supply and sewerage for a development' (NSW GPT 1994, p. vi). Developer charges are considered to provide:

- better signals for resource allocation and usage
- better signals to reflect environmental effects of urban development (NSW GPT 1994, p. I)

In NSW, IPART has recently reviewed developer charges for the four NSW metropolitan water agencies (IPART 2000). The latest determination continues to allow water agencies to levy a developer charge for the capital cost of water infrastructure (including headworks), minus the difference between the net present value of revenues and costs that will accrue to the agency (IPART 2000). Other councils are being encouraged to implement similar regimes. For example, the NSW Government is tying the provision of financial assistance for water supply and sewerage infrastructure to the implementation of, among other things, developer charges (DLWC 1999).

²⁸ Neither source reports how much water prices in the Hunter rose.

6.2 Irrigation water

The Industry Commission concluded that for the Murray-Darling Basin ‘water is grossly over allocated. This is placing aquatic environments under severe stress...’ (Industry Commission 1997a, p. 24). It found that:

Rivers have been altered by significant changes in the annual flow, in the distribution of flow throughout the year, and in the length of low flow periods. These changes have resulted in: increases in stream salinity; reductions in the frequency of flooding of some wetlands and the permanent inundation of others that would be seasonally dry; each resulting in significant damage to some ecosystems; river conditions which are more suitable for the growth of blue-green algae; and declines in native fish populations (Industry Commission 1997a, p. 25).

In considering the available policy responses the Industry Commission noted in 1997 that government actions ‘to remove impediments to well-functioning markets and make greater use of market-based measures for managing key natural resources have been tentative and limited’ (Industry Commission 1997b, p 49). Hamilton, Hundloe and Quiggin (1997) advocated allocation of 20-30 per cent of current diversions in the Murray-Darling to environmental flows, with the rest allocated by a comprehensive system of tradable water entitlements. Some trade in water entitlements already occurs in the Basin; between 1988 and 1993 temporary and permanent transfers of entitlements accounted for between 1 and 4 per cent of total water allocation (MDBMC 1995, pp. 37-38). In the past, water rights have been attached to land, so that farmers requiring more water were required to buy land. Water rights are now being separated from land rights. Trading is advancing within States and trading water rights between States is being trialled (National Competition Council 1999, p. 92).

COAG is due to consider a framework for rural water pricing reform in 2001 and the National Competition Council (NCC) has said that rural water reform should require all commercial water users to pay cost-reflective prices (summarised in Cape 1997, p. 88). Clause 3(d) of the Competition Principles Agreement says that water charges should comply with the principle of full cost recovery with any subsidies made transparent no later than 2001. Dividends should be set at levels that reflect commercial realities and stimulate competition (National Competition Council 2001a, p. 5).

Some of the existing entitlements will need to be recovered by governments in order to permit adequate environmental flows. Keyworth (1996) suggests three possible mechanisms:

- purchase of existing licences;
- non-renewal or modification of existing licences; and
- provision of new supply infrastructure (such as lining of channel systems) or new technology to improve efficiency of water use.

The second would be the cheapest option financially for governments. In the case of the third option, it is hard to see why the taxpayer should subsidise investments in water efficiency that will be of substantial commercial benefit to private producers, particularly when simply reducing the volumes available under existing licences will encourage producers to seek similar outcomes.

Keyworth (1996) argues that there are unlikely to be significant costs to irrigation industries from reduced entitlements because the effect of capping water off-takes will be to constrain future expansion of the industry (which may benefit existing producers) and because major savings in water use can be had cheaply through a range of physical, technological and managerial measures. The Industry Commission argued that higher charges for irrigation water are likely to induce farmers to invest in water-saving technology and to induce other farmers to switch to dry-land farming (Industry Commission 1992, pp. 158-59).

6.3 Land

Land degradation in its various forms generates a number of severe environmental problems. While tax systems in the past provided substantial incentives to clearing this is no longer the case, and tackling the issue of land degradation requires a broad strategy aimed at land management as a whole rather than specific financial mechanisms such as tax changes. However, there is some scope for more use of targeted incentives. Recently, Toyne and Farley have called for large investments in land conservation funded by a 1 per cent income tax levy with the revenue used to fund agreements with land holders based on the principle of mutual obligation (Toyne and Farley 2000).

As is the case in some states of the USA, some local councils in Australia provide concessions on land rates for land used for conservation. In South Australia, land subject to conservation improvements can be exempted from rates and taxes under Heritage Agreements (Industry Commission 1997a, p. 179).

TAXATION

However, the Commonwealth tax system is somewhat inconsistent in its treatment of land conservation measures. In particular, tax incentives for conservation measures are provided to landholders who are conducting a business on the land, whereas landholders who wish to conduct solely conservation on their land are unable to access the same tax concessions (Binning and Young 1999).²⁹ This has implications for areas of high-conservation value where conducting a business on that land may be incompatible with maintaining this value.

