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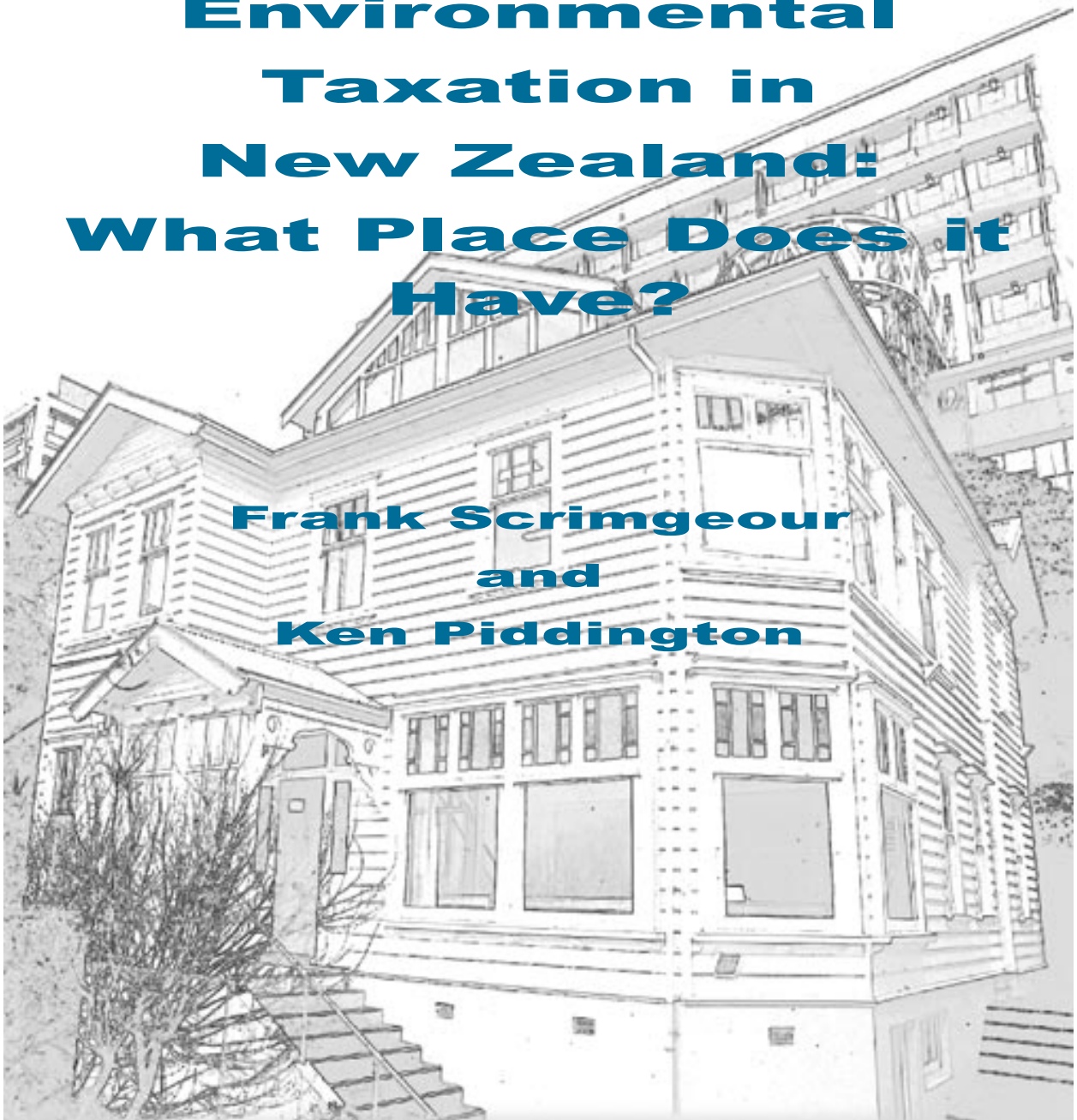
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**Environmental
Taxation in
New Zealand:
What Place Does it
Have?**

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and
Ken Piddington**



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Introduction

The 2001 Tax Review (McLeod et al, 2001) includes a timely discussion about the place of environmental taxation in New Zealand. The review's discussion paper released on 20 June 2001 and the final report in October 2001 both devote a whole chapter to environmental taxation. This is not surprising given the current influence of the Greens in Parliament, the Kyoto Protocol and the enthusiasm of some analysts for using economic instruments to achieve environmental outcomes.

