OVERVIEW AND RECENT EXPERIENCES WITH ECOLOGICAL TAX REFORMS IN EUROPE

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EXECUTIVE SUMMARY

At the turn of the millennium the use of environmental taxes has accelerated, at least at the level of the individual member states of the European Union (EU). However, at the EU level hardly any progress, particularly in the area of energy taxes, is visible, though a vast majority supports broadening and increasing minimum excise levels for all energy products (European Commission, 1997a). In particular, large EU countries such as France, Germany, Italy and the United Kingdom have started applying this instrument. Central and Eastern Europeae (CEE), some Asian and South American countries are also increasingly starting to experiment with environmental taxes, while in North America application is visible only at the individual state level–and apart from comprehensive tax expenditures.

In the EU, the unanimity voting rule renders much enhanced action hardly possible due to competitivity concerns as long as a few cohesion countries are not convinced of the positive impacts of such instruments. Still, in the context of the current Intergovernmental Conference, the Portuguese Presidency and the Commission aim for a qualified majority voting on environmental taxes. For the time being it remains also unclear whether the flexibility clause of the Amsterdam revision of the European Treaty, facilitating a coordinated approach of like-minded countries, can help to overcome the deadlocked situation.

When entering the debate and implementaion of ecological tax reform, several issues are at the core of debate. Potentially negative impacts on competitiveness are the major concern, which is closely related to impacts on employment. However, practically no negative experience is available, as the designs have been chosen appropriately. Other concerns debated are related to equity, inflation, and the potential trade off between raising revenues and showing environmental effects.

Evaluation studies or brief assessments of at least 30 environmental taxes and environmentally related fiscal provisions have been identified and are briefly reviewed in this report. Within the limitations of the studies, it appears that these taxes have been environmentally effective (achieving their environmental objectives) and they seem to have achieved such objectives at reasonable cost. Examples of particularly successful taxes include those on sulphur dioxide in Denmark and Sweden, on nitrogen oxides in Sweden, on Dutch water pollution, and all kinds of tax differentiation schemes for fuels in most countries.

Most barriers to implementation, especially to energy taxes, such as potential negative impacts on competitiveness, on employment (particularly on specific sectors and regions), on inflation, and on low income groups can be overcome by the removal of environmentally damaging subsidies and regulations, careful design, the use of environmental taxes and respective revenues within broader tax reforms, looking at distributional impacts by taking into account the proportionally higher positive physical impacts of reduced environmental damages for low-income groups; and abolishing the requirement of unanimity voting at EU level. Countries applying ecological tax reforms have demonstrated through the specific design of their taxes that these measures help to overcome the barriers.

There is still a wide scope for a much greater use of these instruments and for a much more coordinated policy, particularly between like-minded countries. If these national policies are better coordinated, current exemptions mostly given to the industrial sector can be reduced substantially while increasing the environmental effects. A breakthrough at the EU level has become more likely during the last two years.

If environmental taxes are well designed and implemented to exploit the advantages described above, they could deliver improvements in five key areas of public policy: the environment; innovation and competitiveness; employment; the fiscal system; and the functioning of other instruments such as environmental agreements and regulations.

For least developed countries the concept of an ecological tax reform (ETR) should be adopted to the circumstances of these countries. Aiming at the increased efficiency of the use of resources, a very first step would be to make people pay for environmental services such as the provision of clean water, sewage, waste infrastructure, and transport infrastructure. Another element that can be adopted to national circumstances would be the elimination of environmentally damaging fiscal provisions in existing taxes and expenditures. The introduction of tax differentiations, such as for leaded and unleaded fuels, has turned out to be a very effective instrument in developed countries if alternatives are at hand.

Whereas the perspective that concerns individual countries in Europe is very promising, the opposite holds true at the EU level and in other developed countries. Due to the dynamic that is increasingly taking place in Europe, one can guess that ETR will soon be accepted even more broadly. To close with a saying of the French author Victor Hugo, "Nothing is so powerful as an idea whose time has come."

I. INTRODUCTION

Ecological tax reform (ETR) is a theory and a policy concept that is not only gaining increased attention, but whose first steps are being implemented by more and more countries. It was "invented" about two decades ago, but its cautious implementation started only a decade ago. It then became more popular in the mid-1990s, while it gained strong momentum in the late 1990s in European countries. Environmental taxes are a major part of environmental tax reform, but only with the simultaneous reduction of other taxes is it recognised as an ETR. Depending on the circumstances, either the entire ETR or only the environmnental taxes are considered in the examples reviewed in this paper.

The idea and theory behind an ETR is fairly simple: Shifting the tax burden from "goods" such as labour, investment and capital to "bads" such as environmental pollution and consumption of natural resources, whereas not increasing overall tax burden (revenue neutrality). Such a tax shift would contribute to:

(a) reducing environmental pollution and the use of natural resources;

(b) increasing employment and/or economic performance;

(c) internalising externalities, particularly of environmental pollution;

(d) providing market-based incentives for both consumers and producers to change their behaviour towards a more efficient use of resources;

(e) encouraging innovations which can lead to an increased competitiveness;

(f) raising revenues which can be used in different ways, such as cutting other taxes on labour and capital or increasing environmental expenditures;

(g) being considered as an effective tool to tackle diffuse pollution sources such as transport, waste and chemicals;

(h) enforcing existing regulation which is otherwise often hard to control or costly to administer;

(i) accelerating the required integration of environmental aspects in other policies;

(j) broadening the range of instruments (so far, policy has relied heavily on regulations);

(k) contributing to the implementation of the precautionary principle–in addition to the polluter pays principle.

Although the advantages seem to be fairly clear, implementation turns out to be much more complex. This paper thus aims at providing insights into the specific discussions and the implementation of ecological tax reforms in various developed countries, mainly in Europe where the most experience is available. The issues which are often at the core of the debate are briefly discussed here and in more depth in the subsequent chapter.

The evidence for the environmental effectiveness of an ETR is of most importance for environmentalists. Since these taxes were introduced only during the last years, not much empirical data are yet available. Environmental taxes mostly aim at structural changes, but these only happen in the mid-

and long-term. However, several studies show that environmental taxes bring about positive environmental impacts. Even energy-related taxes, aimed at the most fundamental structural changes, show initial positive effects, thus supporting the importance of that instrument.

Competitiveness of industry has become the major concern in most countries implementing steps of an ETR, closely related to the strong demand for international harmonisation. Industry often claims that the implementation of regular tax rates within an ETR would lead to a reallocation of companies abroad. As a consequence, environmental pollution–as far as climate relevant emissions are concerned–would not be reduced, but just take place abroad because the products would still be imported. Also, the economy would lose due to the loss of jobs.

The impact on employment of an ETR is another big issue. Protagonists argue that major positive job impacts would arise from a shift of supply and demand to more labour-intensive products and processes. Many computer simulations have been carried out, aimed at finding more insight into the existence of a "double dividend". This double dividend would consist of higher environmental protection while at the same time also increasing overall welfare, either by higher growth or by creating more jobs. In a nutshell, they indicate that there can be expected a small, but positive double dividend (INFRAS/Ecoplan 1996). Even if a single dividend only existed, it would still be beneficial to introduce an Ecological Tax Reform.

Equity issues are also raised. On average, bw-income groups spend relatively more of their income on energy products. Still, they also often benefit physically more than average from reduced pollution as they are normally hit hardest by environmental pollution. Depending on the social and cultural background of a society, this issue is either only a side-issue or even becomes the guiding principle when implementing an ETR.

The potential trade-off between reaching an environmental target and raising revenues is often an issue when countries are about to start implementing an ETR. Achieving both objectives seems to exclude each other which, indeed, holds true in theory. However, practice and simulations have clearly shown that an ETR can serve both purposes over a long term. So did the ordinary mineral oil tax in the past. Still, it is not always predictable to what extent which objective can be achieved.

Reducing environmentally counterproductive subsidies and tax expenditures is often claimed to be the best way of starting a green budget reform instead of introducing environmental taxes. Although this is theoretically certainly the adequate order, policy does not often follow. Surprisingly, after implementing the first steps of an ETR, countries often have shifted the focus towards subsidies. Hence, it is interesting to note that through an initially second best approach the first best approach can then be more easily followed.

Impacts on inflation are an issue in countries which are members of the European Monetary Union (EMU). Here three criteria for entering and staying in the EMU apply, of which one is an inflation rate of no more than 3 per cent. Hence, this topic has attracted particular attention for southern countries with traditionally high inflation rates. Some use this argument for preventing any additional energy taxation, others even reduce existing taxes to mitigate the effects triggered by the increase of world market prices for oil. Particularly in CEE countries, environmental tax rates are often linked to income or inflation in order to keep up the level of incentive.