There may also be a need to go further and provide additional incentives for the protection of high-conservation value or unique areas. The current tax regime provides the same incentives regardless of the environmental value of the land in question. It may be appropriate, as suggested by Binning and Young (1999), to extend the 20 per cent rebate available for work on structures on a prescribed heritage list to cover expenditures on areas of high conservation value.

²⁹ The latter are provided some benefit on the disposal of the land, but this provides a different set of incentives.

The use of covenants and easements on land is expanding in Australia. Conservation covenants, which place constraints on the use of the land, usually take the form of voluntary agreements between a government and a landholder, or between a trust (such as the Bush Heritage Trust and Trust for Nature) and a landholder (Allen Consulting 2001). Some shires provide rate relief on land under conservation covenant (ABARE 2001, p. 43). The Federal Government has recently announced plans to change the capital gains tax legislation so that those who enter conservation covenants will not be disadvantaged.³⁰

The Industry Commission has reviewed the impact of income tax concessions on land and water conservation measures (Industry Commission 1997a, pp. 190-92, 488), noting that, under Sections 75B and 75D of the Income Tax Assessment Act,³¹ primary producers can rapidly depreciate and write off capital expenditure for conserving and conveying water and to control land degradation, including dams, bores, irrigation channels, weed eradication, some fencing work and tree establishment.³² The benefit can be provided in the form of either a tax rebate or a tax deduction (ABARE 2001, p. 44). While providing a significant if not large incentive to land care activities, these concessions are not very discriminating and do not necessarily target the most pressing environmental problems. For example, deductions under 387-130 include both conservation and irrigation expenditures and some deductions under both 387-55 and 387-130 may be for activities that would have occurred as a normal part of agricultural operations, such as fencing, although the scale of claims made under these sections are relatively small (Binning and Young 1999, pp. 26, 28). There is also a risk that these concessions may even encourage poor practices so that landholders can subsequently take advantage of tax concessions for remedial work. ABARE concluded that subsidies are a more efficient means of achieving the desired environmental outcome (ABARE 2001, p. 46).

6.4 Forests

In forestry, environmental issues arise principally from the logging of native forests rather than from the establishment and management of plantations. As a general rule, environmental damage will be reduced to the extent that forest products are supplied from plantations instead of native forests.

There are two main factors that affect the way in which the tax system affects native forests – the royalties paid by logging companies for native forest logs and the tax concessions granted to plantation forests which may or may not make them more competitive with native forests.

A study by Dragun (1995) of financial subsidies compared timber revenues with forest management expenses of the forest management agency in Victoria, the Department of Conservation and Natural Resources (DCNR). He concluded that the financial subsidy to the Victorian native forests logging industry is at least \$50 million per annum.

³⁰ Peter Costello, Capital Gains Tax Amendments and Private Conservation Press Release 15 June 2001.

³¹ Now Sections 387-55 and 387-130 of the Income Tax Assessment Act 1997.

³² It also discusses some income tax issues associated with land conservation, but they do not bear on this report.

A study by Read Sturgess of the logging and water values of the Thomson Catchment, which provides part of Melbourne's water supply, showed that if account is taken of the impact of logging on water yields from the catchment then the existing forest management regime is the least efficient of the alternatives considered and that the net present value of the resource could be increased by \$147 million if logging were prevented altogether (Read Sturgess 1992).

ROYALTIES

Apart from direct financial subsidies to logging, if the prices of native forest logs included compensation for some of the external environmental costs of logging then they would be much higher than at present. This would undoubtedly give a substantial price advantage to the main competing product for native hardwoods, that is, plantation softwood for sawn timber and softwood and recycled paper for pulp and paper production (Hamilton 1995). However, it can be argued that high conservation native forests should be protected by direct legislation, rather than be made uncompetitive by the internalisation of environmental damage.

In view of the fact that the environmental damage from native forest logging is much greater than that of plantation forestry, it is anomalous that state forest management agencies charge higher royalties for softwood logs than for hardwood logs, around 30-40 per cent higher according to 1991-92 ABS data (ABS 1995, Table 4.6). According to Victoria's Auditor-General, the Department of Conservation and Natural Resources sets royalties for hardwood sawlogs at an average of \$21 per m³ while the royalty for pine plantation sawlogs is \$38 per m³, 90 per cent higher (see Hamilton 1995). Hamilton *et al.* (1997) called for an increase in the price of native forest sawlogs to \$42 per cubic metre, and estimated that such a measure would raise between \$40 and \$100 million in additional revenue.

TAX TREATMENT

While in the past forestry activities enjoyed substantial tax privileges, this is no longer the case. Forestry is treated in the same way as other agricultural activities (which gives it advantages over other industries such as manufacturing). In 1991, the Resource Assessment Commission concluded that in the 1980s amendments to the Income Tax Assessment Act eliminated certain provisions that provided investors in some forestry activities with tax advantages (RAC 1992, Volume 2B, p. P18), although it recommended some further minor changes.

