General Briefing on Environmental Taxes and Charges: National Experiences and Plans

A general summary report of the workshop organised by the
European Foundation for the Improvement of Living and Working Conditions
held in Dublin, February 7-8, 1996

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EUROPEAN FOUNDATION
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GENERAL BRIEFING

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by

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Note: The interpretation and analysis of the material presented at the workshop, and the conclusions drawn from them, are the Rapporteur's and should not be attributed to the European Foundation.

EXECUTIVE SUMMARY

- Environmental taxes and charges have been the subject of widespread experimentation and implementation in many European countries, especially in North Europe, during the 1990s. This is part of a process of making greater use of market-based instruments in environmental policy and of integrating environmental policy into other policy areas, including fiscal policy.

- Including environmental taxes among environmental policy instruments offers the prospect of meeting environmental objectives more cost effectively than through total reliance on regulations. Such taxes also seek to incorporate the costs of environmental damage into the market-prices of the responsible goods and activities. In addition they have been introduced to raise revenue to finance related environmental policy (cost-covering charges); to induce less environmentally damaging patterns of economic behaviour (incentive taxes); and to raise revenue over and above, or independently of, that required for environmental policy (revenue-raising taxes). Sometimes the revenue may be used to reduce the tax burden on labour, with a view to reducing unemployment, a revenue-neutral tax shift which has been called green tax reform. Norway, Sweden, Denmark and the Netherlands, have already carried out limited green tax reforms and have established governmental commissions to see whether such reforms may be taken further.

- Despite their likely benefits, the introduction of environmental taxes has in the past been opposed by business representatives, environmentalists and administrators. The most important current obstacles to their introduction are uncertainties about their effects, their possible complexities, and business concerns about competitiveness. For example, with regard to the uncertainties, neither economic theory nor simulation modelling have been able to establish conclusively whether green tax reform will increase employment or not. In general model results in Europe suggest that it would, but the increase may be small.

- Effects of environmental taxes on competitiveness can be mitigated by exempting or giving concessions to vulnerable sectors, by making border tax adjustments or through international harmonisation of the taxes. There are problems with each of these approaches: the first diminishes the effectiveness of the tax and increases the cost of attaining given environmental objectives; the second runs the risk of protectionism-in-disguise and may run counter to international trade rules; the third is difficult to negotiate, especially on a worldwide basis, and is sometimes seen to conflict with the principles of sovereignty and subsidiarity.

- In a market economy starting from a situation of environmental unsustainability, environmental taxes are needed both to reduce resource use to a sustainable level and, if the economy is growing, they will then be required at an increasing rate to keep it there. Even allied to other instruments, current rates of environmental taxes will not achieve this objective. Their further implementation probably depends on some international harmonisation, both within the EU and more widely. However, it is not yet clear how this harmonisation will come about.

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Note: in what follows references to workshop papers are simply given by the author's name; references to other documents give a date as well and the documents are listed in the References at the end of this report.

I INTRODUCTION

This briefing is one of a series prepared as an output from the workshop on environmental taxes and charges organised by the European Foundation for the Improvement of Living and Working Conditions in February 1996. The other briefings are directed at businesses and their representative organisations, employees and trade unions, policy makers and advisers, local government officials, non-governmental organisations, and researchers. A full report of the workshop, with the papers that were given at it, is published by the European Foundation as a Working Paper. Unless otherwise referenced, details of environmental taxes in this summary are taken from the full report.

The root cause of environmental damage is the quantity of matter and energy that are involved in human production and consumption, sometimes called the economy's 'material throughput', and the destructive quality of that throughput. Environmental damage can be reduced by reducing either the quantity of throughput or its destructive quality (for example, either reducing the consumption of energy, or consuming less polluting forms of it). In a market economy one way of achieving these goals is to raise the price of each unit of resource use in proportion to its destructive quality. Such a price increase can be achieved through the imposition of environmental taxes and charges.

The rationale for environmental taxes is therefore to seek to ensure that the use of environmental resources, whether in terms of the depletion of resources or the discharge of wastes into the environment, together with any associated costs, are reflected in the costs paid by the users. Increasingly environmental taxes and charges are being seen as a way of implementing environmental policy more cost effectively than through a total reliance on regulation. They are also regarded as a way of integrating environmental policies into other policy areas, in a context of a policy commitment to environmentally sustainable development, which, on some interpretations, demands a substantial reduction in current levels of resource use and waste discharge. Because environmental taxes tend to make environmentally intensive products and processes more expensive, over time they may help to change the structure of both production and consumption: producers will have an incentive to make more efficient their use of environmental resources, and to switch to processes and inputs which are less environmentally damaging; and consumers will have an incentive to switch to more environmentally friendly products and consumption activities.

Where more environmentally friendly products and processes are more labour intensive than those they replace, then this change in the structure of activity will be likely to increase employment. Employment might also be increased by using the revenues from environmental taxes to reduce taxes on labour.

The following report explores these issues in more depth and identifies some of the obstacles to implementing environmental taxes which have resulted in their slower introduction than their benefits would seem to warrant.

II ENVIRONMENTAL TAXES AND CHARGES IN GENERAL

II.1 Objectives Of Environmental Taxes And Charges

An environmental tax or charge is a government-imposed obligation on users of the environment to pay for that use. The tax or charge may be imposed on producers or consumers (although, as with other taxes, those who are strictly liable for the tax may be able to pass it on wholly or partially to others, and this may be important for the incentive effects of the tax); and it may relate to the extraction and/or use of resources from the environment, or the return of wastes to it.

A use of the environment, such as discharging wastes into it, may impose costs on other people. One of the characteristics of many environmental costs, is that they are not incorporated into the prices of the goods or activities which caused them. They are what are known as 'externalities', or external costs. Environmental taxes and charges seek to internalise these external costs, or alternatively the costs of preventing environmental damage, into the market-prices of the responsible goods and activities. They are thus a way of implementing the Polluter Pays Principle, to which the countries of the OECD committed themselves in 1972. Environmental taxes and charges are often the best way to control non-point pollution and other hard to regulate sources. By also giving incentives for the cheapest means of preventing environmental damage to be implemented first, these taxes offer the prospect of meeting environmental objectives more cost effectively than total reliance on regulations.

In addition environmental taxes have been introduced for one or more of three possible broad reasons:

1. To contribute to or cover the costs of environmental monitoring and control (cost-covering charges).
2. To mitigate environmental problems by bringing about changes in the behaviour that is contributing to them (incentive taxes).
3. To raise revenue beyond, or independently of, that required for environmental monitoring and control (revenue-raising taxes). In this case, the revenue may be used to reduce the tax burden on labour, with a view to reducing unemployment, a revenue-neutral tax shift which has been called green tax reform.

It is of course possible for the same tax or charge to serve, or be intended to serve, more than one of the above objectives but, because the objectives are not entirely complementary, it is necessary to be clear about the order of priority for any particular measure

Cost-Covering Charges

The levying of charges on those making use of the environment to contribute to or cover the cost of monitoring or controlling that use has long been part of environmental policy in many countries and, as already noted, is in accordance with the Polluter Pays Principle that has been a guiding principle in OECD countries since

1972. Where they pay for a specific service to the charge-payer, the charges are termed user charges. Where they do not pay for such a service, but are used for an environmental purpose related to the charge, they maybe termed earmarked charges.