Legal restrictions are raised, particularly when it comes to the discussion of international action. Here EU and World Trade Organisation (WTO) rules play an important role. A major question is often if, and by which means, a country which implements ETR is allowed to ensure that its industry is not set at a disadvantage by higher environmental taxes. The possibility that such measures could be abused for protectionism is of great importance. But also at the national level debates on the eligibility of certain environmental taxes within the constitutional frame are taking place.

An institutional approach of how to overcome various barriers has been the setting up of an ETR-Commission. These commissions often help to shift the focus from ETR only to subsidies and other provisions which are potentially environmentally damaging. Hence, "Green Budget Reforms" (GBR) are increasingly considered, taking into account all environmentally relevant fiscal activities of a state.

To avoid any misunderstanding about the papers content, the paper does not aim at providing theoretical insights in the debate of a potential "double dividend". To this end see Bovenberg and Goulder

(1996); Bovenberg and Mooij (1994); and Repetto and others (1992) and for empirical modelling overview INFRAS/ECOPLAN (1996). There, the various aspects and pre-conditions, such as characteristics of labour markets, distortions of other taxes, deadweight losses of various taxes, of the existence of a double dividend are described in detail and discussed with respect to their existence in the real world. Here, however, they are neglected in order not to duplicate this work, but instead to enlighten theory with empirical aspects as outlined above. This is the innovative approach which enhances also the theoretical understanding of an Ecological Tax Reform.

II. DEFINITIONS AND STRUCTURE

Environmental taxes are part of an ecological tax reform. In the following only those reforms are considered as ecological tax reform in which: (a) environmental taxes are introduced/increased; and (b) the revenue is at least mainly spend for reducing other taxes and charges.

A statement given in OECD (1995, 7), which also dealt with environmental taxes, applies: "Defining the scope of the work is inevitably imprecise. Similar measures in different countries may be variously defined as taxes, charges, levies, fees or duties, and it is not the intention to enter into semantic discussions of the borderline between these concepts."

It is the "greening" of the tax system or–more precisely–the fiscal system and/or the budget (thus sometimes called "Green Budget Reform"), which comprises three complementary approaches:

(a) The introduction of new environment-related taxes, generally on environmentally harmful products such as pesticides, fertilisers, batteries, motor vehicles, and waste products;

(b) A restructuring of existing taxes with a strong environmental relevance (energy products), to include an environmental component; for instance, a CO_2 and/or energy tax on energy products; and

(c) The modification or removal of tax provisions and subsidies with potentially detrimental effects on the environment (such as agriculture subsidies or tax provisions in the transport sector) (OECD 1998a).

Hence, environmental taxes are a major element of an environmental tax reform which are themselves a major element of a green budget reform.

The objective is to present various kinds of taxes. From a statistical point of view, fiscal data from national sources have to be defined regardless of national individualities. Terms and concepts are used quite differently in each country, thus causing problems when making international comparisons.

The criterion for deciding if a payment to state authorities is a "tax" in the statistical meaning depends on whether it is accompanied by a benefit which is roughly equal to the amount which the subject is obliged to pay. If there is a good or service in exchange, the payment, usually called a charge or fee, is simply seen as the price of the delivered good. Only those payments where there is no benefit to the individual subject in relation to the amount of money paid are called "taxes".

To complete the picture of possible definitions, the three categories of environmental taxes as classified by EUROSTAT are the following: (a) energy taxes; (b) transport taxes; and (c) pollution taxes.

However, in the following mainly energy taxes–and the term environmental taxes is mostly used as a synonym if not otherwise mentioned–are at the core of the next chapter on implementation issues. This is justified on the grounds that most problems with respect to implementation of ecological tax reforms become relevant when implementing energy taxes. The reason behind this is that energy costs normally have the highest share of environmental costs of a company and that energy taxes also can lead to substantial revenues with their respective financial and economic impacts. However, since environmental evaluations are available for all three kind of environmental taxes they will also be considered where appropriate. Comprehensive reviews of all kinds of environmental taxes are available from OECD (1998b and 1999b). Finally, conclusions are drawn.

Full references are at the end of the paper. In Annex I, details on the design of the ecological tax reforms of the countries at the forefront, Denmark and the Netherlands, can be found. Annex II contains information on countries of Central and Eastern Europe (CEE).

Overall, the paper comprises analytical assessments as well as descriptive elements though the focus is on the latter given limited evaluations available due to fairly recent introductions of environmental tax reforms. Previous meetings of the Expert Group Meeting on Financial Issues of Agenda 21 in 1996 and 1997 (United Nations, 1996 and 1997) are also referenced, as their proceedings contain several articles on similar and the same topic, however with different focusses.

III. ISSUES OF IMPLEMENTATION

This chapter is structured along the most important issues of implementation. In order to give insights in practice, the paper does not stay at the theoretical level briefly outlined in the introduction, but illustrates these issues by providing experience from several countries. A comprehensive assessment is still difficult to do since ecological tax reforms were only introduced a few years ago and are aimed at mid- and long-term impacts.

A. Environmental effects

Environmental taxes were initially invented to primarily pursue environmental objectives. As set out in the introduction and when part of an ETR, they often serve several purposes. Still, the main purpose is to reduce environmental pollution and the use of natural resources. To this end, it is necessary to collect information on the environmental impacts of an ETR.

Since these taxes were introduced mainly in the 1990s, much empirical data are not yet available. Still, a distinction between energy taxes and pollution and transport taxes can be made. Whereas energy taxes aim at fundamental structural changes, pollution and transport taxes aim at achieving specific environmental improvements. On the one hand, the latter show more concrete results in the short- and mid-term. On the other hand, the former tend to show impacts mainly in the mid- and long-term. This renders evaluation of energy taxes difficult, in addition to the difficulties realted to the unsteadiness of the world oil/energy market.

Consequently, most evaluations concentrate on transport and pollution taxes, but a few preliminary evaluations are also available for energy taxes. Three comprehensive overviews of evaluated environmental taxes are available. Two are published by the European Environment Agency (EEA 1996 and 2000–forthcoming), and the third was published by the OECD (1997a). For the year 2000 or 2001, an assessment of the evaluations is foreseen by Mikael Skou Andersen on behalf of the Nordic Council. Subsequent summaries of evaluations are mainly based on a draft for publication by the EEA in the year 2000.

Although environmental taxation has for several years been at the core of the environmental debate in Europe and the OECD, there is no systematic and coordinated evaluation of market-based instruments. In 1997, the OECD formulated a framework for "Evaluating Economic Instruments for Environmental Policy" (OECD, 1997a), but hard scientific evidence on the effectiveness of environmental taxes is still difficult to obtain. As the OECD (1999b, 78) puts it: "There is still a lack of evaluation of the environmental effectiveness of economic instruments, not to speak about their static and dynamic efficiency…Effectiveness is rated positively in general, although the substance of this information is meagre. Many statements regard sometimes remote proxies for environmental effectiveness, rather than effectiveness itself."

In CEE countries it is even worse. There are hardly any recent ex-post evaluation studies of environmental taxes available which could provide reliable data. Apart from the general difficulty of disentangling policy packages, which cannot be underestimated, evaluations are made even more difficult for several reasons:

(a) Most taxes–at least in the past–only worked under a centralised planning system. Hence, environmental funds often only became effective when the phase of transformation started and the market mechanism reflected more appropriately any scarcity. Otherwise, any kind of incentives were often offset by counteracting subsidy schemes or non-implementation of regulation.

(b) High rates of inflation threatened all environmental taxes in accession candidates. Some, such as Poland and Estonia, have thus linked charge rates to inflation.

(c) The transition phase often led to reduced growth and thus also reduced environmental pressure. It is difficult to separate this from the effects of economic instruments which have just started to function properly.

(d) Since most environmental taxes often have the dominating function of raising revenue and then go to environmental funds, it is necessary to take into account the effects of the spending since major environmental improvements may be expected from that side.

(e) For large polluters, comprehensive exemptions are often provided which reduce the environmental effects, but it is difficult to evaluate them if other instruments are part of a policy package.

Given these severe limitations, one can only rely on empirical observations without aiming at scientifically sound data: "For the Polish air pollution charges, there are incentive effects even if not at the efficient level. In Hungary, the packaging product charge had substantial environmental impact in the preparatory phase" (Klarer 1999, 211).

Poland was particularly successful in increasing charge rates. Levels have been increased to approximately 18-20 times the levels during the communist regime and now are among the highest in the world. Still, the estimated marginal cost of investments to achieve, for example, a 30 per cent reduction (equivalent to the new standards for large combustion sources that took effect in 1998) in SO_2 using the RAINS (Regional Acidification Information and Simulation) model developed by the International Institute for Applied Systems (IIASA, Laxenburg/Austria), is approximately $600 per ton for large combustion sources. However, there is at least some interesting evidence that the high fee rates have provided incentives for polluters to make low-cost improvements to reduce emissions of particulates and SO_2, although not necessarily in compliance with the standards. As a result, fees are complemented by permits and emission and discharge standards (Peszko, 1999, 132). The indication of the non-implementation of the fee regime in part is supported by simulations of London Economics (Pototschnig 1996, 219). "A tougher environmental policy characterised by higher charges (...) would impose an extremely high resource cost to the Polish economy. A cost that few countries, let alone a country in transition, would be able to afford."