In reviewing the academic case for environment taxation, it is appropriate to go back to the Pigouvian tradition, and its more recent interpretation by Coase, Tietenberg and others. At its simplest, an efficient Pigouvian tax and an effect regulation achieve the same outcome. The policy analyst is indifferent. However, given the range of real world circumstances, comparisons can be made between doing nothing, imposing a regulation, imposing a tax, implementing a tradeable permits system or some other policy instrument. Analysts are left to choose between instruments by comparing each instrument against a set of criteria.

The Tax Review discussion paper took a cautious approach suggesting that eco-taxes are only appropriate when "damage of each unit of emissions is the same across the geographic area to which the tax applies; the volume of emission is measurable; and the marginal net damage of emissions is measurable". At a regional level

they are more optimistic, suggesting "eco-charges may be appropriate at a local level". The review does see a real possibility for carbon taxes and notes there is no research available about the potential impact of methane taxes.

The Tax Review discussion paper conclusions are driven by some critical assumptions. The authors place a tough standard as a requirement for any environmental tax. This requirement is not always or often met with regulations and other policy instruments. The authors are also concerned about taxes attenuating property rights at all levels of production. This is certainly an impact but it is an efficient impact. The authors suggest that double dividends result from the transfer of rents to the Crown and not productive efficiency. This assumption needs to be tested theoretically and empirically. The authors assume New Zealand should be slow to implement taxes as part of its response to the Kyoto protocol. This ignores the possibility that there may be gains from early adoption.

Environmental taxation will continue to be an important political issue in this part of the world as evidenced by the current fuel tax enquiry in Australia. Despite its importance, the consideration of environmental taxation by the Tax Review Committee is unsatisfactory. Further analysis is required which considers the performance of environmental taxation against other instruments used to achieve government goals. This paper provides some history of the concept of environmental taxation as a framework for further research to address the issues raised by the Taxation Review 2001. This paper should form a basis for further work in New Zealand examining specific opportunities for environmental and resource-use taxation.

Some History

Environmental tax reform has moved rapidly onto the political agenda in many countries over the past decade. In large part, it has been given impetus by the need to deal with the risk of climate change. Despite the continuing political stalemate, the Kyoto Protocol forced most OECD countries to think about the mechanisms they would use to limit emissions of greenhouse gases. Taxation options, such as a carbon tax, held obvious appeal and became the preferred instrument for some countries.

The re-emergence of Green politics, particularly in Europe, has also revived interest in tackling the whole range of environmental problems. Public concern about the lack of practical solutions has been growing and there has been mounting opposition to new forms of environmental risk. (This is reflected in New Zealand in the heat of the debate over genetic engineering.) Each new exposure, such as the BSE episode, ratchets up the level of political awareness.

The discussion of policy options has led to a general consensus that taxes are efficient instruments to achieve environmental targets. Since they also yield revenues, government can look for a wider range of policy packages to win acceptance for this approach. In New Zealand, the recent review of the tax system and its shortcomings has created an ideal opportunity to look at all the issues surrounding various forms of resource-use taxation.

Such taxes are designed to internalise the social costs of environmental degradation. Full cost pricing requires that all costs (present, future, private and external to the user) incurred by society during production and consumption of a good or service be fully covered by the price of that good or service. This is a necessary, but not sufficient, condition for sustainability (Panayotou & Yajun, 1999). In addition to confronting polluters with the full costs of their polluting activities, resource taxes can be used to optimise the consumption mix of renewable resources and non-renewable resources.

Environmental tax reform can cover both incentives for investment in clean technology and penalties for continuing pollution. The mix of instruments selected can induce more rapid or less rapid shifts in behaviour. It is clearly desirable to seek some level of political consensus on the rate at which adjustments should be made. Beyond this, any government or political party would also have the option of signalling the possibility of future taxes or future increases. Through these techniques, the reform process can build a continuous process of improved environmental performance. Taxpayers are able to reduce or avoid the tax by changing their behaviour. Hence, taxes create a continuous incentive to decrease pollution (EEA, 1996).

For over a decade there has been a push towards development models which are environmentally sensitive. The 1992 Earth Summit articulated the principles of such development, under the umbrella

concept of 'Sustainable Development'. This move has coincided with the strong move away from regulatory and interventionist techniques of economic management.

Around the world a new phase of environmental policy has therefore opened up, using market-based incentives for reducing pollution, limiting waste and other environmental goals. Furthermore, as former command economies are restructured, market-based instruments are gaining increasing attention. For instance, China is making use of market-based instruments to integrate its environmental and economic policies (Panayotou & Yajun, 1999).

In integrating these policies, a comprehensive approach to market failure is needed. This is evident in the energy efficiency market where there are many factors working to discourage energy efficiency. These include information gaps, demand for short payback periods and tariff structures that encourage energy supply rather than energy saving. Because of these factors, the exclusive use of a tax to encourage energy efficiency would require it to be set at a penal rate (EEA, 1996).