In 1997, the Industry Commission raised the issue of double taxation of profits arising from forest plantations due to an anomaly in the capital gains tax legislation, although the Tax Office was aware of this issue (Industry Commission 1997a, pp. 133-34). It is unclear how significant an issue this is and if it has been resolved.³³

COMPETITION POLICY IN THE FORESTRY INDUSTRY

The remaining significant problem in the forestry sector lies in the different pricing and regulatory environment facing the competing segments of the industry – the native forest logging industry and the plantation industry.

³³ The Tax Office does not appear to have issued any specific determinations relating to this issue since 1996.

A recent report commissioned by the Australian Conservation Foundation (ACF) has highlighted the fact that the structure of state government-owned forestry agencies, and the charging regimes used by them, may contravene National Competition Policy (see Marsden Jacob 2001). In so doing, native forest logging enjoys a competitive advantage over the plantation industry resulting in greater environmental damage. Amongst other things, NCP requires forestry departments to:

- recover all their costs;
- provide a return (i.e. profit) to government; and
- be subject to the same taxes and charges that other businesses face.

The extent to which these conditions are not met provides a subsidy to loggers of native forests providing them with a price advantage over plantation timber operations. Such a distortion will lead, *ceterus paribus*, to an over-reliance on native forests as a source of logs and in turn result in additional environmental damage.

The concerns expressed by Marsden Jacob mirror those raised by Industry Commission (1997a), which stated:

The major concern is that log prices charged by government agencies do not reflect all costs of supply. Allied with this are concerns about the systems used to allocate logs to users. Allocations have often been at the discretion of forestry agencies. And their sale has frequently been conditional on end-use... To the extent that logs are underpriced, the returns achieved by private wood supplies are reduced – as is the incentive to investment in private plantations and farm forestry (Industry Commission 1997a, p. 136).

The report by Marsden Jacob identifies Victoria as the state that most consistently breaches the requirements of NCP with respect to the management of native forests. ‘We conclude that there is a *prima facie* case that with respect to forestry activities, Victoria does not comply with the minimum requirements for competitive neutrality’ (Marsden Jacob 2001, p. ES iii). However, there are shortfalls in NSW with respect to charging policies that have a bearing on this report. Marsden Jacob conclude that NSW violates the requirements of competitive neutrality due to current pricing approach (2001, p. ES vi). They note that the National Forest Policy Statement advocates that prices should:

- be market-based;
- at least cover the full cost of efficient management (including regeneration) attributable to wood production;
- include a fair return on capital; and
- provide an adequate return to the community from the use of a public resource (Marsden Jacob 2001, p. 3.3).

Several studies have concluded that logs from public native forests are underpriced and that sawmillers would be willing to pay significantly more than prevailing royalties (DNRE 2001, pp. 3-4; Marsden Jacob 2001, p. 3.11).

Marsden Jacob recommend that log pricing be based on auctions and open competitive tendering for all licenses to take saw logs and pulp logs and that logging licences be freely contestable.³⁴ In addition, consistent application of National Competition Policy to native forest logging – including prices oversight by the appropriate regulator – would ensure that full-cost pricing prevails and that subsidies are eliminated (Marsden Jacob 2001, p. 3.16).

6.5 Summary and conclusions

In the case of urban water consumption, water conservation requires a more rapid transition to a two-part tariff in which a volumetric charge can encourage water saving. In the case of irrigation water, there are no major tax issues influencing the environmental impact of irrigation water use, except for the availability of accelerated depreciation for investments in irrigation and water storage. However, faster progress is needed towards an efficient system of water charges, or equivalent pricing through water trading.

In the case of land, the tax system needs to treat consistently conservation activities on land regardless of whether a business is being operated. Addressing this should remove some incentives to exploit, rather than protect, high-conservation value areas. Access to accelerated depreciation for water and land conservation activities also needs to be tightened to ensure only genuine conservation activities receive these benefits. In addition, there may be some need to provide additional incentives to undertake conservation activities on those areas with highest environmental value, perhaps through an additional rebate.

For forest operations, there do not appear to be major tax issues although some attention could be given to investigating the comparative level of royalties between logs from native forests and plantations. The charging and pricing practices of state forest management agencies may be contrary to the principles of competitive neutrality thereby disadvantaging plantation timber.

Overall, in the case of forests environmental protection issues are best dealt with through regulation (including legislated reservation) than by the use of economic instruments. This holds for publicly owned forests. There is a stronger case for the use of economic instruments to bring about a higher level of protection of high conservation value native forests on private land.

³⁴ Some lower grade logs are already priced through a system of tendering by logging contractors.

7. Wastes

7.1 Solid waste

The environmental problems associated with solid waste disposal include: pollution of ground water and surface water through leaching; impacts on habitat from dust; health impacts from leaching and dust, and from the release of toxic substances through incineration; the contribution of landfill to greenhouse gases; and, loss of amenity due to odour, litter and visual pollution. In addition, availability of relatively cheap landfill encourages excessive use of 'disposable' resources.