Since evidence is difficult to obtain and experience with environmental taxation is rather recent, a number of only western European countries have created environmental tax commissions for the further development and partly also for the evaluation of their environmental taxes (see below on institutional approaches/capacity-building and Schlegelmilch 1998a). The commissions usually have the format of a round-table. Representatives from different interest groups, science, politics and sometimes only public administration, support the governmental and parliamentarian decision-making. Some exist(ed) for a short period, some for a long period, others have been set up several times. Thus far, environmental tax commissions have been established in Austria, Belgium, Denmark, Ireland, the Netherlands, Norway, Sweden, the United Kingdom; similar approaches were chosen in Canada, the USA and Japan.

Conclusions and recommendations are usually connected to the national debate. However, according to OECD (1997b, 26) certain conclusions have general validity for the assessment of environmental taxes:

(a) Environmental taxes are an effective and efficient instrument for environmental protection.

(b) An ecological tax reform which shifts the tax burden from nature to labour and which contributes to the reduction of distorting taxes and subsidies, increases the economic performance by improving the environment and reducing market failure and distortions through wrong price signals.

(c) The improvements do not result in significant job losses, but they could even increase employment opportunities.

(d) An ecological tax reform alone will only play a small contribution to the solution of unemployment in OECD countries.

(e) Increasing mobility of production factors can result in significant adjustment costs, if small open markets introduce measures which create a different environment for investments than in the rest

of the world market. Ambitious environmental policies should therefore be co-ordinated internationally.

Next to "hard" scientific evidence, for example on quantitative reduction, there are a number of "soft", sometimes capacity-building effects which deserve more attention when evaluating market-based instruments. An example of "soft effects" is the "capacity-building" effects of the German waste water charge (Kraemer 1995).

The German water effluent charge system induced a "capacity-building" process. In particular, the charge improved administrative competence by:

(a) providing financial resources for increasing the number and capability of staff engaged in determining and issuing water pollution permits, and in monitoring and modelling activities;

(b) creating the need for better information and monitoring of effluent discharges—better monitoring strengthened the position of environmental authorities vis-à-vis polluters;

(c) introducing into the relationship between authorities and polluters the objective elements of control and enforcement associated with fiscal legislation;

(d) providing polluters with an incentive to review their discharges, and to consider technological options (awareness effect);

(e) giving more attention and recognition to issues of municipal sewage treatment;

(f) signalling the legislators' determination to ensure more effective compliance with existing pollution control requirements.

The simple fact that taxes are subject to a public debate makes not only the financial aspect, but also the environmental reason for introducing these instruments known to a broader public. As the evaluation shows, even negligible volumes of taxes and charges can result in a change of preferences which are not necessarily in proportion to the economic benefits which are gained by behavioural change. A purely economically based approach to evaluating environmental taxes is thus neither reasonable nor followed here.

Table 1 summarises the results of the review and qualitative assessment of the evaluation studies available on environmental taxes. The main conclusions are:

(a) the number of evaluation studies has increased substantially recently, not least due to a similarly increased application of environmental taxes and the need for evaluating their effects. The quality of these evaluations varies considerably and a water-proof causal relationship can likely never be established, though in some cases this relationship is very obvious;

(b) the taxes evaluated revealed environmental benefits and in most cases appear to be cost effective within the constraints of the evaluation performed;

(c) examples of particularly effective taxes are those on Swedish NO_x-emissions; on Dutch water pollution; on Danish sulphur emissions; all kinds of tax differentiation schemes for fuels in most countries were also very effective;

(d) incentive taxes are, in general, environmentally effective when the tax is sufficiently high to stimulate abatement measures;

(e) a significant contribution to the environmental effectiveness of the cost-covering charges is provided by the use of revenues for related environmental expenditures. In addition, some even had an unexpected incentive function;

(f) taxes can work over relatively short periods of time (2-4 years), and so compare favourably with other environmental policy tools

(g) environmental taxes are often more effective than environmental agreements as supported by the fact that several of the latter had to be substituted by taxes after agreed targets were not achieved (examples are the Danish tax on NiCd batteries and the PVC tax);

(h) for several energy taxes there are now first evaluations available which provide first evidence for their achievement of their twin role as revenue raisers and as environmental incentive taxes;

(i) evaluating a tax and its environmental impact is often difficult. Environmental taxes are often part of a policy package that is hard to disentangle. Therefore the effectiveness of the tax 'per se' cannot always be clearly identified;

(j) evaluations of environmental taxes in accession candidates are basically not available; their evaluation has often been hindered or deteriorated by the fact that either hardly any environmental taxes were applied or that surrounding their applications the absence of market conditions were hampering their impacts. Still, they definitely worked in raising revenues and thus provided the funding for environmental expenditures and respective environmental effects.

Overall it is often found that environmental taxes can have multiple environmental effects and secondary benefits that could improve policy in five key areas: the environment, innovation and competitiveness, employment, the tax system, and the reinforcement of regulatory and other, e.g. so-called "voluntary" policies.

B. Competitiveness

Competitiveness has become the major concern in most countries implementing steps of an ETR, strongly related to the demand for international harmonisation. Industry often claims that the implementation of regular tax rates within an ETR would lead to a reallocation of companies abroad. As a consequence, environmental pollution–as far as greenhouse gases are concerned–would not be reduced, but would just take place abroad because the products would still be imported. Also, the economy would lose due to the loss of jobs.

However, this perspective presents only one side of the coin. So far, the polluter pays principle is not sufficiently applied, and the so-called external costs are not internalised in market prices. This means that the costs caused by environmental damages are borne by society, but not by the polluter. Hence, companies offering environmentally friendly, eco-efficient technologies, processes, products and services are facing a disadvantage. Were these costs internalised, the demand for such commodities would be much higher leading to increased competitiveness of these companies. Consequently, the perceived problem is more a problem of transition. The crucial question is thus: To what extent can a government burden its energy-intensive industries without the industry reallocating or closing down in the short run while providing incentives to increase demand for efficient commodities of advanced industries?

This ambivalence is also mirrored by the fact that initially an ETR was considered as an effective instrument to spur innovation and reach environmental targets more effectively. Though this still holds true, it is no longer so much at the core of discussion. Instead, concerns about the competitiveness of energy intensive industries dominate debates for a long time.

Another surrounding debate is that on the "national go-it-alone effort". To what extent may a country go ahead with implementing an ecological tax reform, possibly damaging its energy intensive industries, if others have not yet done so? Considering the recent implemention of the first of five steps of an ecological tax reform in Germany by 1 April 1999, Germany has in no way chosen a "national go-it-alone effort", as is so often asserted, usually by domestic industry; quite the opposite. The majority of the EU States have meanwhile implemented more or less many elements of ecological tax reforms–and partly even higher energy taxation. Now that Germany is one of the countries implementing ecological tax reform, others have again more windows of opportunity to further increase their tax levels. This holds true for Denmark and the Netherlands, which explicitly orient their environmental, but particularly energy tax policy along the steps Germany is taking. Both immediately increased diesel taxes, while Denmark was even a quarter earlier by accident since the initial time for its introduction was January 1999. Germany thus helped to break the deadlock situation and has allowed for new dynamics in Europe.

Italy also contributed to this dynamic substantially. In 1999, Italy was the first southern country to embark on carrying out eco-tax reform in five stages up to 2004.

The question of "national go-it-alone effort" or not is based moreover on a somewhat peculiar understanding of progress. Once one transfers the development of progress to companies, products and processes, this can only mean that something is tried out and done individually, without everything being done the same way and at the same time by everyone. This is how innovation happens–by trial and error. Transferred to the environmental tax debate, it means that one or two countries must, of course, lead the

way and experiment, to learn from their experiences. Then, when they see that the concept makes sense, others will follow on to a certain extent and as a result make that progress a part of everyday life. In that light, ecological tax reform is well on the way to being introduced and developed by most countries in Europe, and possibly also other industrialised countries.

Denmark and the Netherlands have both taken different approaches to combat possibly negative impacts on the competitiveness of energy-intensive industries. Denmark has applied differentiated tax rates depending on the existence of environmental agreements and respective measures taken and on the energy-intensity of various processes (for example, space heating is equally taxed as households since this is not relevant for competitiveness), gradually increasing rates while recycling all revenues through energy investment grants and reduction of social security contributions. The Netherlands has simply differentiated according to the amount of energy consumed. More details can be found in Annex I.