Types of Environmental Taxes

Environmental taxes can be classified into four types according to the way in which the environmental tax is levied (Bosquet, 2000; OECD, 1997; Panayotou & Yajun, 1999):

i. *Effluent and Emission Taxes*

These are a Pigouvian type tax that is directly related to the quantity and quality of pollutants discharged. Examples of these include water pollution effluent taxes and air pollution charges.

ii. *Product and Input Taxes*

These are indirect taxes that are based on products that create environmental externalities when manufactured, consumed or disposed of. Taxes on motor fuels, pesticides, fertilisers and batteries are examples of this class of environmental tax.

iii. *Environmental Subsidies*

This is where polluters are subsidised to decrease the pollution that they generate.

iv. *Investment Tax Incentives*

Tax credits for environmental protection investments are used in the Netherlands. Accelerated depreciation for pollution control equipment and

waste treatment facilities is used in Germany and Japan. Canada, France and Korea undertake both types of incentive measures.

There are three important functions of these various taxes: cost recovery, incentive effects and revenue raising (EEA, 1996). The choice by governments will be influenced by the weighting they give to these overlapping functions. The design of a specific fiscal measure will also be determined by the same political judgement on priorities.

Cost covering charges are designed to raise funds needed for sustainable management of environmental systems, environmental measures or environmental programmes. They include earmarked charges and user charges. For instance, France and Germany impose charges on water pollutants that are designed to raise revenues to cover administration expenses for water quality management and to subsidise water quality improving projects (Hahn, 2000). The Netherlands implemented an aircraft noise charge, imposing a surplus on landing fees. The revenue from this charge is earmarked to finance measures to reduce the noise annoyance of airports, including insulation and redevelopment (EEA, 199).

Incentive taxes are designed to achieve a specific environmental impact. The UK landfill tax that was introduced in 1996 is an example of an incentive tax. The purpose of this tax was to internalise externalities and increase waste recycling, while reducing disposal to landfills (Hogg, 1999).

Fiscal environmental taxes are intended primarily to raise income for government expenditures. The environmental effect is considered to be a side-effect (Ribeiro, 1999). The Danish charge on non-hazardous waste disposal is a fiscal environmental tax. The revenues raised by this tax are part of the general budget (EEA, 1996).

For a chronological development of environmental taxes, see EEA, 1996, p 22.

Environmental Tax Reform

Environmental tax reform¹ (ETR) is where the tax burden is shifted from factors of production, such as labour and capital, to pollution and the use of natural resources (EC, 1997). The most recent and extensive

tax reforms applied in the area of environmental protection have been implemented in Sweden (1990), Norway (1992), Denmark (1994), Netherlands (1995) and Finland (1997) (Álvarez et al, 1998).

Conventional taxes tend to reduce incentives for work, savings, investment and conservation, while increasing incentives for leisure, consumption, resource depletion and environmental degradation. Hence, the existing system of taxing social benefits introduces a market distortion, while a reformed system that taxes social costs would remove or reduce distortions and mitigate market failures (Panayotou & Yajun, 1999).

Environmental tax reform is therefore a tool that can be used to target the sustainable management of many natural and physical resources. Although this same goal is written into the Resource Management Act (1991), the statute itself offers relatively little guidance or incentive towards its achievement. Many stakeholders would welcome the use of specific taxes/tax incentives to lend weight to the Act and accelerate New Zealand's progress towards an ecologically sustainable economy.

Strategic tax reform would potentially involve three complementary activities (OECD, 1997). These are:

- i. removal of existing taxes and subsidies that have negative environmental impacts; for example, subsidies on intensive agriculture, fossil fuels, or road and air transport will counteract the effect of an environmental tax (EEA, 1996);
- ii. restructuring of existing taxes in an environmentally friendly manner; and
- iii. introducing new environmental taxes.

Revenue Recycling

In order to make environmental tax reform politically acceptable, many governments have combined it with tax reduction in other areas. If total revenue is left unchanged, this is described as revenue neutrality, although the effects will of course vary for different players in the economy, so the reform is only neutral in terms of the total tax take by government. A further choice is whether to shift the reform in a revenue-positive or revenue-negative direction. Finland and Sweden have both undertaken revenue-negative tax reform.

Environmental tax reform recycles the revenue that is raised by environmental taxes by a tax reduction. This

may involve a decrease in employers' social security contributions. These are the non-wage labour tax paid by firms for each worker employed. Alternatively, personal income taxes may be decreased. The purpose of these tax reductions is to increase incentives to work and hire (Bosquet, 2000). The other main revenue recycling instruments are corporate income tax, specific commodity taxes, general commodity taxes (such as sales or value-added taxes) and employment taxes (Park & Pezzey, 1999).