The problem of solid waste disposal is attracting a great deal of attention and legislative action overseas. The European Union has targeted certain waste streams for priority legislative action, including used tyres, end-of-life vehicles, construction and demolition waste, clinical waste and electronic and electrical waste (see Section 3).

In 1991, the Commonwealth developed with the States the National Waste Minimisation and Recycling Strategy (NWMRS) aimed at reducing waste generation, increasing recycling, treating harmful wastes and improving safe disposal. It set targets for a range of waste categories with the overall aim of reducing solid waste disposal in landfills by 50 per cent on a per capita basis by the year 2000.³⁵ According to estimates by the Commonwealth EPA in 1996, the targets are unlikely to be achieved for some plastic containers, liquid paperboard and oil, but are likely to be met or exceeded in the cases of PET bottles, glass and aluminium containers, newsprint and paper packaging. Overall, progress on achieving the national target of a 50 per cent reduction has been 'insufficient' (ABS 1996, Table 12.1.3.5). The House of Representatives Standing Committee on Environment, Recreation and the Arts (HORSCERA) report indicated that progress is being constrained primarily by lack of commercial viability of recycled inputs (HORSCERA 1994, p. 60).

The NSW Waste Minimisation and Management Act 1995 and associated regulations established a 60 per cent per capita cut in solid waste disposal in NSW (NSW EPA 2001, Section 2.6), and by 1998 there had been a 22 per cent reduction. The 50 per cent per capita cut in wastes to landfill is probably the maximum that can be expected under current methods of production and recycling, and using the methods envisaged by the NWMRS. However, under policies being developed by the Victorian Environment Protection Authority (EPA), solid wastes going to landfills could be cut to 20 per cent of current levels over the next 20 years.

Another way to expand recycling and reduce the levels of waste directed to landfill is through the use of waste in the production of energy. This helps address some of the environmental impacts from energy generation, although it should not substitute for waste reduction, reuse and recycling measures.

³⁵ However, the Victorian Recycling and Resource Recovery Council has indicated that up to two thirds of waste can be diverted to re-use or recycling (quoted in DEST 1996a, pp. 86-87). It is reported that around 48 per cent of paper, 62 per cent of aluminium cans and 42-44 per cent of glass are collected for recycling in Australia. The percentage for plastics is much lower (HORSCERA 1994, p. 62).

7.2 Waste water

Emissions and effluent charges are a recent development in Australia, but have become significant policy instruments in some States. South Australia played a leading role with its system of charging fees for point source emissions into tidal waters with the fee linked to the toxicity and volume of discharges. Other taxes and charges include the load-based licensing systems discussed above, the trade waste program operated by Sydney Water Corporation and the product tax operating on ozone depleting substances.

The Industry Commission urged the States to introduce tradeable emission permits for both point and non-point source discharges into rivers and coastal waters (Industry Commission 1997b, p. 130). It suggested that the strategy should focus firstly on the most damaging pollutants and those from the most significant point sources. It referred to the NSW EPA's South Creek Bubble Licence Scheme, which progressively limits discharges of phosphorus and nitrogen and allows Sydney Water to 'trade' allocations between its three treatment plants.

7.3 Industrial waste

The widespread adoption of cleaner production will depend on persuading firms that it is in their commercial interests to do so. Thus the Victorian EPA has developed a program of advice, demonstration and support for targeted firms. In Queensland, a similar approach is being taken by the Cleaner Production Taskforce, a tri-partite initiative of government, business and universities. Firms that successfully adopt cleaner production are encouraged to promote its application elsewhere in their industries. In addition, industry organisations are urged to promote cleaner production as a service to their members.

Victoria introduced a system of load-based licensing for industrial and commercial polluters in 1991 and NSW has followed suit more recently (NSW EPA 1998). Licence fees are tied to the volume and nature of pollutants emitted thus providing a financial incentive to reduce emissions. According to the NSW EPA: 'By encouraging licence holders to adopt technical and managerial innovations over time, the scheme has the potential to reduce the economic impact' of achieving the Government's pollution and waste minimisation objectives (NSW EPA 1996, p. 6). Load-based licensing represents a shift away from regulations that limit concentrations of certain pollutants to imposing fees according to actual load or mass discharges of pollutants, backed by absolute maximum load limits. Reflecting a polluter-pays philosophy, licence fees are linked directly to pollutant loads. Load-based licensing schemes include industry-specific and pollutant-specific emission targets. NSW has specified both short-term and long-term targets for a range of pollutants.³⁶

The impact of existing systems of load-based licensing is difficult to assess at this stage, but they appear to be significant motivating factors in reducing pollution. The