A country with some of the most extensive experience of cost-covering charges is France. French environmental taxes raise over FF19 billion a year, of which over FF7 billion comes from the waste-removal tax, while the rest comes from indirect taxes, including FF9 billion from water-pollution charges. 95% of the indirect environmental taxes are earmarked for environmental improvement purposes. Other countries with earmarked taxes include the Netherlands, with a surface-water pollution tax and a surplus manure tax; the UK, which charges for water abstraction and pollution, and whose new landfill tax has provision for payments of tax to environmental trusts rather than the government; and Germany, where charges for water pollution rose from DM12 to DM60 per unit of pollution (calculated according to a formula to bring different pollutants within the same scale) between 1981 and 1993 (Smith 1995, p.26), raising DM340 million in 1990, of which about 15% was accounted for by costs of administration (ibid., p.28).

Earmarking has its dangers, which are discussed in detail in OECD 1996 (pp.30ff.). For example, it seems that a greater rate of subsidy from the revenues from the French water charges is given to capital expenditure than to labour-intensive operating costs, thereby discriminating against labour-intensive treatment technologies. This is unlikely to be optimal in a situation of unemployment, in which, on another programme, the government is subsidising job-creation in environmental projects.

There is also the possibility that environmental expenditure priorities will come to be set by the amount of money raised by the charges, rather than according to their own merits compared with other demands on public expenditure. Where the charges are low, they may not raise enough money for efficient environmental expenditure; where they are high, either too much money may be spent, or the charges may come to be valued as revenue-raisers in their own right, and abatement could be curtailed to maintain the revenues. Against these dangers must be put the point that earmarking some at least of an environmental tax for related environmental purposes can increase the political acceptability of the tax, and therefore the feasibility of its introduction. Moreover Smith (1995, pp.91-92) has noted that there may be a case for using revenues from environmental taxes as subsidies, where, for example, the size of such taxes is constrained below the optimal level by political considerations, when the subsidies may increase the elasticity of response to the constrained tax; or where the subsidy introduces an incentive for a firm to invest in pollution-abatement which was otherwise lacking. The detailed study of the experience of water charges in four countries by Andersen (1994) seems to lend some empirical support to this hypothesis.

Several of the so-called ‘cohesion’ countries (Greece, Ireland, Portugal, Spain) in the European Union have developed highly innovative charging systems for the use of environmental resources. For example, Setúbal in Portugal has a progressive scale for charging households for both water consumption and waste-water treatment, which prevents charges bearing too heavily on the essential use of water

Incentive Taxes

If a use of the environment is socially excessive (in other words its use has reached the point where further use results in more cost to society than benefit), then applying an environmental tax to the environmental use may cause the user either to abate the excessive environmental effect or reduce the activity which is giving rise to it. The optimal tax maximises the social welfare deriving from the activity.

To derive the optimal tax it is necessary to know the costs and benefits incurred by each successive use of the environment, for example each successive unit of pollution. The former of these especially may be subject to considerable uncertainty, because environmental damage is often unpriced in markets and spread over space and time with effects on both people and ecosystems that can be either unknown (for example, it was many decades after their introduction before it was discovered that CFCs damage the stratospheric ozone layer) or poorly understood (for example, the climatic effects of increasing atmospheric concentrations of CO_2 and other greenhouse gases).

Where the optimal tax can be derived, then this provides a clear and adequate rationale for its introduction. An example of this is the UK landfill tax, announced in 1994 and due to be introduced in October 1996. Prior to its announcement a focused research programme had calculated the environmental costs associated with landfill, and the tax was set at a level to internalise these.

In contrast to the UK approach has been Denmark's treatment of its landfill tax. This was introduced in 1986 at DKK40 per tonne, a level not dissimilar to the initial UK rate. However, by 1993 this had risen by nearly 400% to DKK195 per tonne for landfill (DKK160 for incineration). By 1997 the landfill rate is scheduled to be DKK295 per tonne. This increase has not been related to any calculation of externalities. Rather the tax is used as an instrument of environmental policy to help achieve the goals set out in Denmark's Waste Action Plan (MOE 1992), which specifies target levels for reductions in landfill through recycling, reuse and waste reduction. These targets in turn do not derive from a cost-benefit analysis, but are the result of considerations of what is required to achieve sustainable development. Interestingly, the UK has a waste management strategy not dissimilar to Denmark's in that in envisages substantial reductions in landfill and increases in recycling. It remains to be seen whether the UK landfill tax will be increased in order to pursue these objectives, as happened in Denmark, or whether the tax will be kept at its present level of calculated optimality, with the objectives being pursued through other instruments.

This distinction between the UK's and Denmark's implementation of a landfill tax has been elaborated because it provides an example of two possible approaches to incentive taxes. What might be called 'the optimal approach' derives the optimal tax in advance, leaving the behavioural adjustment and envisaged improvement in environmental quality implicit. In contrast, 'the instrumental approach' defines in advance the required behavioural change and environmental improvement, and then uses the tax as an instrument to help achieve it. In this latter case, of course, there is no need for the environmental tax to be the only instrument used to achieve the environmental objective. Indeed, it will usually be desirable for other instruments to be employed as well.

Incentive charges may be used to moderate the demand for resources as well as to limit the disposal of wastes. In this case the charge amounts to a user charge on the resource in question. An example is the water charge system for domestic consumers in Germany, 90% of whose bills are a volumetric charge per m^3 consumed. In the UK, by contrast, most households pay a charge unrelated to consumption. German household water consumption per head is thought to be 8-12% below that in the UK, and to have been broadly static for some time, whereas UK household water demand grew by 16% from 1980-1991 (Smith 1995, p.43)

Tax differentiation may also be an effective incentive instrument. Lower taxes on unleaded petrol in many countries have resulted in it securing a substantially increased market share. In Greece a high tax on car ownership combined with a low tax on fuel had led to a high concentration of old, fuel-inefficient cars in an Athens car fleet that grew 200 fold to about 1.25 million in the forty years to 1994. A tax reduction for cars with catalytic converters, together with a scrapping refund when an old car was exchanged, resulted in a perceptible slowing of the growth of the fleet and an improvement in its emission characteristics.

Finally, incentive taxes may be considered in a context of rising incomes.
Where negative environmental effects are the result of normal activities of production and consumption, as is usually the case, rising incomes will, in themselves, tend to magnify the effects. This will increase the optimal tax rate required to internalise the effect. It will also necessitate a higher tax rate to achieve a given environmental target. In other words, whether the optimal or instrumental approach to environmental taxation is taken, a context of rising incomes, with no other environmental policy to reduce consequent environmental effects, calls for an increasing environmental tax rate if the same environmental targets are to be met. The development of the Danish landfill tax has been consistent with this insight.

Revenue-Raising Taxes

All environmental taxes and charges raise revenue to some extent, but it is important, if their objectives are to be met, that there is clarity as to whether this is the principal purpose of the tax and, if so, where it is envisaged the revenues will be directed.

Charges that are intended to cover the cost of environmental policy related to the activity or output being charged for have already been discussed, together with the danger that the earmarking of revenues may lead to too little or too much being spent on the environmental policy. In contrast, if an environmental tax has a substantial incentive effect in terms of changing behaviour, then it may generate considerably less revenue than had been anticipated, so that projections for expenditures or tax shifts based on those revenues would need to be revised downwards. For example, the revenue from the Swedish sulphur tax was considerably lower than had been expected when the tax was introduced.