The revenue-recycling effect of revenue neutral environmental tax reform is influenced by the institutional arrangement for tax. For instance, the taxation of unemployment benefits, the type of tax exemption and price-indexation of unemployment benefits, and tax exemptions are important factors in considering the impacts of reform (Koskela & Schöb, 1999).

The double dividend debate is concerned with the idea that an environmental tax results in more than just an environmental improvement. The double dividend hypothesis suggests that both the environment and the efficiency of the tax system are improved (Park & Pezzey, 1999). There is disagreement amongst theoretical and empirical studies as to whether the double dividend does occur. It is clearly not an automatic outcome. Some analysts argue that it depends on careful design of any environmental tax system. There is also reason to believe that the tax system becomes less distortionary when the revenue raised by environmental taxes is recycled efficiently. However, most analysts only accept the possibility of a double dividend if the existing tax system is highly distortionary (NZIER, 2001).

Both the choice of revenue recycling instrument and the extent of any double dividend will make a difference to the political desirability of environmental tax reform. Relief on labour or income taxes has been the preferred choice of governments to date (Park & Pezzey, 1999). The evidence also suggests that any employment or other social benefits thus generated can be used to win support from groups such as employers and unions, which might not support reform measures purely on the grounds of improved environmental management.

The Effectiveness of Environmental Tax Reform

When assessing the effectiveness of an environmental

tax, there are two criteria to be considered. First, the effect of the tax on environmental pollution or the use of scarce natural resources. This is the environmental effect. The second criterion is the economic. This involves evaluation of the level of economic resources forgone to achieve the environmental outcome. It includes those costs borne by consumers, firms and taxpayers (EEA, 1996; Ribeiro, 1999).

Environmental Effectiveness

A positive environmental impact is expected from the imposition of an environmental tax because the incentive effects of the tax lead to a change in behaviour (Ribeiro, 1999).

To be effective, a tax needs to be as closely linked to the externality as possible. Environmental taxes can therefore be ranked in terms of their environmental efficiency with (i) being most efficient and (iii) being least (Pearce, 2000):

- i. Tax on pollution itself – A tax on the environmental impact creates an incentive to maintain output by adopting cleaner technologies or inputs.
- ii. Tax on input (e.g. coal for electricity generation) – This encourages a switch to an alternative fuel source such as gas, but not to cleaner coal.
- iii. Tax on product itself (e.g. electricity) – This creates less demand, but there is no direct incentive for producers to change their fuel mix or engage in energy efficient electricity generation.

The effectiveness of indirect taxes or incentive-based targeting depends on the linkage and ability of the tax to discriminate between those who are polluters, and those who are not (Jackson, 2000).

The Swedish sulphur tax implemented in 1991 had a considerable impact. It caused a reduction of the sulphur content of fuel oils by almost 40% below the legal standards (OECD, 1997; EEA, 1996).

The carbon dioxide tax in Norway went into effect in 1991. Evidence suggests that carbon dioxide emissions from stationary combustion have decreased up to 21% per year, while emissions from households' motor vehicles have been reduced 2-3% per year (EEA, 1996; OECD, 1997).

In Denmark, a charge on the disposal of non-

hazardous waste decreased the share of waste dumping in overall waste treatment from 39% to 18%. The tax also increased the rate of reuse and recycling from 35% to 61% between 1985 and 1995 (OECD, 1997). A charge on the sale of batteries was introduced by Sweden in 1991 to cover the costs of collection and disposal. In 1993, the collection rate for lead batteries was 95% (EEA, 1996).

Economic Efficiency

Taxation is an efficient way to meet environmental goals because it minimises the costs of compliance with environmental regulation (Pearce, 2000; Tindale & Holtman, 1996). Unlike command and control regulation, environmental taxes have static efficiency gains where sectors are able to select least cost compliance methods. Taxes have additional dynamic efficiency gains. They signal that it is best to abate in areas with low abatement costs. They also provide continuing incentives for improvements beyond minimal compliance (Jackson, 2000; Pearce, 2000).

Economic efficiency is improved when the environmental goals are to reduce resource use and waste flows. This has been extensively documented in the energy sector, as has the need for clear market-based incentives. Fiscal instruments, including tax rebates, open up a wide range of options for governments when designing a programme of environmental tax reform.

Equity

The equity of environmental taxation matters. This is evident, as concerns about the distributional effects of environmental taxes have hindered the wider use of these market-based instruments.