³⁶ For example, in the case of sewage treatment plants the short-term target for suspended solids is 0.7 kg/person while the long-term target is 0.088. The targets for all metals discharged from sewage plants are 0.036 kg/person in the short-term and 0.004 kg/person in the long-term. In the case of petrochemical works, the short-term target for fine particulates is 0.02 kg/tonne manufactured while the long-term target is 0.003 kg/tonne (EPA NSW 1996, Appendix 5).

systems are supported by industry and government. In addition to the penalties for pollution, the Victorian EPA has developed the Accredited License Scheme that provides for a 25 per cent reduction in license fees for the best performers in an industry. To gain accreditation firms must adopt an approved environmental management system, subject themselves to an external audit and develop an environmental improvement plan in consultation with the local community. Experience suggests that while a 25 per cent cut in license fees may be trivial financially, especially for large companies, and the benefits of being an accredited firm can be very substantial. The reported benefits include improved public relations, easier access to finance for investment and exemption from most works approval requirements.

Hamilton, Hundloe and Quiggin (1997) proposed extending load-based licensing to all States and territories and increase licence fees over five years with a view to raising around \$50-60 million in revenue, enough to finance a major extension to cleaner production programs. They suggested that the combination of load-based licensing and promotion of cleaner production proposed here is expected to reduce emissions per unit of industrial output by 45-55 per cent over current levels and resource use by 25-30 per cent.

7.4 Domestic and non-industrial waste

Turning to the problems of domestic and (non-industrial) commercial waste generation and disposal, at present most waste collection is funded by property-based charges. However, property-based charges for household and commercial waste disposal are ineffective in persuading households and firms to reduce wastes generated. A number of studies have shown that user pays charges set according to volume are effective at reducing wastes and encouraging recycling (Hamilton, Hundloe and Quiggin 1997).

A US study found that replacing a property tax financing system for collection of household waste with a fee of US\$1.50 per bag (a fee that covers the marginal cost of collection and disposal) would reduce household waste by 18 per cent. When combined with a free kerb-side recycling program the waste volume is reduced by over 30 per cent (Repetto *et al.* 1992, p. 18). A large proportion of households, up to half in some areas, find that they pay less for garbage services under a pay-by-the-bag system than under a flat-fee system.

In Australia, according to one study: 'Many councils still do not have specific garbage rates and even fewer adopt charging systems for garbage that are based on pay-by-volume or pay-by-weight basis. There is, therefore, little incentive for residents to minimise their waste' (DEST 1996a, p. 88).³⁷ However, voluntary recycling stimulated by effective collection systems (including big bins) have proven to be very effective at increasing the volume of waste recycled.

In addition, there may be difficulties with applying pay-by-volume schemes to households, including the problem of illegal dumping and use of neighbours' bins.

³⁷ Plastic shopping bags account for 11 per cent of plastic waste collected on Clean Up Day Australia 1995 (ABS 1996a, Table 7.2.8). It is claimed that a charge of 10 cents per bag would reduce consumption substantially (*Canberra Times* 21 August 1996).

There are also equity concerns as poorer households may be required to pay a larger proportion of their income than under property based systems.

In recent years, kerbside recycling schemes have been adopted by many local councils. In 1993, 49 per cent of the population lived in local government areas with kerbside collection schemes (see Hamilton, Hundloe and Quiggin 1997). Many households participate in other recycling schemes in addition to or instead of kerbside collections.³⁸ As a result, growth in the annual volume of solid wastes going to landfills has slowed to the point where, in many areas, the volume has been falling. The main obstacle to the continued growth of household (and for that matter, commercial recycling) is the instability of markets for recycled materials. Prices paid for recycled glass and paper can fluctuate sharply and this instability may discourage investment in recycling plant and equipment. However, markets for virgin materials, including some that compete directly with recycled materials, also fluctuate and producers adapt to this. There may be some scope for policies to stabilise the markets for recycled materials, but a better policy response would be to implement measures to give recycled materials a price advantage that fully reflects the external environmental benefits associated with recycling.

Tip fees have been extended across Australia. Charging full cost recovery for landfill services raises the costs of goods that generate substantial wastes and should be encouraged. This would provide an advantage to goods that are recyclable and promote more efficient use of materials. In addition, the current best-practice kerbside recycling schemes in Australia should be extended to all municipalities with priority given to major urban areas. Outside of urban areas the emphasis should be on hazardous wastes.

Introduction of kerb-side recycling and landfill charges can have a dramatic impact on the volumes of waste going to landfill. Some waste management authorities have developed a 'no waste to landfill' strategy, with the aim of reducing waste to zero. In the ACT considerable progress has been made along this path under its 'No Waste by 2010' strategy. Total wastes to landfill fell 39 per cent between 1993/94 and 1995/96, from 416,000 tonnes to 252,000. This was due principally to the introduction of waste disposal charges. Over the same period, the introduction of kerb-side recycling saw the volume of recycled materials collected rise 125 per cent from 118,000 tonnes to 265,000 tonnes. The household participation rate is 98 per cent (ACT Government 1996). The ACT strategy and performance is far ahead of almost all other parts of Australia.