The most successful tax base in revenue terms is one which is large, is spread across many sectors and is broadly unaffected by the imposition of the tax, this last being the opposite characteristic to that which is desired for incentive-tax purposes. One of the few environmentally-related tax bases which satisfies all these criteria is energy. It is

perhaps not surprising that many countries have had purely revenue-oriented energy taxes well before the environmental impacts of energy use began to cause serious consideration of the imposition of energy taxes for environmental purposes.

Apart from contributing towards the costs of related environmental policy, there are two main possible destinations for the revenues from environmental taxes. One is the general budget, which is where most revenues from energy taxation to date have ended up. Increasingly, however, new environmental taxes (for example, the Dutch small energy users' tax, and the UK landfill tax) are being implemented in a revenue-neutral way, by which is meant that the rates of other taxes are reduced as the environmental tax is imposed, so that government revenues overall are unchanged. It is sometimes perceived that, if existing distortionary taxes are reduced in this way, there may be gains in economic output and/or employment from such a tax shift (as well as the environmental gains from any change in behaviour which the environmental tax has induced). This 'double dividend' issue is discussed in more detail later.

II.2 Major Issues Relating To Environmental Taxes

There are several issues which merit discussion in any treatment of environmental taxation.

Environmental Taxes as Complements to Other Instruments

It will often be the case that environmental objectives are best pursued with a combination of instruments, of which environmental taxes may be one. Thus one workshop paper recommended that taxes on acid pollutants in Poland should be confined to large emitters, while small or diffuse sources are subject to regulation. The Danish Waste Action Plan makes use of, in addition to waste charges, waste mapping and planning at regional and local level, voluntary agreements with manufacturers and importers, legislation and statutory orders regarding certain types of waste and subsidies for the development of cleaner technologies or recycling pilot projects.

Environmental Taxes, Competitiveness and Trade

Neither theory, experience nor modelling can give clear guidance for the future on the issue of environmental taxes, competitiveness and trade. Theoretically the international effects of environmental taxes are dependent on too many uncertain parameters for the net result to be predictable. The parameters include differences between small and large, and open and relatively closed economies; the point of imposition of the tax; the economic importance of the taxed resource or activity; factor mobility; market structure; assumptions about possibilities for technical innovation; and the availability or otherwise of border tax adjustments to counteract any competitiveness effects.

At the corporate level, competitiveness simply refers to the ability of a business to sell its products in an open market. Clearly costs are only one element, albeit an important one, of such competitiveness. Another aspect, which some analysts (for example, De Andraca & McCready 1994) consider to be stimulated by stringent regulations and a high price of natural resources, is technical dynamism and innovation. A general loss of competitiveness at the corporate level may result in effects at the national level, at least while the economy adjusts, such as increased unemployment, relocation of industries, and currency devaluation, all of which are of political concern.

Having said that, with regard to experience of past environmental taxes and regulation, the record is relatively conclusive and has been summarised by the OECD thus: "The trade and investment impacts which have been measured empirically are almost negligible." (OECD 1996, p.45). However, this is possibly because the environmental regulations applied so far have been relatively modest compared to those sometimes considered necessary to move towards environmental sustainability, and they have not predominantly been in the form of green taxes. These may impose higher costs on seriously affected sectors because the firms concerned will need to pay for abatement (up to the efficient level) *and* for residual emissions (although these payments should be regarded as transfers through the tax system rather than macroeconomic costs as such). Modellers of the imposition of carbon taxes have got widely differing results for their impacts on trade and competitiveness, ranging from small and positive to substantially negative. The OECD concludes: "Probably all that can be said with confidence is that the effect of a carbon tax policy on competitiveness could be substantial." (OECD 1996, p.42)

It is therefore not surprising that much discussion at the workshop about competitiveness related to those countries which have already imposed their own carbon taxes: Denmark, Finland, the Netherlands, Norway, Sweden. With the exception of Finland, which has very much the lowest carbon tax rate, all the countries have exempted or partially-exempted their energy-intensive industries from their carbon taxes. Finland is drawing up plans to do so should it decide that this is necessary.

Possible competitiveness effects are important not only because of their economic implications. Were they to lead to the relocation of production, with its associated environmental impacts, they could also mitigate the environmental effectiveness of a tax. Of course, if the taxed environmental effect is purely local, then the country levying the tax and losing the business through relocation will experience local environmental improvement (and the country to which the activity is relocated will experience environmental deterioration). But if the environmental effect is global (e.g. climate change from CO_2 emissions), such that it is independent of where emissions take place, then the leakage of emissions from one country to another may mean that there is no environmental gain from the tax at all.

Attempting to mitigate or compensate for competitiveness effects can distort or reduce the effectiveness of environmental policy in at least three ways:

1. For economic efficiency all emitters of a taxed emission should face the same tax rate. Yet because of fears about competitiveness, the tax rate on high emission sectors can be well below that on smaller emission sectors or households. This means in turn that, in order to achieve a certain emission reduction, the tax rate

on lower emission sectors and households is higher than it would otherwise need to be, which introduces further inefficiency. For example, when Sweden restructured its CO_2 tax in 1992, and reduced it substantially on industry and commercial horticulture, it raised it from SEK250 to SEK320 per tonne CO_2 for other users in order to make up for the fall in revenue (OECD 1994, p.95). The spread of the CO_2 tax was then SEK80 (for industry and horticulture) to SEK320 for everyone else. This is a source of economic inefficiency.

2. An environmental tax should be levied as close to the actual environmental effect as possible. For CO_2 emissions the most convenient and efficient tax base is the primary fuel source. Because different fossil fuels have different carbon intensities, a tax on these fuels based on their carbon intensity will encourage switching towards low carbon fuels. Such an effect may be particularly important with regard to reducing carbon emissions from electricity generation, because electricity can be generated using all the fossil, as well as some non-fossil, fuels. Yet Finland, which initially taxed the fuel inputs into electricity according to their carbon content, has decided to tax electricity directly. Its previous system taxed imports of electricity at some average level based on its domestic taxation, in order to neutralise the tax's competitiveness effects. Such a system does not conform to EU trade regulations (or those of the World Trade Organisation), which stipulate that there may be no difference between taxes on domestic and imported like products.
3. A core component of the rationale for environmental taxes is that, by bearing most heavily on the most environmentally intensive sectors, through their effect on prices they encourage structural change in the economy away from those sectors. By taxing high energy, and therefore high CO_2 emitting, sectors less heavily, or by reimbursing tax revenues, this incentive for structural change is reduced.

Another impact of concerns about competitiveness on environmental taxes may be to prevent their introduction at all. Especially in the context of a small, open economy, serious use of environmental taxes as major instruments of environmental policy may simply be ruled out. For example, Germany is not considering the introduction of a carbon tax on a unilateral basis, for competitiveness reasons. The German paper at the workshop considers that, where these taxes are desirable, they should be introduced in more than one country or, in the case of the EU, across the EU as a whole.