Intragenerational Equity

Any policy measure designed to improve the environmental situation will have distributive effects, but these seem to be more visible in the case of taxes (OECD, 1997). The distributional impacts of environmental taxes depend on local circumstances, location, the time horizon and how tax revenues are spent (Panayotou & Yajun, 1999).

When environmental taxes are applied to mass consumption products and basic commodities, regressive effects can be expected (OECD, 1997). An environmental

tax is regressive when the tax represents a higher proportion of the income of low-income groups than that of the higher-income groups. This usually occurs when the tax is applied to a product or input, rather than to emissions or environmental damage (Pearce, 2000). For instance, energy taxes fall heavily on the poor, reflecting the importance of energy expenditures in the budgets of these poorer households (Panayotou & Yajun, 1999; Smith, 1996). Consider taxes on gasoline and vehicle fuels. These are only regressive across those households who own vehicles (Pearce, 2000). Furthermore, it would be possible for the poor to be made worse off if employment was diverted away from sectors of the economy where those on low incomes are predominantly employed (Park & Pezzey, 1999).

When assessing the distributional incidence of the burden of an environmental tax, concern should be for the final incidence (the households that ultimately bear the burden of the tax) rather than the formal incidence (who makes the tax payments) (Smith, 1997). Moreover, it is the net incidence of the policy measure that matters. The net incidence of a tax is the cost of the tax to an individual, minus the benefit that is secured from an increased environmental improvement (Pearce, 2000). Furthermore, the net distributional impact is important. For instance, a regressive impact may affect poorer households, while related environmental improvements may be distributed progressively (OECD, 1997).

The regressive effects of environmental taxes can be overcome by various means. Information campaigns can help to ensure that what is not regressive is seen not to be regressive. It is important that the distributive effects of the policy measure are compared with the appropriate baseline, that is, the alternative policy measure that would otherwise be adopted. In other words, a tax may be regressive, but is it more regressive than the alternative (Pearce, 2000)? Note that while some economic instruments may be distributionally regressive, the resources freed by greater economic efficiency and the revenues that are generated can be more purposely directed at addressing equity issues (Panayotou & Yajun, 1999).

Mitigation involves modification of the policy at the outset to take account of impacts on vulnerable groups. Consider a tax that targets older road vehicles that are not well maintained, or have low efficiency. This would be

regressive, as many such vehicles are likely to be owned by lower income groups. An alternative would be to subsidise early retirement of such vehicles (Pearce, 2000). Mitigation can also be undertaken using cross subsidies. For example, lifeline tariffs are familiar in the contexts of electricity and water. These involve prices that are lower for low-income consumers than high-income consumers (Pearce, 2000).

However, the more exemptions or tax discriminations there are, the less effective the tax is at meeting its environmental objective (OECD, 1997; Pearce, 2000). Hence, mitigation efforts should be avoided as far as possible (OECD, 1997).

Compensation provides an alternative to mitigation. This attempts to make vulnerable groups at least no worse off once the policy is implemented. Compensation is preferred to mitigation because it does not reduce the environmental efficiency of a policy. Compensation may be directly related to a tax (for example, specified energy allowance to mitigate an energy tax) or may take the form of a lump-sum payment (for example, households receive payments equal to the average environmental tax payment). Alternatively, the income tax system could be changed to favour households on low incomes, excise taxes could be lowered on goods that are more likely to be bought by low-income households, or investment could be made in job creation schemes (EEA, 1996; Panayotou & Yajun, 1999; Pearce, 2000; Smith, 1996).

The need to finance such compensation partly explains the trend towards revenue neutrality or the recycling of revenue to compensatory use (Pearce, 2000). Can revenue-neutral environmental tax reform be regressive? If the environmental tax that is introduced is more regressive than the tax that is lowered, the overall effect of reform will be regressive (Park & Pezzey, 1999).

Intergenerational Equity

This concept is central to any policy designed to bring about 'sustainable management' or sustainable development' over a longer time horizon. The environmental ethic has therefore emphasised the rights of future generations to enjoy the same range of resources as those available to the present generation. It has, however, proved extremely difficult to

introduce practical policy instruments to bring this goal within reach.

Environmental economists have argued that natural capital should not be treated as a residual. They make a logical case for treating natural forests, marine resources and other ecosystems as part of a country's resource inventory, using accounting systems that will rapidly reflect any depletion of this natural wealth. It follows that environmental tax reform should bring about some balance between the treatment of man-made capital and natural capital, so that growth (traditionally defined) of the former is not continually achieved at the expense of the latter.

Tax measures and other instruments can be used to reinforce these arguments and create a more even approach to resource management in the longer term. They have not generally been incorporated in the first stages of environmental tax reform. Sometimes they have been introduced separately for reasons that lie outside of environmental policy. This was the case when individual transferable quotas (ITQs) were brought in as the management regime for New Zealand fisheries. As suggested below, sustainable resource use should, however, be incorporated among the objectives of any programme of environmental tax reform.