The extension of the best waste management schemes, including landfill charges and recycling, to all areas in Australia could see waste to landfill largely disappear over the next 20 years. Under current policies we are likely to see wastes to landfill stabilise or fall slightly.

Product taxes on hard-to-dispose of and dangerous items are rare in Australia. South Australia has a container deposit refund scheme, and revenue from a levy on oil is used to support an oil-recycling system. There is also a system of charges for ozone-

³⁸ For example, South Australia also has a deposit refund for beverage containers (see Industry Commission 1997b, Chapter 3).

depleting substances (James 1997, pp. 42-43) and differential excises on leaded and unleaded petrol. From 1989 to 1995, recycled paper enjoyed an exemption from or a reduction in sales tax. At various times taxes or charges have been considered for tyres, batteries, and fertilisers. James suggests extension of deposit refund schemes to car batteries, tyres and car bodies (James 1997, p. 50). More recently, the NSW Minister for the Environment has commissioned an independent review of container deposit legislation, although the findings have not yet been released.³⁹

7.5 Summary and conclusions

To date, governments have established per capita targets for waste reduction, introduced load-based licensing schemes, waste charges and kerb-side recycling and, in the case of South Australia, maintained deposit-refund schemes. These measures have successfully reduced waste generation, although it appears that some of the per capita targets are unlikely to be met within the timeframes proposed. However, other work suggests that waste generation can be reduced further by changing the focus of initiatives to reducing material consumption. One means to promote this is through taxes and deposit-refund schemes on various materials should be investigated.

Industrial waste should be addressed by continuation and expansion of load-based licensing schemes, and the introduction of tradable permit schemes where appropriate. Over the long-term, clearly-defined targets for future licensing charges and reducing caps need to be established. These should be coupled with cleaner production initiatives, which could potentially be encouraged through a life-cycle pollution trading scheme.

For hazard wastes and materials, there may be some scope for the extension of deposit-refund schemes, or the introduction of hazardous material taxes. Such approaches may also be appropriate for dealing with those wastes prone to illegal dumping or are difficult to collect in recycling schemes.

³⁹ For more information, see http://www.isf.uts.edu.au/CDL_Review/index.html.

8. Conclusions and priority areas for reform

8.1 Priority reforms

The objective of this paper has been to review the evidence on the environmental impacts of taxes and charges and to make recommendations for potentially useful changes to the system of taxes and charges. The criteria on which to base recommendations for reform to taxes and charges to promote environmental protection are:

- The reform should have a major environmental benefit; and
- The reform should preferably benefit a wide range of stakeholders.

The priority areas to be considered for reform are discussed below. It should be noted that a number of these proposals involve levying charges on activities that have previously been unpriced. This may make some proposals politically sensitive. However, it is recommended that in most cases any new charge form part of a package that is revenue neutral and reduces regressive aspects of the policy. Thus in the case of the first proposed reform below calling for more cost-reflective road-user charges, the revenue raised from this initiative could be used to remove other regressive taxes or charges paid by road users, to promote alternatives to direct road use or to directly compensate road users with a lump-sum payment. In this way, proposed reforms can be made more politically acceptable, particularly when combined with information and education.

Transport

- Introduce a more cost-reflective system of road-user charges for heavy vehicles.
- Investigate area-based congestion charging for all vehicles in congested areas.
- To tackle congestion and air pollution in metropolitan areas, a system of cap and trade for parking spaces in the central and other major business districts as outlined in Section 4 be introduced.
- As a measure to promote fuel efficiency, introduce graduated stamp duty on new car purchases and graduated registration fees rewarding purchasers of fuel-efficient vehicles and penalising gas guzzlers, including four-wheel drive vehicles. In addition, consider the introduction of pay-by-kilometre third party insurance and registration charges. The changes could be revenue neutral.
- Reform FBT provisions so that employer-provided vehicles no longer receive concessional treatment. The effects of FBT on parking should also be considered.

In terms of political feasibility, any changes to charges and prices affecting the freight transport industry are likely to be met with well-organised and concerted opposition. On the other hand, the underpricing of road freight is a serious problem recognised by all experts in the area. Congestion charging is being adopted in various places around

the world, and there is widespread understanding in the community about the need to do something. Graduated charges to reward fuel-efficiency and penalise gas-guzzlers would be politically feasible if handled carefully. The difference in charges should be small at first and increase over time to give motorists an opportunity to react to the price signals. Concessions on increased charges on four-wheel drive vehicles could be provided for genuine primary producers.