Environmental Taxes and Distribution

Environmental taxes, like practically any other policy, will impose different costs and benefits on different groups of people. Indeed, the concerns with competitiveness discussed above arise because of the uneven impact of environmental taxes, falling relatively heavily on environmentally intensive sectors. Although the impact of the tax on business may be neutral overall, especially if the revenues taken from business are recycled to it in some way, and some sectors may benefit from the policy, there will also be losing sectors. As has been seen, where the losing sectors are economically or politically significant, these distributional results of the tax may increase the difficulty of introducing it.

Another group that is potentially vulnerable to environmental taxes is low income consumers and households. This is because some environmentally sensitive goods, such as energy or water, may be relatively more important in the expenditure or

consumption of low income groups than of richer groups. As with issues of competitiveness, these possible distributional effects on low income groups warrant serious political attention when environmental taxes are being designed, if public support for the taxes is to be secured. The inability of the British Government in 1994 to raise VAT on domestic fuel from 8% to 17½ % was at least partly due to concerns about the impact of this tax increase on the poor.

Two brief general points about these distributional concerns may be made. The first, relatively obvious but sometimes overlooked, is that with any tax that raises revenue from both the better and the less well-off, it is always possible to fully compensate the latter from the revenue raised. The second is that an effective compensation scheme may be complex, and not easy to design in order to avoid distorting secondary effects. An example of such distortions, where the compensation is effected through the social security system, may be a reduction in the difference between low wages and the benefit level, reducing the employment incentive or, equivalently, increasing the marginal tax rate for low-income jobs.

One way of mitigating regressive distributional effects is to have a tax-free threshold for essential use of the taxed product. Another is to introduce the tax progressively, with higher taxation on successive blocks of consumption. An example of the latter, as was seen earlier, is the tax on water consumption and waste-water treatment at Setúbal in Portugal.

The Dutch small energy users' tax, introduced in 1996 was designed with special consideration given to distributional concerns. Revenues are recycled separately to businesses and households, corresponding to their respective tax payments. For businesses the recycling is mainly effected through a reduction in employers' non-wage labour costs. For households, a tax-free threshold of energy use has been introduced, which avoids a regressive burden on low-income households. In addition, households get income tax relief such that an average energy user in each of four income groups will be made no worse off from the tax (higher and lower than average energy users in each group will be worse and better off respectively). It is likely that this transparent and specific revenue-neutrality, with regard to particular groups as well as overall, contributed substantially to the tax's acceptability in the Netherlands. It is also the major component in the Government's attempt to win social consensus on the tax, and in particular to persuade employees not to claim further compensation for it in their wages than is already in the recycling package. Any such double compensation would, of course, have negative macroeconomic effects, risking a wage-price spiral, and abort any potential employment benefits from the change in the relative prices of energy and labour facing low energy using businesses.

III ENVIRONMENTAL TAXES IN PARTICULAR

III.1 Air Pollution Taxes

Air emissions which are associated with environmental problems at the global and regional levels include CO_2 and other greenhouse gases (climate change), CFCs and other ozone-depleting substances (stratospheric ozone depletion), the oxides of sulphur, especially sulphur dioxide SO_2, and nitrogen, NO_X (acidification). Some of these emissions (e.g. SO_2, NO_X) are also troublesome at the local level, as are also lead (from lead in petrol) and volatile organic compounds.

Before 1990 taxes aimed at reducing air pollution were limited to tax differentiation schemes, such as that operating in several countries with regard to leaded and unleaded petrol, with the exception of emission charges in France, introduced in 1985, the revenues from which were used for abatement measures (OECD 1995, p.27).

In the 1990s, Denmark, Norway and Sweden have all introduced sulphur taxation, Sweden introduced NO_X charges and four Scandinavian countries and the Netherlands introduced a tax on carbon, which has already been discussed. The Swedish experience of sulphur taxation and NO_X charges has been uniformly positive. Both have had the desired incentive effect.

The sulphur tax was set at SEK30 per kg SO_2 . The average cost of the abatement action it has brought about has been SEK10 per kg SO_2 , while the revenue, at SEK217 million in 1993/94, has been substantially less than anticipated because of it. The NO_X charge is payable on a per plant basis by a relatively small group of large energy using plants and is charged on their actual emissions. Revenues from the charge of SEK40 per kg NO_X are recycled to each charge-paying plant on the basis of the proportion of the group's energy that the plant generated. Perhaps, as a result of this at least in part, total energy output from the plants has increased even as their NO_X emissions has declined. The NO_X tax, payable on measured emissions, precisely accords with the theoretical recommendations for such taxation. However, the requisite measurement of emissions is expensive, and it has been estimated that the monitoring of the NO_X emissions costs SEK350,000 per plant, or SEK200 per tonne of NO_X abated (OECD 1996, pp.24,28).

III.2 Waste-Disposal Taxes

Historically the main mode of disposal of both industrial and domestic wastes has been to landfill sites. It has, however, become increasingly apparent that landfilling is both a potential and actual source of environmental costs and involves the loss of materials which might beneficially be recovered for recycling or reuse. The first consideration justifies imposing an environmental tax on landfill waste. The second has resulted in a number of OECD governments adopting targets for increased recycling of the waste-stream.

The UK is the most recent country to impose a landfill tax: announced in 1994 it is due to come into effect in October 1996. The tax, and its introduction process, well illustrate many of the issues connected with environmental taxation, as illustrated in Box 1.

Box 1: Elements in the Introduction of the UK Landfill Tax

- **Tax base:** The decision was taken to levy the tax on the weight of waste disposed, rather than *ad valorem*. This gets the tax as close to the source of the environmental damage as possible. The tax was further related to the damage by differentiating the tax rates for active and inactive wastes.
- **Dangers of perverse incentives:** The wrong choice of tax base can introduce environmentally perverse incentives. In this case, an *ad valorem* tax might have discriminated against better engineered (and therefore more expensive) sites; and might have increased the transport of waste (by increasing the price differential between the cheaper and more expensive sites).
- **The usefulness of consultation:** The intensive consultation between the announcement and the decision of the detail of the tax clearly improved both its design and its public acceptance.
- **Earmarking:** The tax design permits a small proportion of the revenues to be allocated by the payer to environmental trusts to pay for environmental remediation work. This appears to have been politically popular and to have helped sweeten the tax's reception.
- **Revenue-recycling:** The bulk of the revenues (all those not going to environmental trusts) is to be redistributed to employers as a whole through a reduction in their non-wage labour costs. This reassured business that the tax was not a way of increasing its overall tax burden.
- **The need for whole-economy modelling:** One of the few groups that showed hostility to the tax was local authorities, who argued that their reduction in non-wage labour costs would not compensate them for their increased waste-disposal costs, and that they could not pass the tax back to householders to stimulate waste-reduction. The second point is valid. There is a case for investigation and experimentation to see how this might be achieved at reasonable administrative cost. On the first point the local authorities may well be mistaken, for their calculations were based on simple first-round estimates of tax payments and non-wage labour cost reduction. When these effects knock-on through the whole economy, it is quite possible that, as major employers and purchasers of labour-intensive goods and services, local authorities would in fact be made better off by the tax. Preliminary whole-economy modelling of the tax seems to indicate this (CE & Forum 1995).
- **Explicit basis for the tax:** The estimates of environmental costs on which the tax rate is based are controversial and they may be changed in future, But the fact that the initial tax rates were based on extensive prior analysis is likely to have helped the tax's acceptability.