Interestingly, some of the countries at the forefront, like Denmark and the Netherlands have good economic indicators that show high growth rates and low unemployment figures (Annex I). There has been no apparent negative effect on the competitiveness of the pioneer states either. This can also be concluded from a worldwide comparative study by the *Institute for Management Development*, in which Denmark, Norway and the Netherlands were identified as the most strongly competitive (IMD, 1996). Furthermore, an empirical study unveils that the design of the ETR in Denmark is most profitable for industry (Clasen, 1998a and 1998b).

By using two examples–the Netherlands and Denmark–it is clear that an ETR can be organized so that it avoids negative effects without necessarily stopping the positive ones from being effective. No company reallocated abroad because of environmental tax reform; on the contrary, the export of environmental technologies was able to be increased in Denmark. There is an analysis of the impacts on employment, which is closely related to competitiveness, in the next section on employment.

C. Employment

The impact of an ETR on employment is another big issue. Protagonists argue that major positive job impacts would arise from a shift to more labour-intensive products and processes. Many computer simulations have been carried out, aiming at finding more insights in the existence of a "double dividend". This double dividend would consist of higher environmental protection whereas also increasing overall welfare, either by higher growth or by creating more jobs. In a nutshell, the large majority of studies indicates that there will be a small, but positive double dividend (INFRAS/ECOPLAN, 1996).

Looking for practical evidence is much more difficult since the macro-economic impacts of ecological tax reform is often over-estimated. Thus, other factors such as exchange rates, labour market developments, tariff agreements, interest rates, demand, and so on, have a much larger influence on the economic performance in general and on employment in particular. However, theory on the one hand, but also politicians on the other, increasingly ask for empirical evidence. Still, this is a very hard task given so many influencing and more dominating factors. It is thus hardly possible to carry out such a task. Still, an attempt is made in the following, providing comparisons on a macro level, but also giving some indications for possible employment impacts on a micro level. It is very important to note that the following analysis is based on figures before the ecological tax reform was introduced in Germany.

Unemployment rates and ecological tax reform

Largely simultaneous with the introduction of an ETR, unemployment rates in Denmark and the Netherlands are falling. In Germany, on the other hand, where no ETR had been introduced up to the end of March 1999, the rate of unemployment rose almost continuously. Moreover, the rates in Denmark of 7.4 per cent and in the Netherlands of 5.6 per cent in 1998 were the lowest for several years, while Germany notched to 10.9 per cent.

Table 1: Summary of an assessment of selected environmental taxes

Instrument	*Environmental Effect*	*Remarks on Effectiveness*
Annual car taxes (A, B, CH, CZ, D, DK, E, FIN, F, GR, HU, I, ICE, IRL, L, N, NL, P, S, UK)	+	not quantified
differentation or temporary exception by certain criteria	+	not quantified
Battery charges (S)	+++	collection rate increased from 60% (1988) to around 100%, after the charge was introduced in 1989
CFC tax (DK)	++	reduction of consumption of CFC by 50% (from 5.660 tons to 2.225 tons) between 1986 and 1992 supported by taxation
charges on domestic air traffic (S)	++	unknown for the noise effect but 90% reduction of hydrocarbon emissions by the change of the combustion chambers of Fokker F28 engines
CO_2 tax (DK)	+	reduction of 1 million t CO_2 (1988-1995) CO_2 emissions (industrial sector) were, compared to 1988, 3.0% lower in 1996 and 3.4% lower in 1997
CO_2 tax (N)	++	Reduction of CO_2 emissions: private cars 2-3%(1991-1993) stationary combustion plants up to 21% in 1991 (year of introduction) production of intermediate products 11% (in 1991) government services 10% (in 1991) oil industry (1.5 per cent) total decrease 2-4% (1991-1993) household transport volume: total decrease by 1.5-1.9%/a private cars decreased 2-3% (1991-1993) public transport increased 0.5%/a
CO_2 tax (NL)	+	Reduction of CO_2 emissions by 1.7 million tons in 1994
CO_2 tax (S)	++	reduction of Swedish CO_2 emission by 5 million tons in the period of 1991-1994 (9 per cent of total emissions) amount of biomass fuel used at heating plants doubled from 10.2 to 20.4 TWh or from 25% to 42% of total district heating, whereas fossil fuels decreased from 36% to 30% (1990-1995) reduction in the district heating sector by 1.5 million tonnes
Environmental classification of diesel oil (S)	+++	in 1991 almost no automotive diesel was sold of Environmental Class (EC) 1 and EC 2, it rose to 50% in 1992 (4% for EC 1 and 46% for EC 2) and in 1993 20% was sold in EC 1 and 57% of EC 2
Environmental classification of petrol (S)	+++	EC2 (more environmentally friendly) accounted for 6% in first half of 1994, 16% for the second half and 85% in December when the tax differential took effect
Excise duties on motor fuels (A, B, CH, CZ, D, DK, E, FIN, F, GR, HU, I, ICE, IRL, L, N, NL, P, S, UK)	++	(see below on UK road fuel escalator)
Fertiliser tax (FIN)	++	consumption of nitrogen fertiliser was in the 1990s about 40m kg less than in the 1980s and about 22% less than without the price increase of the levy 11% reduction [period unclear] of total fertiliser use brought by changes in prices of production factors
Fuel duty escalator (UK)	+/?	average miles per hour for lorries over 33 tonnes increased by 13% (1993-1998)
Landfill tax (UK)	++	64% of interviewed companies recycled, reused or minimised their waste, whereas only 29% were already engaged in re-use, recycling and minimisation beforehand, 13% knew about the tax but did nothing and 11% knew, analysed and though did nothing

Table 1. (continued)

Instrument	*Environmental Effect*	*Remarks on Effectiveness*
NO_x charge (S)	+++	NO_x emissions from combustion plants would have been 25% or 10.000 tons higher in 1995 (likely against 1992) (app. 3 per cent of total NO_x emission of Sweden) emissions from boilers would have been 80% higher
Pesticide tax (DK)	+	consumption fell by 10-13% (1995/96-1997), although this is not entirely to the tax
Pesticide tax (S)	++	reduction of sales of pesticides by 35 per cent between 1981-1985
Petroleum tax differential (P)	++	share of super unleaded petrol increased from 0.3% to 18.3% (1989-1993)
regulatory energy tax (NL)	+	estimated Increase of energy-saving by 1-3 per cent increase of economic feasibility of energy-saving measures by 5 per cent
Sales tax differentiation for 'clean' cars (S)	+/?	'soft effects' had an impact on newly registered cars belonging to classes 1+2, it did rise from about 16% to over 75% (1993-1996)
Sulphur tax (DK)	+++	Decreasing sulphur content of fuel gas oil from 0.2 to 0.05% (within a few weeks from introduction in 1996) and the sulphur content of coal has been reduced by 30-35% 33% reduction of SO_2 emissions in 1996 in the "other sectors" by a changeover to low sulphur content fuels
Sulphur tax (S)	++	decrease of sulphur content of oil-based fuels of more than 50 per cent below the legal limit (0.2 per cent). total reductions of 19.000 $S0_2$ (1989-1995) which stands for 30% of the total emissions reduction
Tax differential on high sulphur diesel (UK)	++	proportion of ultra low sulphur diesel (ULSD) increased from 0 to 43% by Feb. 1999
Tax differentiation on leaded petrol (A, B, CH, DK, E, FIN, F, D, GR, HU, IRL, I, ICE, L, N, NL, P, POL, S, UK)	+++	quantified seldomly
Tax on some substances in commercial fertiliser (S)	++	fertiliser use declined by 2-3% in the first years reduction in use of nitrogen fertiliser by 15-20% (1991/1992) reduction in cadmium content from 35 to 20 grams cadmium per tonne phosphorus (likely in 1994)
Taxes levied on the purchase or registration of a new car (A, B, CH, DK, E, FIN, GR, HU, I, ICE, IRL, N, NL, P, S)	++	e.g. car fleet in Denmark is about 30% vs. over 50% in Germany
The energy package (CO_2 tax, sulphur tax, energy tax) (DK)	++	decrease of consumption on space heating by 10-15% (1970s to the 1990s) share of energy-saving refrigerators increased from 40% to 85% (1994-1996)
Vehicle scrapping charge (S) vehicle scrapping premium	+/?	A "clear reduction" in number of abandoned cars
Waste tax (DK)	++	return rates increased from 35 to 61 per cent (1985-1995) recycling of construction waste increased from 0.8 to 1.6 mio. tons (1991-1995) waste dumping decreased from 39 to 18 per cent (1985-1995) household waste reduced by 16 per cent, construction waste by over 60 per cent, "miscellaneous" waste by 22 per cent, industrial waste increased by 8 per cent (1987-1993) more than 80% of the reduction occurred in areas not subject to regulation, where establishment of new recycling facilities played a big role

Source: EEA (1996), excerpt from Wuppertal Institutes' contribution to EEA (2000)
Note: +/++/+++ = small/medium/high effect; 0 = absent or negligible effect; ? = unknown effect

On the one hand, it is clear that as yet no causality is connected with the observation of these phenomena. On the other hand, a connection can be assumed on the basis of the theoretical discussion. In the example of Denmark in particular, the effects of the ETR on the job market can be described. The 1999 publication of the evaluation of the CO_2 tax in Denmark also suggests that positive effects ensued in the job market (Danish Government, 1999a and 1999b).