Stationary energy

- Renegotiation of electricity contracts with aluminium smelters to eliminate price subsidies. The savings, in the order of \$300 million per annum could be used to promote low-emission energy sources.
- Reform of transmission charges in the National Electricity Market so as to eliminate the disadvantage to non-remote sources. More generally, investigate cross-subsidies that disadvantage electricity supply from gas and renewable sources.
- Introduce a greenhouse gas emissions trading system for retailers selling into the National Electricity Market.
- Apply a small levy to all electricity sales with the revenue used to overcome the price disadvantage for electricity from renewable sources, particularly Green Power. Consider changing the Green Power scheme from an opt-in to an opt-out system.

Renegotiation of electricity contracts for aluminium smelters will attract opposition from the companies concerned, but the opposition would be isolated if the revenue saved from this measure were directed at sustainable industry development. Reform of the NEM to remove impediments to gas and renewables is unlikely to meet any opposition, other than bureaucratic, and this reform should be pursued with vigour. A system of emissions trading based on emission caps would be challenged by Victorian electricity retailers but supported by NSW retailers. The last proposal is an alternative to the third. If presented the right way, and introduced at a low level, a levy on electricity sales to subsidise renewables would be widely accepted and could give a very substantial boost to the development of the sustainable energy industry in Australia.

Forests

- Through the competition policy framework, ensure that royalties, land-use charges, profits and taxes paid by suppliers of native forest logs are competitively neutral with respect to plantation timber.

This should be done as a matter of course and would meet no opposition other than from state forestry agencies.

Urban water use

- Hasten the shift to full user charging with a two-part tariff. Consider raising the user charge above the level required to meet variable costs in order to send

stronger conservation signals. Additional revenue could be recycled back to users to assist with domestic water conservation (especially in poorer households).

- Consider introducing a price differential between fresh and recycled water to encourage recycling such as a resource rent tax on fresh water.

User charging for water is widely accepted and provides the opportunity for households and businesses to cut their bills through conservation measures. The resource rent tax on fresh water is a new idea worth serious consideration.

Rural water use

- Rapid extension to full water rights trading for all commercial users. Trading in water rights to be based on a reducing cap on total extractions aim at achieving an adequate level of environmental flows. Some especially vulnerable regions may require low or zero caps.
- Consider extension of salinity and other pollutant trading schemes for discharges into waterways.

Irrigators have at every stage resisted paying the full cost of their water, but it is inevitable. Since public awareness of the dire situation in water systems is high and the need for guaranteed environmental flows is well accepted, federal and state governments should pursue proper charging.

Land

- Introduce a 1 per cent income tax levy to fund large-scale investments in land conservation based on the principle of mutual obligation.
- Tighten those sections of the Income Tax Assessment Act that deal with land and water conservation and ensure that the incentives for conservation activities do not depend on whether that land is used of commercial activities.

The Commonwealth tax levy to fund conservation is politically complex, and something that is likely to gain momentum only if adopted by a major party at the federal level.

Wastes

- Extend load-based licensing schemes and introduce tradable permit schemes for pollutants where appropriate. Determine the level of load-based charges or the capped quantities required to meet stringent community standards into the future.
- To promote cleaner production, investigate a system of life-cycle pollution trading that allows producers to meet licensing requirements through improvements in product design and manufacturing processes.

- Consider measures designed to improve the relative cost of using recycled building materials compared to virgin materials.
- Consider extensive system of product taxes and/or deposit refunds, including tyres, batteries, car bodies, beverage containers, packaging, white goods, computers, office equipment and pesticides with revenue earmarked for clean-up and disposal or recycling of resource-intensive, long-lived and dangerous goods.

There is strong community support for measures to reduce industrial pollution, and extension of load-based licensing should be pursued, even if industry claims that the pace of reform is too fast. Product taxes and deposit refunds have proven generally popular abroad (and in South Australia) and have not been more widely adopted principally because of industry resistance.

8.2 The policy process

A wide range of research is still needed if policy makers wish to be able to base decisions concerning the management of all natural resources on a thorough cost/benefit basis. However, such an objective should itself be subject to an informal cost/benefit process. Reasonable judgement may conclude that collecting detailed information on the entire range of effects may itself be inefficient. We have seen that other countries have not waited for 'full information' before acting on environmental problems whose effects are manifest.

On the other hand, continued collection of good-quality information may be needed to prevent other actions that have unanticipated environmental effects. In recent years, despite the evidence of climate change, governments in Australia have placed a tax on public transport, provided concessions on the fringe benefits taxation of company cars, extended a rebate on the use of diesel fuel, and introduced changes to the structure of the electricity industry that have resulted in reduced prices for coal-fired electricity at the expense of lower-emission fuels.

The latter point is increasingly important. More attention needs to be paid to the negative effects of competition policy on the environment. The National Competition Council (NCC) pays little regard to the environmental components of the public benefit test despite strong evidence that some reforms have damaged the environment. The NCC claimed in 1999 that:

The energy reforms also have significant implications for the environment. For example, the creation of a national electricity market allows suppliers to sell 'green energy' into the market and makes it easier for consumers to buy energy from renewable resources (National Competition Council 1999, p. 14).