Competitiveness

There is no significant impact on the competitiveness of individual sectors or whole economies from current environmental policies in OECD countries. Neither is there evidence of industrial relocation to 'pollution havens' (OECD, 1997).

When studying the impact of environmental taxes on competitiveness, there are two components to be addressed: macro-competitiveness and sectoral competitiveness (Pearce, 2000). The competitiveness of the economy as a whole (macro) is what matters (OECD, 1997). Studies on the effects of environmental regulation generally on macro-competitiveness do not detect any significant impact (Pearce, 2000).

On a sectoral level, energy-intensive sectors will be most affected by environmental tax reform, while labour-intensive sectors will benefit (Bosquet, 2000). In the case of an energy tax, the effects on sectoral competitiveness are small, because the loss of competitiveness from an increase in fuel costs as a result

of the tax is offset by a gain in competitiveness from a decrease in labour costs (Barker, 1997).

When favourable treatment is given to energy intensive industries, in response to competitiveness concerns, competitive disadvantage for renewable energy sources may result (EEA, 1996). Hence, any analysis of competitiveness has to address the question of both winners and losers (EEA, 1996).

There is concern that the impact on competitiveness may also affect the environment. If production is relocated as a result of an environmental tax, the environmental damage is simply shifted elsewhere (EEA, 1996). However, there is no evidence of these ‘pollution havens’ emerging. This is because many other factors influence a firm’s decision to locate in a particular country; factors such as the size and growth of potential markets, political stability, labour force competence, ease of access to raw materials or markets, and adequacy of infrastructure (OECD, 1997).

Ultimately, the extent to which green tax reform improves the functioning of the economy by decreasing market distortions could enhance the long-term competitiveness of the country as a whole (OECD, 1997).

Mitigation of Adverse Effects on Competitiveness

There are measures that may be taken to offset any adverse effects that environmental taxes may have on competitiveness.² It is important that any such measure do not reduce the environmental effectiveness and economic efficiency of the tax (OECD, 1997).

Exemptions

Exemptions reduce the overall effectiveness of the tax (Brack, 1998). Exemptions make environmental policy more costly because they narrow the tax base and increase the deadweight loss, as well as compromising environmental objectives (Bohringer & Rutherford, 1997).

Revenue Recycling

Revenue raised from the environmental tax may be used to lower pre-existing taxes on labour. Alternatively, it can be used to fund additional public spending on environmental concerns (Brack, 1998).

Reform Energy Cost Provisions in Business Taxation

There could be reform of the business tax system to provide energy efficiency incentives by not allowing energy costs to be exempt from tax as a business expense, except for high energy users, and by providing a tax-free portion of total costs to all other firms (EEA, 1996).

Tax-free Thresholds

This involves rising taxation with higher levels of consumption of environmental goods such as water and energy. This can lessen the impact of environmental taxes on small firms and households (EEA, 1996).

Border Tax Adjustments

This is the adjustment of tax rates at the border so that exports are rebated by the amount of tax they bear, and imports from untaxed foreign competitors are taxed equivalently (Brack, 1998). However, the rules and practices for such measures are not fully clarified (OECD, 1997).

International Harmonisation

Measures needed to mitigate the competitiveness impacts of environmental taxation would be unnecessary if there was harmonisation at, for instance, EU, OECD or even global levels (EEA, 1996). This is best handled by organisations such as the World Trade Organisation.

Employment

There is reason to believe that shifting the tax burden from personal income taxes, corporation taxes or value-added taxes towards environmental pollution will increase employment. This is because there will be more demand for labour-intensive commodities as prices change in favour of these. The demand for labour will increase due to the lower cost of labour. Furthermore, the supply of labour will rise, as more people are encouraged to enter the labour market as unemployment falls. This will cause expenditure by government on unemployment benefits and social security to fall (Barker, 1997).

Evidence on this reduction of unemployment is mixed (OECD, 1997). For employment gains to materialise, the labour market must be flexible. If wages are directly linked to the price level, then an environmental

tax could cause inflation (Bosquet, 2000).

Potential for an employment double dividend depends on the effectiveness of labour tax cuts in increasing employment and on how much of the burden of environmental taxes is borne by labour. As a significant employment benefit would require substantial cuts in the taxation of labour, broad tax bases would probably be needed to make up the revenue shortfall from reduced labour taxes (OECD, 1997).

Evidence suggests that the best results in terms of employment are obtained when recycling occurs through cuts in social security contributions.³ The mode of recycling of tax revenue plays a significant role in determining employment effects (Bosquet, 2000).