The falling unemployment rates in the Netherlands and Denmark can clearly be attributed to a great extent to the higher proportion of part-time employment in Denmark and in the Netherlands. Also the noticeably more active jobs market policy in these two countries is reflected here. Another factor is the different statistical definition of who shows as unemployed in the statistics. In Germany, a substantial part of the increase in the rate of unemployment can be explained by the unification of Germany and the associated de-industrialization of East Germany. Consequently, at the present time probably only a small part of the declining unemployment rate is attributable to the introduction of an ETR. (Schlegelmilch 1998c).

Table 2: Unemployment rates 1990-1998 (per cent)

Country	*1990*	*1995*	*1996*	*1997*	*1998*
Denmark	9.6	10.3	8.8	8.1	7.4
Germany	6.2	9.4	10.3	11.1	10.9
Netherlands	6.0	7.1	6.7	6.2	5.6

Source: OECD (1997c), p. A24, table 21.

(a) Denmark

Since energy intensive processes were only burdened to a very low degree, no job losses happened there as far as is known. The relatively constructive co-operation of the Danish Industry Confederation (Dansk Industri) contributed to this (Schlegelmilch, 1998a).

In the field of regenerative industries, Denmark forced the development of wind power and biomass thermal power stations. New, competitive jobs no doubt resulted from this. Thus in 1997, the turnover of Danish manufacturers of wind power plants climbed to 1.3 billion DM. Meanwhile, they employed more than 10,000 people (Zank, 1998, 16). In 1996 Denmark was the third largest market in the world for the installation of wind power plants (Worldwatch Institute, 1997, 52). This positive development was confirmed by the Danish Department of Trade and Industry (1996) and it supplemented its good experiences with an associated export drive: "Danish experience through many years is that we have not damaged our competitiveness because of green taxes. In addition, we have developed new exports in the environmental area.."

The sales of refrigerators experienced a boom after the introduction of the ETR, which also led to additional employment. Not only were significantly more refrigerators sold than previously, but the demand for energy-saving appliances rose sharply. During the early part of 1994 just 40 per cent of the appliances sold were of more than average efficiency, but by the end of 1996 energy-saving appliances accounted for over 85 per cent of sales. In 1994 and 1995, mainly C-class appliances were bought, which use 10 per cent less electricity than the average. In 1996 B-class appliances were in most demand, which are up to 35 per cent more efficient. In the meantime, A and B class appliances account for more than 50 per cent of refrigerators sold in Denmark (Jänicke and others, 1997).

The Danish Energy Agency took on about 40 employees to cover the voluntary energy audits. Since energy audits are also partially carried out by outside consultants, a positive employment effect was also registered here. In the case of tax consultancies such as KPMG, the actual implementation of the ETR provided a demand for advisory services at the company level with a corresponding employment effect.

However, there is, in part macro-economically, the methodical problem of clearly allocating these positive employment effects to an ETR. The essential instrument in support of wind power is the obligation

of electricity companies to pay an appropriate refund to the wind turbine operators. In real terms about EUR 0.08 per kilowatt-hour must be paid. High energy prices would also be of additional assistance for wind power. Denmark is one of the few countries to have kept the energy price level artificially high after the oil price crisis of the 1970s and has not reduced them, with the result that efforts in energy conservation continue to pay off and were not reduced by the fall in oil prices since the beginning of the 1980s.

The presumed connection of the medium and long term drop in unemployment rates and the introduction of the ETR is supported by the estimate of the expected macro-economic effects of the changes in taxation of energy by the Danish Ministry of Finance. According to that estimate, employment will rise by a net 2,000 additional jobs by the year 2000 (Danish Ministry of Taxation, 1995, 17-20). This is explained in part by the fact that the total industrial costs burden will decrease by one half of one per cent in the year 2000, which is conditional upon a reduction in the employers' social security contributions and a special fund for small businesses.

A comparative study shows that the tax solution in Denmark has produced noticeably lower CO_2 emissions in the industrial sector than a solution mainly based on covenants (a kind of environmental agreement) for energy intensive industries provided with few incentives in the Netherlands (Enevoldsen, 1998 and 2000).

(b) The Netherlands

As pointed out above, the Netherlands has falling rates of unemployment. There is still no information available at company and sector levels. There is only an estimate of the expected employment effects of the ETR in the Netherlands prepared by the Centraal Planbureau (CPB)–the official economic advisory bureau of the Netherlands government. In it the effects of the ETR on employment are assessed as minor but positive. The unions are asked not to boost the wage-price spiral to compensate for price rises. Indeed, two large unions have undertaken not to take possible price rises triggered by the ETR as a reason for higher wage demands. As a result they are meeting a very important condition for ensuring the creation of extra jobs. Whether a price rise has been caused like that has not yet been analysed.

Interim Conclusions

The politically important conclusion is: No exodus of industry or even single branches or companies–so often feared–occurs with an intelligent concept for ecological tax reform. Rather, it has a tendency to secure jobs and create new ones.

The arguments produced for the net employment effect of an ETR on the national leadership anticipates the occurrence of a positive net effect. The innovations initiated by the ETR and the associated dynamic contribute to this. Also of considerable importance is the intelligent concept of the tax reform in a manner that allows it to use national leeway even in a time of increasing globalization and to be a pioneer in tax/environment policy. The positive development of unemployment rates and the approximately simultaneous introduction of an ETR in Denmark and the Netherlands as well as the positive effects at sector and company levels suggest the conclusion that a causality is to be seen between the two–a confirmation of the "double dividend" theory, as it were. However, these developments in the job market are partly attributable to an active employment policy and more part-time working. The effects of the ETR could be relatively low in the short term, but positive. In the long term, and that is where an ETR is aimed, the effects on the employment market could be greater. But an ecological tax reform cannot be expected to remedy the unemployment problem by itself, even in part. Besides, deeper evaluations of the connections are missing. In summary, it may be worth remembering that the ETR–as far as is known–had no negative effect on the job market either in Denmark or the Netherlands. On the other hand, there are obvious positive indications and evidence for the policy.

The OECD also encourages its Member States to introduce an ETR: "Consequently the individual countries, as part of the current process of structural adaptation and regulation shaping in the OECD area, should investigate the possibilities and the potential for ecologizing their tax systems considering the country-specific economic, financial and environmentally political constraints. Concerted action would reduce potential emission transfer and unwanted interference with competitiveness to a minimum." (OECD, 1997b, 12). Thus, the greatest employment policy effects could be implemented.

D. Equity

Low-income groups normally have to spend relatively more of their income on energy products than on average and than rich people. Still, they do also often benefit physically more than on average from reduced pollution as they are normally hit hardest by environmental pollution. This has been shown by an empirical comparison between the distribution of incomes and the environmental pollution in a city such as Berlin where data for such an analysis was available (Luhmann, Ell and Roemer, 1998). Depending on the social and cultural background of a society, this issue is either only a side-issue or even becomes the guiding principle when implementing an ETR. Implementation issues are shown through the examples of the United Kingdom and the Netherlands where these issues were very dominant. Still, equity will also be considered with respect to the terms of trade and the relation to least developed countries.

For the United Kingdom, this issue is the most relevant concern. On 9 March 1999, the United Kingdom announced in its budget–which was greener than ever before–the introduction in April 2001 of a tax on–and this is extremely noteworthy–industrial energy consumption. This was detailed in November 1999. This means explicitly that higher taxation on private households will not be aimed at. The background to this is as follows. In 1993 the John Major government attempted to raise the VAT rate on private energy consumption, in particular on light heating oil, in two stages from the then 0 per cent to 8 and 17.5 per cent. The first stage was implemented successfully, but the full plan was felt to be socially unjust. The British weather, together with the relatively poor standard of heat insulation of British houses and the shortage of capital of many house owners (to possibly invest in better insulation) had significantly increased energy costs. Labour at that time was vehemently opposed to this, and promised to lower the VAT from 8 to 5 per cent, which they in fact did in 1998 after the change of government. Against the background of this public dispute, the almost revolutionary "fuel duty escalator" was able to be pushed through in 1993 without much discussion, though its revenue will be hypothecated from the year 2000 on and spent for public transport means.