In the Netherlands waste disposal from households and small businesses is the responsibility of municipalities, which can either utilise general funds or, as most do, levy a special waste disposal charge. This charge can either be a flat-rate charge per household, or be dependent on the amount of waste offered for disposal. Most municipalities opt for the former for administrative simplicity.

Costs of disposal have risen greatly in recent years, which has put pressure on municipalities to find ways of differentiating between households according to waste offered. Experiments with 'expensive bags' for disposal have, however, sometimes resulted in an appreciable phenomenon of 'waste tourism', whereby waste is illegally dumped in municipalities with lower charges. The right balance of incentives has yet to be found.

1995 saw the introduction of a waste tax in the Netherlands, as one of five 'taxes with an environmental base'. It is currently only levied on landfill waste and charged by weight. Although its first aim is to raise revenue, as part of a wider move to increase

the role of environmental taxes in the Dutch tax system, it is also intended to raise the costs of landfill to match those of incineration, thereby encouraging this as well as recycling and waste-reduction. This use of the tax - to promote the aims of environmental policy - contrasts interestingly with the UK landfill tax's basis in the calculation of externalities.

The waste charge in Denmark was introduced as part of its Waste Action Plan, with the same goals as in the Netherlands, but in the reverse order, which is to say that the environmental goal was primary, and aimed at reducing the growth in the production of wastes and increasing recycling and reuse. The revenue goal was secondary and revenues went into the general budget. In 1993-94 it was offset by reductions in direct income taxation. As in the Netherlands, households are generally charged a fixed waste disposal fee by the collecting authorities, and therefore have no incentive to reduce waste. Some authorities, however, are starting to split the charge into a fixed and variable part, the latter dependent on the non-separated or non-recyclable waste offered.

Although the Danish waste charge was introduced in 1986, no assessment has as yet been made of its effectiveness in meeting environmental goals. This will be done in 1996. From the figures shown in the Danish paper (by Christensen), it can be seen that the amounts of domestic and industrial waste in 1993 were 9% higher than in 1985, while Danish GDP was 11% higher. While lack of data does not permit comparison with other countries or other periods, there is no firm evidence that the charge has had a significant impact on decoupling of waste production from income growth. On the other hand landfill fell from 39% to 26% of the waste stream, while recycling increased from 35% to 50% over the same period. Within this, the reuse of construction waste rose from 12% to 82%. While the other instruments in the Action Plan, including voluntary agreements and regulations, will undoubtedly have contributed to these changes in final disposal, the waste charge is likely also to have played a major role.

III.3 Taxation Of Products

Where it is difficult or costly to tax the actual agent or activity responsible for environmental degradation, and where a certain product is closely linked to this agent or activity, then it can be both efficient and effective to tax the product instead. This is the basis for taxing fuels according to their carbon content, rather than CO_2 emissions themselves. Where the product is an input into production, it can affect producer incentives and thence, through price changes, those of consumers. Where it is part of final consumption, only consumer incentives are relevant.

A number of environmentally-motivated product taxes are levied in OECD countries, on such items as agricultural chemicals, batteries, tyres and disposable containers. Belgium is one of the countries that has made most use of this kind of environmental tax.

The Belgian experience clearly shows the enormous complexities involved in introducing product taxes into a small, open economy like Belgium's. The purpose of the taxes was clearly defined in advance: by changing the relative prices of goods, in particular by increasing the prices of *less* environmentally desirable products, in a

situation where some *more* environmentally desirable substitutes existed, the tax was intended to bring about a shift away from less to more environmentally desirable consumption. It was acknowledged, hoped for even, that revenues from the taxes would be small, because this would indicate that the desired incentive effect was working.

In the event the meanings even of such words as 'substitutes' and 'more' or 'less environmentally desirable' have been subject to general, including scientific, uncertainty. And Belgium's administrative structure, in which the three regional governments have responsibility for environmental policy, the national government has responsibility for taxation, and measures with implications for trade have to be compatible with EU-regulations, has engendered further complications and extensive, time-consuming consultation.

It is hardly surprising that theoretically ideal configurations for product taxes have been extensively adapted to political and administrative realities. It is on the contrary remarkable that the taxes have been implemented at all, given these difficulties, and that they appear to have won sufficient public acceptance for their extension to new products to be planned. Currently taxes have been imposed on all drink containers, throw-away cameras and razors, industrial packaging, batteries, and, from July 1996, some pesticides and phytopharmaceutical products and, from December 1996, paper.

It is too soon to judge the incentive effects of these taxes, although potential market sensitivities to them have been illustrated by a number of cases where producers have withdrawn goods from the market or otherwise modified their behaviour on the expressed intention of introduction of the tax, but before its implementation. The "soft signalling effect" of the discussions prior to implementation of the tax may have been at least as important in the tax's significance as the actual price discrimination.

IV TOWARDS GREEN TAX REFORM?

The possibility of new environmental taxes raising substantial revenues, which can then be used to reduce other taxes which are perceived as distortionary or otherwise undesirable has led to increasing interest, as noted earlier, in the idea of a 'double dividend' from environmental taxation: the achievement of both environmental benefits and gains in economic efficiency. The main motivation for trying to achieve these efficiency gains is usually the desire to reduce unemployment or, at least, reduce the tax burden on labour. This idea of using the introduction of environmental taxes to achieve a 'tax shift' was behind the introduction of the 'taxes with an environmental base' in the Netherlands and the tax reforms of several Nordic countries in the early 1990s. The idea was also endorsed by the UK Chancellor of the Exchequer in his 1994 Budget, when he stated: "Taxes can play an important role in protecting the environment. ... But I am determined not to impose additional costs on business overall. ... In brief, I want to raise tax on polluters to make further cuts in the tax on jobs." (Clarke 1994, p.35). Chapter 10 of the Delors White Paper *Growth, Competitiveness, Employment* went even further: "If the double challenge of unemployment/environmental pollution is to be addressed, a swap can be envisaged between reducing labour costs through increased pollution charges." (EC 1993, p.150)

Green, sometimes called Ecological, Tax Reform, has thus come to mean a systematic shift of the tax burden away from labour and, perhaps, capital, and onto the use of environmental resources. There is still a broad spectrum of opinion about the size, or even likelihood of existence, of the double dividend that might be achieved in this way, and about the general desirability of a Green Tax Reform (GTR).

Those sceptical of GTR consider that environmental taxes should remain essentially part of environmental rather than fiscal policy. Because of their incentive effects if successful, environmental taxes in this view are of uncertain and unstable fiscal potential, while their introduction on a unilateral basis on a scale to yield substantial revenue can be damaging to the competitiveness of a national economy. An alternative to the GTR approach involves the careful introduction of incentives, through taxes or subsidies, in environmentally sensitive areas, while introducing more substantial environmental taxes, such as any further taxation of energy, at the European level.

However, four OECD countries - Denmark, the Netherlands, Norway, Sweden - are actively investigating the idea of GTR, three of them through special government commissions. The countries bring to their different commissions a lot of common experience, in terms of energy taxation, early experimentation with carbon taxes and a variety of other green taxes, and a long-standing commitment to environmental improvement and sustainable development. A basic question for all the commissions is whether the potential exists for these countries to push on with implementing green taxes more and more widely on a unilateral basis, or whether some wider EU action is now necessary to take the process forward.