Investment, Prices, Economic Activity

Environmental policy instruments impact on incentives to invest in environmental research and development (R&D). New technology should be encouraged because it offers fundamental solutions for environmental problems. Technology is emphasised because behavioural changes are hindered by various forms of inertia. Hence, the appropriate choice of policy instruments should accelerate technological innovation (Albrecht, 1999).

Environmental taxes, without important exceptions or escape clauses, offer the clearest incentives for technological innovations – the more expensive the tax, the more incentive that will be created to invest in new emission-reducing technologies (Albrecht, 1999). Consider, for instance, the Californian zero emissions requirement for new vehicles. This led to a huge investment in innovation.

The immediate effect of an isolated increase in environmental taxes would be an increase in the general price level. However, a revenue neutral tax would entail a number of other effects that could partly offset this immediate effect (OECD, 1997).

Economic activity, often measured by gross domestic product (GDP), is positively impacted by environmental taxes. This is because new taxes raise consumer prices and wages, which depress economic activity. However, after some time, the cuts in social security contributions more than offset the negative impact on demand, leading to gains in employment and GDP (Bosquet, 2000). There are problems with the use of GDP as a measure of

economic activity because it does not measure long-term sustainable growth and welfare (Bosquet, 2000).

Design and Implementation

Criteria for Consideration of a New Policy

Policy reform should be aimed at improving sustainable resource management. There are at least five issues to be addressed when considering a new policy (Park & Pezzey, 1999):

- i. evaluation of what causes the environmental damage;
- ii. assessment of the potential to control the adverse effects;
- iii. assessment of the potential to develop and introduce new technologies to minimise or eliminate the environmental damage;
- iv. assessment of the financial costs to the government or agency to monitor the results of the policy;
- v. assessment of the political will to impose the costs of control on polluting firms (and their customers). This is related to the ‘polluter-pays principle’.

Determining a Tax Rate

Who should have the role of determining the appropriate tax rate? Is it the role of environmental government departments or economic government departments? It is not appropriate for the same part of government to be responsible for determining the rate of tax and receiving the revenues (Smith, 1997).

How should the tax rate be set? In an ideal world, the rate would be set with regard for economic costs and environmental benefits. There are problems setting a tax rate that will deal with the ecological thresholds for these benefits and costs. In this case regulation may be better.

Linkage

The effectiveness of environmental taxation depends on linkage. This is the degree to which a tax is linked to the pollution it aims to control (the linkage of tax point and point of pollution) (Paulus, 1994; Smith, 1997). Where the link between the tax point and pollution point is weak, the tax may fail to have the desired impact on pollution. It may also introduce costly distortions into production and consumption decisions (Smith, 1996).

Consider, for example, the Norwegian charge on domestic waste collection. This charge was based on the number of refuse sacks that households put out for collection. It resulted in some households economising on sacks rather than on waste, and overfilling sacks or dumping illegally (Smith, 1996).

Of course, the benefits of more direct linkage between the tax and the amount of pollution caused must be compared with the possible increase in administration costs (Paulus, 1994).

Administration and Implementation Costs

Administration costs are the costs of assessment, collection or enforcement of taxes. Generally, these costs are lower for new environmental taxes that are incorporated into the existing tax administration and controlling systems (Paulus, 1994). The cost of the measurement system depends on the measurement costs per source and the number of emissions sources. Measurement costs per source depend on the range of monitoring technologies, the characteristics of emissions and the substances involved (Smith, 1997). The incorporation of measurement into normal commercial activities can decrease measurement costs (Paulus, 1994). In general, the administrative costs of environmental taxes compare favourably with other policy tools (EEA, 1996).

Concordance with Existing Systems, Frameworks and Starting Points

There may be conflict with the current national tax or legal system if taxes and reforms cannot be embedded into the existing system. This is because they may be inconsistent with the restrictions of these systems. For instance, European Union legislation prevents member countries from levying particular types of taxes. There must be no interference with the free movement of goods, products, capital and services within the Union (Paulus, 1994).

Additionally, environmental taxes must meet generally accepted policy principles (Paulus, 1994) such as:

- the polluter-pays principle – polluters should bear the expenses of carrying out measures to ensure that the environment is in an acceptable state;

- the cooperation principle – refers to possibilities for particular societal groups and those affected by particular environmental policy measures to cooperate in environmental policies; and
- the precautionary principle – refers to prevention of environmental problems.

These issues are already being considered in the case of the Waikato River where resource use taxation is being discussed in the negotiations between the Crown and Tainui over future governance and management of the river (Way & Scrimgeour, 2000).