A different approach was chosen by the Netherlands in order to meet social concerns. Apart from competitive concerns, social ones were at the core of the debate and many calculations were carried out so as to ensure the social balance of the environmental tax reform. So as not to overburden lower income groups excessively, tax-free allowances of 800 kilowatt-hours (kWh) and 800 cubic meters (cbm) of gas were introduced, on which neither households nor companies need to pay tax. In order not to tax bulk consumers too heavily, at the beginning (between 1996 and 1998) quantities over 170,000 cbm of gas and 50,000 kWh of electricity were also exempted from the tax. Other minor adjustments were also made. However, according to information from the Netherlands Finance Ministry, the complete gas and electricity consumption by households and about 95 per cent of the corresponding company consumption are affected by the tax. A drop of five per cent is expected in CO_2 emissions by the year 2000 because of the taxation on consumption.

In 1998, the government noticeably raised the tax-free limits on the basis of the third and final report of the environmental tax reform commission. The limits up to which electricity and gas are taxed were increased from 50,000 kWh of electricity to 10 million kWh and from 170,000 cbm of gas to 1 million cbm respectively (this equals approximately 10 million kWh).

The expected revenue of 2.1 billion Dutch Gilders (NLG) in 1998 was refunded in proportion to the revenue to households (less than 60 per cent) and companies (more than 40 per cent). For this purpose the income tax for households was changed at three points: (1) the entry tax rate was reduced by 0.6 per cent, (2) the tax-free subsistence level minimum was increased by 80 NLG and (3) tax allowances for senior citizens were increased by 1 per cent.

Furthermore, employers' social security contributions were decreased. Small companies are able to claim higher tax relief, and the corporation tax was reduced by three per cent over the first 100,000 NLG. Lastly, the regenerative energy source operator obtained a full refund, and is thus exempted from the tax. Until 2001 the Netherlands will double the tax rates introduced between 1996 and 1998 again.

This example demonstrates that one can keep up the entire incentive function for households while keeping the tax burden low. It is done by mainly taxing the marginal energy consumption and leaving bulk energy consumption, here considered as required for living (a kind of existence minimum), tax free. The marginal tax rate is high while the average tax burden is low. Though the concept is administrable in the Netherlands, it does certainly depend on a metering infrastructure. However, in this electronic and technical world it appears feasible to transfer such an approach to other countries, too.

If equity is considered in the context of the developing countries, the fear often is that taxing energy or other raw materials will hit their export economy. At first sight this certainly is an argument. However, it does not specifically apply to the concept of an ETR but it holds true for any measure or simply reduction of demand of a commodity. Hence, one first has to analyse the policy that is followed in industrialised countries. If, and this is mostly the case, the aim is to increase efficiency, be it energy or resource efficiency, then it is this policy which might affect demand, but not the chosen instrument such as a tax. An ETR can neither solve nor worsen the problems that exist. Still, if pressure from least developed countries is increased they might succeed in gaining some of the additional revenues (currently not the case due to the guiding principle of revenue neutrality) for official development assistance (ODA).

E. Trade-off between environmental and fiscal objectives

When countries are about to start implementing an ETR a trade-off between environmental and fiscal objectives is often perceived as an unresolvable issue. Both aims seem to exclude each other, which, indeed, holds true in theory. However, practice and simulations have clearly shown that an ETR can serve both purposes over a long term. Still, it is not always predictable to what extent which objective can be achieved. Furthermore, the motivation to introduce such taxes often differs between various stakeholders. Hence, quite a few taxes serve at least two purposes, whereas the trigger for high revenues often stems from the labour side wishing to reduce the burden on labour. Still, the environmentalists are not unsatisfied since the interest of the finance and labour side will ensure a steadily increasing level of taxation and thus incentives.

Some considerations on two fundamentally different types of environmental taxes may help to get an understanding in which cases the trade-off becomes relevant and which cases it is negligible.

Introducing a product tax can make that trade-off occur significantly. This holds particularly true if alternatives are readily available and if no tax is levied on that alternative. For example, given the introduction of a tax on aluminium cans, consumers might easily change preferences due to increasing prices and buy glass bottles. Then tax revenues would soon fall, but the environmental impact would be large. However, product taxes are one element of an ecological tax reform only. And in fact, they mostly constitute only a minor part in terms of revenues.

If an ecological tax reform is introduced, not product but energy taxes are practically at the core of the reform since they ensure a broad and fairly stable source of revenues. Only given this prerequisite is it possible to do a reform. By counting on substantial revenues at least for mid-term, finance ministries are ready to use the revenues for the reduction of other taxes or levies. Energy consumption can simply not be substituted either in the short-term or in the mid-term. Hence, taxing energy is an ideal revenue raiser (only a little bit less ideal is CO_2). Looking back on the outgoing century one easily notices that finance ministers have relied heavily on some kind of energy taxation. Mineral oils in particular often provide for the third largest source of revenues in federal budgets (after income and value-added taxes). And ministers were not afraid of losing revenues when increasing rates. Quite the opposite. They did the latter again and again while revenues did so as well. Still, now as they are not only increased for financing the budget, the announcement of further increases is likely to have a certain environmental impact. But it should not be overestimated since mobility is increasing and basically not price driven, but demand driven.

Of course, the question immediately arises of whether these mineral oil taxes have had any environmental impact. This is certainly not true since increase of demand for mineral oils would certainly have been higher than without any tax. However, the assessment is difficult as shown in the previous section.

In the case of the Netherlands a specific problem appears to emerge, which is that revenue recycling seems to become difficult. Still, it is interesting to note that the Netherlands have already achieved such a state.

A final remark shall be made on the expectations which an environmental tax reform meets. Hardly ever has a tax reform concept had to meet so many requirements. Compared with dozens of income tax reforms where long-term predictability of revenues were often not even considered, environmental tax reform must prove this. Looking back in time, the history of public finance tells us that as soon as a potential new tax base is ready to be taxed, it will be taxed. This still holds true and thus any worries about a decrease of revenues should not be overestimated.

F. Reducing environmentally counterproductive subsidies and tax expenditures

Reducing environmentally counterproductive subsidies and tax expenditures is often claimed to be the best way of starting a fiscal reform instead of starting with introducing environmental taxes. Although this is theoretically certainly the adequate order, policy does not care too much about it, but often seems to prefer the second best approach of introducing taxes first. Still surprisingly, after implementing first steps of an ETR countries often shifted the focus towards reducing environmentally damaging subsidies. Hence, it is interesting to note that through an initially second best approach the first best approach can be more easily followed. This holds true for Norway and the Netherlands. This was, if not triggered, at least essentially influenced by reports from commissions on ecological tax reforms in these two countries.

Still, the United Kingdom first reduced support to coal mining substantially before introducing environmental taxes. This also appears to be the way forward in the United States. Introducing new taxes or increasing existing ones appears to be almost like committing political suicide. Hence, decreasing subsidies, possibly first the most environmentally damaging subsidies presents an approach that was at least partially successful (Friends of the Earth, 1999). However, in times of falling world market prices for oil, as in the first half of 1999, the government seemed to abandon its initial approach and put the profitability of oil and other energy companies higher on the agenda and provided generous tax exemptions for those sectors. The danger emerges again that abandoned subsidies revive again and that past small steps are now turned into fake reforms, easily reversible. Apparently economic considerations are still dominating fiscal and environmental ones.

G. Impacts on inflation

Impacts on inflation are an issue in countries which are members of the European Monetary Union (EMU). Here three criteria for entering and remaining in the EMU apply, of which one is an inflation rate of no more than 3 per cent. Hence this topic has attracted particular attention for southern countries with traditionally high inflation rates. Some use this argument for preventing any additional energy taxation, others even reduce existing taxes to mitigate the effects triggered by the increase of world market prices for oil.

This topic is particularly stressed by the so-called cohesion countries such as Spain, Ireland, Greece and Portugal, since Greece is not yet a member of the EMU because it failed compliance with some criteria and the others fear being penalised due to non-compliance. However, reducing other taxes than energy or environmental taxes is another possibility of how to avoid such effects.

Particularly in CEE countries, environmental tax rates are often linked to income or inflation in order to keep up the level of incentive. This is of great importance to really provide incentives. In the past this has not always been the case given that inflation rates were often far more than 10 per cent. Indexation ensures an automatic increase, possibly also above inflation rates in order to increase the incentive. This has been established in the United Kingdom, which is already well-known for the automatic increase in fuel tax of about 6 per cent above inflation without time restriction, the so-called “fuel tax escalator”. First, at the beginning of the 1990s, the taxes on diesel and petrol–a worldwide one-off–were raised to the same level. Secondly, in March 1993, it was resolved that a start would be made with a real annual tax rate increase of 3 per cent, in November the annual rate increase was raised to 5 per cent, and the new Labour government under Tony Blair resolved to raise it to 6 per cent in 1998.

H. Legal Restrictions

Legal matters are raised, particularly when it comes to the discussion of international action. Here EU and WTO-rules play an important role. The major question is often, if and by which means is a country which implements ETR allowed to ensure that its industry is not set at a disadvantage by higher environmental taxes whilst not abusing them for illegible protectionism. But also on a national level, debates on the eligibility of certain environmental taxes within the constitutional framework are taking place. The latter is perceived as too specific to be discussed here since every country has its own evolution and thus constitutional framework for such taxes.