The Norwegian Green Tax Commission has been in existence for a number of years and, as a result of its first series of recommendation in 1992, a number of green taxes were both proposed and introduced. Its current work is to take a broader focus than green taxes and to specifically examine the opportunities to restructure the tax system to make the use of labour less costly, by replacing taxes on labour with green taxes, taxes on resource rents and with other taxes as appropriate. In parallel, the Commission is seeking to identify all those subsidies that have an environmentally damaging effect.

The work of the Norwegian Green Tax Commission is still incomplete and any results must be treated as tentative. However, the prognosis for a GTR, in which the revenues from green taxes are recycled by reducing payroll taxes, using the substantial Norwegian modelling expertise in this area, is good in both the short and medium term. By 2000 CO_2 emissions are down by 2.4% (3.2% by 2010), employment is up by 0.4% (0.7% in 2010), unemployment is down by 0.2% (0.3% by 2010), consumer prices are down by 0.6% (0.8% by 2010) and output is up by 0.1% (0.6% by 2010). The emission reduction is significant. The other numbers are small but economically positive.

The Dutch Green Commission has also been established out of substantial experience with environmental taxes, most importantly the five ‘taxes with an environmental base’ which have been introduced since 1992, taxes on fuels, groundwater, waste, uranium and small energy users. In 1996 revenues from these taxes are expected to be Dfl.2.8 billion, or 1.8% of tax revenues, rising to 2.5% by 1998. With the exception of the small energy users’ tax, these taxes are directed principally towards revenue-raising, with the revenues going to the general budget in a conscious attempt to shift the base of general taxation, albeit slightly,

towards the use of environmental resources. The small energy users' tax has, as discussed earlier, a complex, revenue-neutral recycling mechanism.

The Dutch Green Commission was set up in 1995 to discuss how to make further progress in this area. Its first report concentrated on the fiscal treatment of transport and advocated giving further encouragement to public transport and cycling. The second report, due in April, is likely to focus on further opportunities for shifting taxation from labour onto use of the environment (with energy taxation remaining the basis of any such tax shift), and on the opportunities for encouragement of environmental investment.

Sweden's Green Tax Commission was also set up in 1995 and, again, has the issue of a green tax shift as its central agenda item, mooting a possible "marriage" between the two areas of tax policy relating to environment and employment. In this context it is undertaking several special projects, including analysis of the development of energy and environmental taxes, the functioning of the labour market and investigations into possible impacts on competitiveness and income distribution.

Finally, a series of similar concerns is under investigation in Denmark, which is seeking ways of building on the tax reform it enacted in 1993/94. This reform increased the energy tax rate on households. With economic efficiency in mind it is decided that the 1996 Energy Package will increase the CO_2 and energy tax rates on Danish industry, with recycling of the revenues back to industry, via reductions of social security contributions, to limit effects on competitiveness.

Modelling the Danish Energy Package comes up with results that are very similar to Norwegian modelling of its possible green tax reform: by 2005 CO_2 emissions are down by 5%, employment is up by 0.1%, GDP is up by 0.1%. Again the environmental benefit is significant while the macroeconomic changes are small but positive.

V GENERAL CONCLUSIONS

The 1990s have seen green taxes firmly established on the public policy agenda. Recommendations for the 'internalisation of externalities' or the use of market-based instruments for economic efficiency, which languished for many years as arcane concerns of academic environmental economists, are now the established concern of Ministries of Finance and the Environment, as has been seen. It is a development that results in a richer, more balanced approach to environmental policy, that is likely also to be more cost-effective. This discovery of economic instruments for the environment seems to have been driven by an increasing awareness of the power and potential of markets, and of the limited performance of conventional environmental regulations, combined with the need of governments to find new, or different, sources of revenue.

The experimental phase in the imposition of environmental taxes and charges is by no means over. While a few countries now have substantial experience in all kinds of green taxation - cost-covering charges, incentive-taxation, revenue-raising taxation - most still have considerable scope for adapting these to their own national circumstances. Such adaptation appears to be crucial for the successful application of these taxes. The various national experiences show that there is no one successful

'model'. Rather the principles of green taxation are implemented, and widely modified, in accordance with national priorities and perspectives.

National differences in the implementation of environmental taxes arise to a large extent from the political difficulties of such implementation. Hanley et al. (1990, p.1432) report on a survey in 1981 of a US group of congressional staff members, lobbyists from environmental organisations and trade association representatives. Only 23% of the group, and only 32% of the environmentalists, were in favour of environmental charges being introduced; 85% of the industrialists in the group were opposed.

The early objections of some environmentalists to environmental taxes largely derived from two misunderstandings about them: that they amounted to an unlimited 'licence to pollute'; and that it was imagined that they could replace environmental regulations altogether. With regard to the first objection there seems to be little reason why environmental taxes at a level calculated to reduce discharges to achieve certain standards of environmental quality should be regarded as 'licences to pollute' any more than specific emission permits that are compatible with such standards. With regard to regulations, it is now usually perceived that good environmental policy needs to make use of an appropriate combination of taxes and regulations, rather than one or the other. In general, now that environmental taxes are better understood, environmentalists tend to support their introduction, such that environmental groups in both the US and Europe have become some of environmental taxation's most committed advocates.

Reasons that have been given as to why administrators oppose environmental taxes include:

- bureaucratic inertia - marginal changes to an existing regulatory system are preferred to the introduction of a new system;
- satisfaction with regulatory systems that seem to work, allied to worries about an environmental tax regime - environmental taxes can be technically complex, uncertain in their environmental effect and politically difficult to introduce;
- vested interests - regulatory systems may be perceived to give more jobs and influence to current administrators than tax regimes, which would in any case tend to come under the purview of fiscal rather than environmental authorities.

As in the 1981 study, opposition to environmental taxes is probably still greatest from business, although business-environment organisations founded since 1981 are now giving them their endorsement. For example, the Business Council for Sustainable Development (BCSD) stated in its 1992 report to the Rio Summit: "It is entirely appropriate that many governments are now studying and introducing economic instruments", because "firms' compliance costs tend to be lower with economic instruments" and because "economic instruments encourage innovation" (Schmidheiny 1992, pp.23-24). A later report from the BCSD specifically advocates "a tax shift away from labour and investment to value-depleting activities such as pollution and the inefficient use of environmental resources" (De Andraca & McCready 1994, p.8).

However, business more generally continues to be concerned about environmental taxes for a number of reasons. First, under an environmental tax regime, firms pay not

only for pollution abatement measures to bring environmental impacts down to the required level, but also the tax due on all emissions or taxable impacts below this level. Even though abatement costs for business may be less with environmental taxes than with regulation, the extra taxes may mean that firms end up paying more than they would under a regulatory regime. Second, businesses fear that governments will start to use environmental taxation as an extra source of revenue, rather than as a substitute for existing taxes, thereby increasing overall costs on business. Third, if environmental taxes are introduced in only some countries, environmentally intensive sectors in those countries may suffer debilitating effects on their competitiveness. And fourth, perhaps businesses perceive that they have more influence in negotiations with regulators than in exchanges with national Ministries of Finance.