In fact, the national electricity market was introduced without any consideration of the possible environmental damage, and the damage has been very considerable.

The case for the explicit incorporation of the natural environment into the decision-making process, and the usefulness of market instruments for doing so, is

unchallengeable. Academic researchers, Australian governments and international agencies have all expressed their support for the adoption of such measures. However, limited progress has been made in Australia. Both the Australian National Audit Office (1997) and Industry Commission (1997b) have found a lack of progress on implementing cost-effective environmental protection measures. In addition to asking themselves ‘how can economic instruments be used to protect the environment?’, policy makers should also pay serious attention to a different question, ‘why has so little been done to use economic instruments to protect the environment when there appears to be no opposition to the principle?’

A possible explanation for this is that while the economics of environmental protection have been extensively studied, the distributional and political dimensions of such reforms have been largely ignored.

The imposition of environmental taxes and cost-reflective charging for natural resources explicitly relies on increasing relative prices to shift both producer and consumer behaviour away from reliance on currently underpriced goods and services. The imposition of environmental tax reform will therefore often impose substantial costs on small groups in society (groups that rely heavily on the consumption or use of currently underpriced goods and services). The imposition of these costs can be justified in terms of improving the allocation of resources and increasing the welfare of society as a whole, but they are likely to be met with fierce opposition from the adversely affected groups. While society is accustomed to imposing costs on some groups in order to increase the welfare of others, it is possible that the groups likely to be affected by environmental tax reforms have better-than-average capacity to influence both public and government perceptions of ‘the public interest’.

It is important to note that opposition to the introduction of environmental tax reform is rarely, if ever, based on the argument that the concept is inherently flawed. Rather, the following arguments are used.

1. The costs and benefits associated with proposed reforms are uncertain and a significant amount of research needs to be conducted before progress can occur.
2. The imposition of taxes and charges would result in firms closing down and jobs being lost.
3. Firms cannot change their production processes in the short-term making the introduction of new charging regimes ‘unfair’.
4. Foreign competitors are not subject to the same controls so that the introduction of environmental tax reforms would make Australia ‘uncompetitive’.

In the case of the first argument, the absence of complete information is not a justification for failing to use what information is available. If available information suggests that the *status quo* is inefficient, and suggests the direction in which change needs to occur, the first step in the policy process should be to begin to move in that direction. Debate about how far the shift away from the *status quo* needs to be can, and should, be conducted after the necessary transition has already begun. That is, if

a resource is currently priced at zero, and available evidence suggests that a significant positive price is warranted, then a price should be introduced immediately, along with an automatic price elevator. Debate over the magnitude of the price can occur while the market is in the process of already moving closer towards equilibrium.

The second criticism, that firms may close and jobs may be lost, cannot be avoided. The objective of environmental tax reform is to shift consumption away from goods that harm the natural environment. Firms and workers whose activities are closely related to those processes will, therefore, suffer a reduction in demand for their services. Structural change is a continuing process, and in recent times has been hastened by explicit reform policies. While electricity industry restructuring, privatisation and private sector mergers have led to the loss of tens of thousands of jobs, the need for 'reform' and the benefits to the broader community were always placed at the forefront.

The phased introduction of environmental tax reforms would serve to provide longer-run signals to both employers and employees about the need to adjust. Rather than precipitate a crisis within firms by suddenly introducing full environmental cost pricing for natural resources, the gradual introduction of higher charges provides firms with more time to introduce new production processes, retrain workers and diversify into the production of new goods and services. This also deals with the third argument.

The fourth argument, concerning effects on international 'competitiveness', usually reflects a lack of understanding about the foundations of international trade. Countries trade in goods and services because it has the potential to improve the standard of living in all countries. By specialising in the production of goods or services in which a country has a 'comparative advantage' over another and then trading for goods in which another country has a 'comparative advantage' the total amount of production within the trading countries will be greater than if both countries had tried to produce all their own goods and services.

If Australia's trade partners subsidise industries, either directly or indirectly by allowing them to despoil their natural environment, rather than matching those subsidies, the optimal decision for Australia may well be to take advantage of their subsidised production and redirect domestic production towards other sectors, always with a view to ensuring that Australian production is as efficient as possible.

Environmental tax reform is a logical extension of the reform process that has taken place in the Australian economy over the last 15 years. There is nothing 'inefficient' about efficiently pricing all inputs into the production process, including the environmental costs. It must be recognised, however, that attempts to charge full price for environmental services will cause some hardship for those who have relied on subsidised provision in the past. In order to both ease the costs of the transition period and to overcome political objections to the reform process it will be beneficial to consider the timing of the transition to full-cost pricing. The implementation of a small tax or charge on an environmental problem followed by automatic growth in the rate while detailed discussions about the appropriate size of the charge take place will ensure that not only will environmental benefits arise much more quickly, but also

that firms will have a much longer period over which to either implement reforms in the production process or pursue opportunities in new markets.

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