Environmental tariffs can ensure that imports pay a similar level of tax to domestic products, thereby neutralising any competitiveness effects in the domestic market, while export rebates can ensure

that the taxed domestic industries' ability to compete abroad does not suffer. However, calculating appropriate tariffs on imports, especially when the environmental tax base is an industrial input, such as energy, rather than a final product, is difficult, and easily interpreted, rightly or wrongly, as protectionism.

Border tax adjustments may run counter to international trade rules which are exactly designed to prevent protectionism. This is particularly true if domestic and foreign products are not treated equally. But in general, border tax adjustments are an important means of providing an equal level playing field. However, so far it is only applied in a single case with respect to environmental taxes, whereas it is often applied in the case of turnover taxes in the particular case of value added tax as in the European Union. The United States has set up a border tax adjustment for its tax on chlorofluorocarbons (CFC). It is levied on imports on the basis of calculations of CFCs used as content as well as in the imports' manufacture (Hoerner, 1995, 185-199). Still, whether border tax adjustment on energy or carbon content will be set up is unclear since calculation appears to be more difficult. Given the enormous amount of information available nowadays it is though not only of theoretical value, but could well become relevant in practice.

Another example of legal problems became visible when the EU Court of Justice in a sentence on 2 April 1998 ruled Finland to abolish a discriminatory fiscal provision. An importeur of electricity from Sweden to Finland had complained that the electricity which he argued was generated from renewable energy sources was taxed at a higher rate than electricity domestically generated from renewable energy sources in Finland. This sentence rendered it even more difficult to exempt electricity from renewables from electricity taxation. But it was stated that not even the possibility of proofing that the electricity was generated from renewables was eligible which may be interpreted as a possible solution. Hence, a network called Renewable Energy Certificate System (RECS) is currently carrying out a pilot project to establish such a certificate system on which all participating countries could rely (http://www.recs.org). This appears to be a prerequisite for trading renewables, but also for treating them preferentially from a fiscal point of view.

There are many more legal problems involved and particularly countries at the forefront in Europe have a long (and often bad) experience with respect to extending environmental taxation. Examples are that Denmark was neither allowed to tax kerosene on flights of commercial carriers, nor to tax at least the fuel consumption of its domestic ships and ferries.

State aid poses another particular problem for countries who wish to go ahead. Here, clear guidelines and practice from the European Commission are required to ensure that Member States of the EU are not facing problems when applying reduced tax rates for energy-intensive branches which might otherwise reallocate abroad. As long as no sufficient international harmonisation is achieved such provisions must be allowed for if forerunners shall not be discouraged. Still the Commission always asks for degressive and limited exceptions even though international harmonisation has not made real progress.

At the EU level the biggest barrier to progress is the requirement for unanimity voting on all fiscal matters thus, including those environmentally related. After the many years of fruitless discussions on an EU-wide CO_2-energy tax since 1992, there has been a new Directive proposal from the Commission on the table since 1997 (so-called Monti proposal), that (a) provides for an extension of the already currently valid minimum taxation of mineral oils to all energy sources–with the exception of renewable ones, and (b) an increase of all minimum tax rates in three stages (initially 1998/2000/2002).

Although several Presidencies tried to get the Council to adopt this proposal, it failed until now. Cohesion states in particular, mainly Spain and Ireland, have come out against the Commission proposal. As a result in the first half of 1999, the German Presidency for its part, has attempted to identify the specific problems that the individual states have with the proposal, and to point out correspondingly specific solution approaches in a compromise paper (http://www.oeko-steuer.de). Specific often means that exceptions and interim periods are authorized in order to achieve a way in at EU level. However, a breakthrough could not be achieved. This means that 13 of the 15 countries are in favour. The negotiations are proving to be very difficult, and, because of the consensus principle, it is hardly foreseeable how a compromise can essentially be achieved about the lowest common denominator, if at all. The right of veto of one of the countries prevents EU-wide progressive energy taxation.

In the conclusion of the presidency of the Cologne EU summit in June 1999 the subject was touched upon in three points:

> "The European Council emphasises the need to make tax systems in Europe more employment-friendly and to combat harmful tax competition: Confirming the conclusions of the Vienna European Council, the European Council calls for: …the Council to continue its work on a framework for the taxation of energy on the basis of the ECOFIN Council report, bearing in mind the impact it will have on the environment" (No. 22).

> "The European Council also considers an appropriate framework for energy taxation to be necessary and urges the Council (Economic and Financial Questions) to reach an early decision in the course of its discussions. The European Council takes note of the incoming Presidency's initiative to step up the Community's activities on climate matters." (No. 31)

> "It calls upon the Council …(Economic and Financial Questions)…to report back to it in 2000 on the integration of environmental issues and sustainable development into each of the policy areas." (No. 32)

Behind it are concealed in part very different initial situations. How is one to deal with the fact that we are indeed talking about an EU-wide energy taxation, but the energy policy and also the energy mix in the individual Member States differ widely on occasions? Would it make sense to start with the uniform minimum taxation of products that are used in similar ways in most of the countries, such as petrol and diesel, and possibly also electricity?

In December 1997 a consensus for a code of behaviour with regard to company taxation was made. Why should something similar not be possible in relation to energy taxation? The Monti proposal can also be interpreted as such a behavioural code, since on the one hand it stipulates a minimum taxation, but on the other hand it makes no stipulation for the structure and maximum rates. Sometimes it is easier if the thing is called by another name. Perhaps the latter would be an approach for making progress EU-wide.

At the same time, the so-called "like-minded" countries, should include their previous meetings and at least come to closer co-ordination of their next stage of ecological tax reform. As a result, problems that might otherwise arise for the economy could be reduced. Even the exemption from the electricity tax for renewable energy sources aimed at for Germany and other countries could happen much more elegantly and simply if all the pioneer states could decide on a similar procedure.

As part of the next intergovernmental conference on the further development of the EU Treaty the subject of consensus about tax regulations, especially of environment policy relevant decisions, will certainly be on the agenda again.

Moreover, one should not only cast one's eyes in the direction of energy taxes. There are several dozen other types of eco-taxes on various substances and activities that could also be subject to taxation. So there is very vague consideration by the EU Commission about taxation on pesticides and/or fertilizer.

I. Institutional Approaches, Capacity Building

An institutional approach of how to overcome various barriers has been the setting up of an ETR-Commission. These commissions often helped to shift the focus from ETR only to subsidies and other provisions which are potentially environmentally damaging. Hence, "Green Budget Reforms" (GBR) are increasingly considered, taking into account all environmentally relevant fiscal activities of a state. They are particularly valuable if the political will for continuous efforts of greening the budget is given. If political will is lacking it also renders implementation very difficult although a commission may have been set up (Japan, Canada, USA, Ireland). The following table 3 provides an overview.

Table 3. Details of Ecological Tax/Budget Reform Commissions

Country	*Date of introduction*	*Environ-mental taxes*	*Recycling revenues*	*Damaging subsidies*	*Other damaging effects of fiscal reform*	*Within the context of broader tax reform*
Austria	1998	+	+	+	+/?	**+**
Belgium	1993	+	+	–	–/?	**?**
Denmark	1993	+	+	–	–	**+**
Ireland	1996/97	+	+	–	?	**?**
Netherlands	1995/1990*	+	+	–/?	+	**+**
Norway	1994/1990*	+	+	+	+	**+**
Sweden	1995	+	+	–	+/?	**+**
U.K.	1998	+	+	–	–	**+**
Canada	1994	+	+	+	+/?	**?**
Japan	1994	+	+	–	–/?	**?**
USA	1993	+	+	+	+	**+**

Source: Schlegelmilch (1999a).

Note: + = considered;–= not considered; ? = unknown or unclear; * = earlier commission existed in this year

Comments:

(a) Austria: Though environmental taxes were examined as part of a major tax reform, no implementation of either results of the Commission took place due to forthcoming elections. The report was published at the end of 1998 (http://www.bmf.gv.at).
(b) Belgium: So far, packaging taxes appear to be the focus of the Commission.
(c) Denmark: Commission facilitated the implementation of an ecological tax reform; strong political commitment.
(d) Ireland: Initially almost no information was available as it was a purely inter-ministerial committee, but it published a report with several deliberations mid-1999.
(e) Netherlands: Commission helped to accelerate implementation and acceptance of environmental taxes. A summarising report of all three Commissions is available, dated 1998.
(f) Norway: Commission made concrete proposals for ecological tax reform, taking into account the employment issues. The Commission released a report on its work in 1997.
(g) Sweden: Commission did some macroeconomic modelling and came up with concrete proposals.
(h) U.K.: The results of the consultation paper by Lord Collin Marshall (1998) prepared the floor for the announcement of the introduction of a tax on industrial energy consumption for 2001 by the Finance Minister, Gordon Brown.
(i) Canada: Commission ended its discussions due to a disputed range of approaches and recommendations; hardly any implementation as a result.
(j) Japan: Commission promoted the use of economic instruments, particularly environmental taxes; a summary of the report is available in English.
(k) USA: general fiscal considerations within a broader approach, of which the environment is one of several issues. A report was published in 1997.