Of these reasons, the first and fourth may be problematic for business, but their effects are likely to be beneficial for society at large. In an age of ecological scarcity it is surely justified that all use of the environment should be paid for; and it is probably socially desirable for business to have less direct influence over the political instruments intended to guide or direct their activities. The second reason relates to the credibility of government policy and any stated intention to introduce environmental taxes in a fiscally neutral manner. A clear announcement to this effect, at the beginning of any consultation process on proposals for an environmental tax, as occurred with the UK Government's introduction of the landfill tax, can obviously help allay business concern on this point. The third reason is the most substantial and is discussed further below.

A final reason why environmental taxes have been opposed, which has already been discussed, is that they can have a regressive effect, i.e. they can have a disproportionately large impact on less well off sectors of society. This does not need to be the case, as has been seen, but remains a cause for concern.

Of all these reasons for opposition to environmental taxes, probably their uncertainties and possible complexities, and the concerns of business over competitiveness, provide most of the explanation for their slow, if now accelerating, introduction. Some of the uncertainties and complexities have already been reviewed. One of the greatest of the uncertainties is whether in fact a tax shift from labour to environmental taxes would yield an increase in employment. There are good theoretical arguments why this should be the case, but much depends on whether cuts in employers' non-wage labour costs result in lower prices of higher wages and/or profits. If the tax shift can be made inflation-neutral, then there is no reason why it should require higher profits or wages to be paid, and companies that reduce their prices should gain a competitive advantage thereby. But it seems likely that awareness of this issue still needs to be raised, and the force of the argument reinforced by some kind of explicit social contract between government, business and employees' representatives, if this outcome in favour of the unemployed is to be achieved.

In addition to this issue as to how cuts in non-wage labour taxes are passed on through the economy, doubts have been raised from a theoretical viewpoint as to whether interaction between different taxes and different markets will in fact permit the achievement of increased employment through environmental taxation. The arguments are complex and cannot be explored here. Simulation modelling of the double dividend

issue has also been inconclusive, not least because modelling results reflect the theoretical assumptions underlying the model, which may be favourable or unfavourable to the achievement of a double dividend. De Wit (1994) reviews both the theoretical and empirical literature concerning a shift in the tax burden from labour to energy (and, by analogy, to other environmental resources). His conclusion, with regard to a national tax (the Dutch small-scale energy users' tax) and the EU carbon-energy tax, is as follows:

> "In the short term it (the Dutch tax) would result in modest but positive employment effects. These effects can be enhanced with targeted variants for feeding back revenue. … Moreover, the finding also tallies with theoretical expectations. … In the longer term the employment effects are less clear, but positive effects are not inconceivable. …
>
> "All the advantages of the small-scale users' variant referred to for the Netherlands also apply to the EU variant. … Theoretical insights would seem to suggest that this variant produces relatively more employment than the small-scale users' variant for the Netherlands alone, because the area of levy is larger." (De Wit 1994, pp.44-45)

Concerns about competitiveness for the business sector as a whole can be met by recycling environmental tax revenues from businesses back to businesses, when businesses with lower environmental impact would gain at the expense of those with a higher environmental impact. For the latter sectors, however, there is the clear prospect of losses from environmental taxes, especially where the tax falls on an input, such as energy, which comprises a significant proportion of a sector's costs.

It must be remembered that this impact on environmentally intensive sectors is part of the fundamental purpose of environmental taxation, both to encourage the sectors to make more efficient use of environmental resources and to introduce new, less environmentally intensive products and processes, and to encourage consumers to shift away from these sectors to less environmentally damaging products. The effect on producers can in principle be achieved through voluntary agreements, and there are a number of countries where these have been substituted for environmental taxes to mitigate competitiveness effects in vulnerable sectors. But exempting environmentally intensive sectors from environmental taxes blunts the effectiveness of the taxation from a consumer point of view, and slows down the changes in consumption, and therefore production, patterns that are widely considered necessary if a process of sustainable development is to be achieved.

There are two means of mitigating competitiveness effects apart from exempting environmentally intensive industries. One is through border tax adjustments, whereby environmental tariffs ensure that imports pay a similar level of tax to domestic industries, thereby neutralising any competitiveness effects in the domestic market, while export rebates ensure that taxed domestic industries' ability to compete abroad is unimpaired. But there are two problems with border tax adjustments. Firstly, it is very difficult to calculate what the environmentally appropriate tariffs on imports should be, especially when the environmental tax base is an industrial input, such as energy, rather than a final product. There are fears that such tariffs would be abused for protectionist,

rather than environmental protection, purposes. Secondly, border tax adjustments may run counter to international trade rules (designed to prevent protectionism), especially where, because of a focus on industrial inputs or processes, they end up treating domestic and foreign like products differently. This is a particular problem with energy or carbon taxes levied on the industrial use of energy, and was the reason Denmark, against environmental economic logic, ended up taxing electricity rather than the carbon content of the fuels used to generate it, and why Finland has also moved in that direction.

The second means of mitigating competitiveness effects is through the international harmonisation of environmental taxation. This is the theoretically ideal solution. It was promoted by the European Commission (EC) with regard to its carbon-energy tax proposal in 1991, and is supported by a number of EU countries. The argument against it, based on the principles of sovereignty and subsidiarity, is that countries have a right to determine their own taxes. Failure to reach unanimous agreement in the EU on this issue has left the EC proposal unimplemented, but even if it had been agreed at the European level, there would have been concerns about competitiveness at the OECD and global levels. The international harmonisation of environmental taxes, if it proceeds at all, will clearly be a long and difficult process.

It is difficult to imagine a comprehensive policy for moving towards sustainable development that does not make systematic use of environmental taxes. In a market economy most resources are allocated through the price mechanism. In a growing economy more of most goods will be demanded as incomes increase. If resources are underpriced, they will in general be overused, as is currently the case. If their price does not increase with incomes, it is likely that a growing economy will exacerbate their overuse. Environmental taxation at a sufficient rate, first, to reduce the current overuse of resources to a sustainable level, and then gradually increasing to keep it there, is an essential instrument of environmental policy if the environmental sustainability of a market economy is to be attained and maintained. It is clear that, even allied to other instruments, current rates of environmental taxes are not sufficient to achieve these objectives.

The Western European experience of green taxation could now develop in one of several different directions. Several countries clearly desire to push ahead with more ambitious schemes of green tax reform, but what they are likely to enact unilaterally is bound to be constrained by concerns about national competitiveness and distortions in the EU single market. However, if the EU were to introduce minimum energy taxes and a carbon/energy tax along the lines of the European Commission's 1991 proposal, as a majority of EU countries seem to desire, a further range of opportunities for unilateral innovation and experimentation would open up, and some of the more ambitious schemes for green tax reform might start to be implemented.

But it is still not clear whether and how such a common introduction of taxes at the European level will come about. For the present, it only seems certain that governments will continue to introduce environmental taxation bit by bit, attracted by the combination that such taxation seems to offer of cost-effective environmental policy and a source of government revenue, which can possibly be used to make some inroads into unemployment.