Policy Evaluation

In evaluating the impacts of an environmental tax, there are three complications that make evaluation difficult (Ribeiro, 1999). First, there are methodological issues concerned with separating the tax effects from other elements in the baseline and policy package. Second, the data that are available may be limited, may not be detailed enough, or may have been collected for other purposes and therefore are not suitable. Third, there is the time factor. It may take up to 10 years for the tax to be effective (EEA, 1996; Ribeiro, 1999).

The evaluation of environmental taxes needs to be built into the design and implementation process so that methodological and data availability problems can be minimised. Linkage of the policy process with the evaluation procedure is given by EEA, 1996, p 32.

Checklist for Successful Implementation

The following checklist is taken from EEA (1996, p 12):

- studies in advance investigating the potential effects of the tax/policy package, in particular the calculation of the abatement costs in each sector, equity implication, and the benefits and costs of improving eco-efficiency;
- early and greater involvement of tax/fiscal authorities;
- extensive consultation with stakeholders and the public;
- early announcement of environmental taxes;
- their introduction within a policy package of complementary measures;
- gradual imposition of the tax;

- recycling of revenues to –
 - taxpayers (for example, for environmental measures, via rebates or investment incentives, provision of information and training)
 - related sectors (for example, some revenues of a waste tax going to the waste sector)
 - reduce other taxes such as taxes on labour;
- increasing incentive effect via –
 - gradually increasing the real price signal over long periods
 - gradually reducing exemptions;
- evaluation measures designed into the tax system.

Use of Revenue

Hypothecation (Earmarking)

Hypothecation is where the revenues from a tax are pre-assigned to certain public expenditures or to a particular agency or department (Smith, 1997). This pre-commitment constrains government spending in a dynamic environment, so it could lead to inefficiency in budgeting and expenditures (Smith, 1997). Hypothecation may create inefficiencies because the tax rate can be determined on the basis of revenue required, and not on the costs and benefits of the tax. Hence, revenue and expenditure requirements move out of line in the long run. Furthermore, it is difficult to determine the appropriate revenue sources for particular expenditures.

On the other hand, most countries give low priority to environmental expenditure, so earmarking serves to raise the priority of particular environmental expenditures. Earmarking creates a more direct relationship so it is expected to increase public support for and acceptability of a new tax. However, there is a need to weight the costs of possible inefficiencies with the benefits of higher support (Paulus, 1994).

It has been suggested that hypothecation is effectively a trade-off between environmental tax reform, which requires that government secures revenues through environmental taxes, and the aim of compensating polluters through recycled revenues (Pearce, 2000). The OECD (1997) recommends that hypothecation should be a transitory approach, if used at all because the

inefficient allocation of resource and government spending priorities may become locked in.

General Policy Expenditure

The revenue raised by environmental taxes may be used to reduce distortionary taxes, decrease public deficits or increase public spending (OECD, 1997).

If environmental tax revenue is used as a substitute for existing tax revenues, there is the question of efficiency and public support. Additionally, the revenue raised may be used to compensate those who suffer from the possible undesirable effects. This raises the issue of determining what is proper and fair compensation.

Sustainability of Revenue

Steering effects are the possible tax avoiding changes in behaviour of those confronted with a tax. If the steering effects of an environmental tax are substantial, then tax bases can be largely or completely eroded (Paulus, 1994). This is the main purpose of incentive taxes; however, it is undesirable for revenue raising taxes.

A successful tax, in terms of changing behaviour, creates less revenue (Tindale & Holtman, 1996). Ultimately, the effect of the tax on behaviour depends on the elasticity of the good that is taxed. If it is a necessity with few substitutes, revenue will not fall over time.

Conclusion

Environmental tax reform has a strategic role in promoting sustainable development. This is because environmental taxes have the potential to achieve environmental targets as well as raise revenue, thus integrating environmental and economic policy goals. Environmental taxes are most effective in achieving their objectives when they are part of a complete policy package (Kerr, 2001). Moreover, environmental taxes must be carefully designed and implemented to ensure they do not impose costs that offset their potential benefits. Given the history and principles described in this paper it is time for further analysis of specific environmental taxes which could be implemented in New Zealand.

Endnotes

- ¹ Also called ecological tax reform, green tax reform, environmental fiscal reform, green tax swap and green tax shifting.
- ² To the extent that it is true that no adverse impacts on competitiveness occur due to imposition of environmental taxes, resources can be focused on education and communication to adjust the misperception that such competitiveness impacts do occur (see Pearce et al, 2000, for recommended methods to counter lobbying insisting that competitiveness effects do exist).
- ³ This is equivalent to ACC payments in the New Zealand context.

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