Appendix of Exchange Rates

There follow the ECU exchange rates (in March 1996) for the currencies that are mentioned in the text:

Denmark	ECU1.39= DKr10
France	ECU1.57 = FF10
Germany	ECU0.54 = DM1
Netherlands	ECU0.48 = Dfl1
Sweden	ECU1.17 = SEK10

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APPENDIX 1
Executive Summary of the Full Workshop Report

Environmental taxes and charges have been the subject of widespread experimentation and implementation in many European countries, especially in North Europe, during the 1990s. They are part of a process of integration of environmental policy into other policy areas, including fiscal policy, which involves Ministries of Finance and other Ministries, as well as Ministries of Environment. The thinking and experience concerning the role of environmental taxes and charges in this process is the subject of this report. Eight of the fifteen papers presented at the European Foundation's workshop are by the senior economic advisers to Ministries of Finance, four are by senior economic advisers to Ministries of Environment, and three are by researchers.

Including environmental taxes among environmental policy instruments involves a richer, more balanced approach to environmental policy, that is likely also to be more cost-effective than total reliance on regulations. Such taxes also seek to incorporate the costs of environmental damage into the market-prices of the responsible goods and activities, thereby acting in accordance with the Polluter Pays Principle. Three other motivations for introducing environmental taxes and charges, by which they may be classified, are: the desire to raise revenue to finance related environmental policy (cost-covering charges); the desire to induce less environmentally damaging patterns of economic behaviour (incentive taxes); and the desire to raise revenue over and above, or independently of, that required for environmental policy (revenue-raising taxes). In the last case, the revenue may be used to reduce the tax burden on labour, with a view to reducing unemployment, a revenue-neutral tax shift which has been called green tax reform.

Cost-covering charges were the earliest kind of environmental tax to be introduced and still play an important part in many countries' environmental policy regimes. Examples include charges for the disposal of waste, to both water and land, in countries as diverse as Germany, France, Netherlands, Portugal, Spain, Ireland and the UK, and charges for the abstraction of water. Cost-covering charges can also have an incentive effect. For example, the German charges for household water consumption are likely to have contributed to the lower per capita household water consumption there compared to the UK, which charges most households for water at a rate unrelated to consumption. Similarly waste-disposal charges in an Irish municipality would appear to have reduced the volume of waste and increased the level of recycling.

Pure incentive taxes are those in which revenues are of no concern. Examples are the Swedish NO_X charges, the revenues from which are returned to the charge-payers on an energy-produced basis, and the recent Belgian product taxes, which are only levied on goods which have clear, more environmentally-desirable, substitutes, in the hope that the switch away from the taxed good to the substitute will be almost total.

Revenue-raising charges are the focus of interest when, in addition to achieving environmental improvements, it is desired to reduce taxes on other factors, especially those on labour with a view to stimulating employment. Several countries, including Norway, Sweden, Denmark and the Netherlands, have already carried out limited green tax reforms and have established governmental commissions to see whether such reforms may be taken further. While the environmental benefits delivered by such tax

shifts are not at dispute, there is some controversy as to whether there will also be gains in output and employment. The evidence from the commissions so far suggests that such gains may be expected, although they will be small. A quite different approach to this issue is currently taken by Germany, which regards environmental taxes as important instruments of environmental policy to tackle particular environmental problems, but unsuitable for playing a major fiscal role.

The various national experiences show that there is no one successful 'model'. Rather the principles of green taxation are implemented, and widely modified, in accordance with national priorities and perspectives. There have been, however, two issues which seem to demand attention in all circumstances: competitiveness and distribution. The distributional issue can, in principle, always be dealt with through compensation, although designing systems of compensation is no easy matter. The mechanism introduced by several countries (the Netherlands with the small energy users' tax; Setúbal, Portugal, with water consumption and waste-water treatment) of allowing a tax-free threshold of essential consumption, or introducing the tax progressively, with higher rates on successive blocks of consumption, would appear to have merit in this context.

Concerns about competitiveness are not so easily dealt with, especially in the context of small, open economies. Much ingenuity has been shown by countries in seeking to mitigate competitiveness effects, especially from energy or carbon taxation, on the worst affected industrial sectors. The carbon/energy taxes of Denmark, the Netherlands, Sweden and Norway all have special provisions, such as concessions or reimbursements, for the countries' energy-intensive sectors. The danger is that such mitigation both introduces inefficiency, such that a given environmental improvement ends up costing more to achieve than it might have done, and impedes the broader process of structural economic change that is likely to be a fundamental part of moves towards sustainable development.

Several of the papers at the workshop suggest that one way of resolving concerns about competitiveness, especially in the single market context of the European Union, would to introduce a degree of harmonisation among EU member states, especially with regard to energy and carbon taxation. However, it is not clear that the disagreements that prevented the introduction of the European carbon/energy tax proposed by the European Commission in 1991 have yet been resolved. Until this occurs, or until the framework for such decisions is changed, the introduction of carbon/energy taxation on a Europe-wide basis would seem unlikely, and concerns about competitiveness, and distortions arising from attempts to address them, seem likely to persist.

Documentation arising from the European Foundation's workshop ***Environmental Taxes and Charges: National Experiences and Plans****:*

- A Working Paper with a full report of the workshop and the presented papers.

- Seven targeted briefings, including a summary of the report, for business and employer's associations, employees and trade unions, policy makers and advisers, local government officials, non-governmental organisations, researchers and the general public.

APPENDIX 2

List of Papers Presented at the Workshop

Hans Christensen, Head of Division, Ministry of the Environment and Energy, Denmark: *Danish Experience with Waste Charges*

Frank Convery, Professor, Environmental Institute, University College Dublin, Ireland: *Making Markets Work for the Economy and the Environment - Lessons from Experience in Greece, Ireland, Portugal and Spain*

Marc De Clercq, Chairman, Belgian Eco-Tax Commission, Belgium:
The Implementation of Green Taxes: the Belgian Experience

Xavier Delache, Chef de Bureau, Ministère de l'Economie et des Finances, France:
Implementing Ecotaxes in France: Some Issues

Anthonie Henderson, Senior Economist, Ministry of Housing, Spatial Planning and the Environment, The Netherlands: *Waste Charges and Taxes in the Netherlands*

Jon Kahn, Ministry of Environment, Sweden:
Economic Instruments to Abate Acidification in Sweden

Jens Pagter Kristensen, Director, Ministry of Economic Affairs, Denmark:
Environmental Taxes, Tax Reform and the Internal Market - Some Danish Experiences and Possible Community Initiatives

Anders Kristofferson, Director, Ministry of Finance, Sweden:
The Work of the Swedish 'Green' Tax Commission

Arie Leder, Head of Finance, Ministry of Taxation, The Netherlands:
Taxes with an Environmental Base and the Dutch Green Commission

Thorvald Moe, Chief Economic Adviser, The Royal Ministry of Finance, Norway:
Ongoing Work in the Norwegian Green Tax Commission

Frank van Nahmen, Bundesministerium der Finanzen, Germany
Effective formulation of Tax Laws Taking Environmental Considerations into Account

Ivan Pittevils, Adviser of Finance, Ministry of Finance, Belgium:
Ecotaxes on Products in Belgium: the Need for a Proper Point of Imposition

Alberto Pototschnig, London Economics, United Kingdom:
Experience with Air Pollution Charges in Poland

Christopher Riley, Chief Economist, Department of the Environment, United Kingdom: *The New UK Landfill Tax*

Gustav Teir, Financial Counsellor, Ministry of Finance, Finland:
Evolution of CO_2/Energy Taxes in Finland