J. Procedural Aspects

Considering the procedure how ecological tax reforms are implemented, the United Kingdom, apart from the abovementioned Commissions provides useful guidance.

Of particular interest is the extremely transparent and open procedure by which this political decision to introduce a tax on industrial energy consumption was arrived at. At the beginning of 1998 the Chancellor of the Exchequers, Gordon Brown, commissioned Lord Collin Marshall, the former president of the Confederation of British Industry (CBI) and currently chairman of British Airways, to investigate which economic instruments would be most suitable for lowering industrial energy consumption. Lord Marshall then published a consultation paper containing many questions, which was also placed on the Internet, addressed to interested specialists in general, and asking for answers to be given to the questions. These were mainly concentrated on whether an energy tax or an emissions trading would be more suitable for reducing the greenhouse gas emissions. Until July 1998 anyone could deliver an opinion on the subject. In spite of this "world-wide" publication, the Wuppertal Institute for Climate, Environment and Energy, Germany, was the only foreign institute to comment. In November 1998 Marshall then delivered his report to the Government, stating "Hence, my conclusion is that there probably is a role for a tax if businesses of all sizes and from all sectors are to contribute to improved energy efficiency and help meet the UK's emissions targets." (Marshall, 1998). Report and recommendations were then considered by Gordon Brown and his team. In a budget speech on 9 March 1999 he announced the introduction of a tax in April

2001, mentioning several details of the tax which was is also named climate change levy (CCL). This is two years prior introduction that the Chancellor delivered a report specifying the legal, administrative and economic questions that would have to be answered about the organization of the CCL. Anyone who wished to respond could do so by 28 May 1999. After intensive consultations with industry the Chancellor announced on 9 November 1999 the concrete rates which were substantially reduced against the initial plans. Though industry is not in favour of this tax, it recognises the transparent and open process.

A less positive example is Slovenia. It introduced a CO_2 tax in 1997 as the first EU accession candidate. Its price effects varied between three and eleven per cent. At the beginning of 1998 it tripled, which caused small disgruntlement in trade and industry. The particular reason for this was the unexpected increase and the way the tax revenue was applied. As in 1997, the tax was increased unannounced, so that no one had been able to anticipate the increase with the corresponding investment and consumer behaviour. Furthermore, the revenue was not returned to trade and industry as a whole, but used clearly and specifically for the investment in filters of a refinery.

The Central and Eastern European (CEE) countries still have a ways to go in order to increase the proportion of environmental taxes and their public acceptance. In many of these countries the grounds for comprehensive ecological tax reform are not yet prepared, e.g. in the Czech Republic. This may be due to a lack of interest in general politics, but also a lack of discussion of environmental issues and thus a lack of environmental awareness. In western countries it took about 30 years to come to the level of common understanding on the high necessity for environmental protection, but CEE countries have to run through all these phases in a very densed time.

This is very important since the envisaged accession to the EU requires to increase energy taxes anyway. Thus one side of the reform is foreseeable and the challenge is to use this pressure from the EU to implement a broad ecological tax reform which finds acceptance. Now is the unique opportunity to establish the correct general conditions to avoid repeating the undesirable trend of the western states with regard to providing the wrong incentives. Still, the frame for additional environmental taxes is not so bad is it might sound like. Many charges and fees are already levied in CEE countries for a long time (Annex II).

IV. CONCLUSIONS

Greater use of environmental taxes. The fact that environmental taxes are used increasingly more, recently also by large European countries such as France, Germany, Italy, and the United Kingdom, shows that the reasons for their application are convincing. Hence, it is likely that more countries and finally also the EU as a whole will follow sooner or later.

Greater coordination and harmonisation. However, there was hardly any coordinated harmonisation and compatibility at the EU level. But factual pressure for following this approach is increasing. At least joint initiatives of like-minded countries, which are in the meantime the vast majority of all EU countries, are likely to emerge if no action is taken on the EU level. Accession candidates could be part of such initiatives in order to soften possible negative effects on trade and border transactions, and to spur their economies directly towards sustainability.

More incentives for industry. Amongst countries at the forefront the need remains to better harmonise the often very different ways of taxing industry at a lower rate. In significant contrast to this general feature, the United Kingdom will introduce a tax on industrial use of energy only which will prepare the ground for a generally higher taxation of industry, at least if several environmental agreements - now being the favourite instrument for this sector - should turn out not to achieve agreed targets.

More and better evaluation. While the theoretical evaluation of environmental taxation is a well developed field, and adequate evaluations of practical experiences with such taxes is increasing, often the quality is still not so good. However, it has improved and it is well possible that this fact is owed to the methods of evaluation reaching limits due to several constraints. The need to integrate evaluation with tax design has been recognised by OECD, which has agreed on methodological guidelines for economic instrument evaluation. Still, apparently these are hardly followed, or at least it is seldom referred to.

More research - especially of policy packages and externalities. Environmental taxes often work best when part of a policy package aiming at addressing one (or more) environmental problems, but the interaction of several policy tools is then complex. Further analysis and understanding of these issues could be helpful for future policy making. Particularly worthwhile would be the further development of the

OECD framework and its application. Of major interest would be assessing the evaluations since qualities and methodologies differ substantially. More research is clearly needed, but sufficient is already known to justify much further policy development on environmental taxes.

Conclusions for Least Developed Countries. The overall aim of an environmental policy should be to increase efficiency of the use of resources as they are particularly scarce in these countries. Copying the concepts of an ETR from developed countries would likely not be appropriate, but rather make ETR disreputable as the conditions are quite different from developed countries. However, some general ideas can and should be tested and applied in these countries, not at least because these indirect taxes are less vulnerable to tax fraud.

A very first step would be to make people pay for environmental services such as the provision of clean water, sewage, waste infrastructure, transport infrastructure. However, this does immediately raise the issue of the effectiveness of administrations and concerns about corruption. The situation is not rendered easier by the fact that mostly wealthy people have access to such environmental infrastructure which mostly also are part of the governing society, thus being more hesitant to charge themselves. However, a modest surplus only could be used to extend the network of water and sewage pipes to quarters which are not yet connected.

Another element that can be adopted to national circumstances would be the elimination of environmentally damaging fiscal provisions in existing taxes and expenditures. The introduction of tax differentiations such as for leaded and unleaded fuels has turned out to be a very effective instrument in developed countries if alternatives are at hand. This should even be the easiest way to start with an enhanced use of economic instruments for environmental protection.

Whereas the perspective that concerns individual countries in Europe is very promising, the opposite holds true at the EU level and in other developed countries. Not at least due to the dynamic that is increasingly taking place in Europe one can guess that ETR will soon be accepted even more broadly. To close with a saying of the French author Victor Hugo: “Nothing is so powerful as an idea whose time has come.”

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ANNEX I

Designs of Ecological Tax Reforms in Denmark and the Netherlands

Denmark

After a CO_2 tax for households had been introduced on 15 May 1992 and for industry on 1 January 1993, this CO_2 tax was embedded in an ETR of wider scope. This was modified in 1996 and is at the moment in place until the year 2000. In 1999 an evaluation was made of the experience gained until then, which confirmed that this system basically worked and had produced the desired results. Only the administrative costs connected with the energy audit needed to be reduced.

The ETR of 1994 included various eco-taxes. Here only the taxes on energy, CO_2 and sulphur (the latest basis for assessment was only set up in 1996) are referred to. Conceptually, particular attention was paid in Denmark to safeguard companies' competitiveness, depending especially on the energy intensity of the production.

Thus the energy tax is refunded up to 100% to the company is refunded. The CO_2 tax is refunded up to at least 50 per cent. The rate of tax moreover depends on a ratio formula worked out from the proportion of energy tax and the net product. To put it very simply: the greater the proportion of energy tax on the net product, the larger the share of CO_2 tax refunded.

To put it in slightly exaggerated terms, this resulted in the incentive for legally taking operating units out of store being so strong that these were widely excepted and the remaining operating units no longer had any substantial energy consumption. The revenue decreased and the ecological aim went amiss–similar incentives are also contained in the organization of the first stage of the ecological tax reform in Germany, which must be abolished in the third stage at the latest.

The reform that came into force in 1996 should plug the gaps contained in the 1994 ETR concept. In addition, things were no longer geared to the legal unit of the company, but to operations, and within them to the use of energy for space heating and the type of production process. (Danish Ministry of Finance 1995; Luhmann 1996). Since then, energy intensive processes have been defined by two criteria: the tax burden must be more than one per cent of turnover and three per cent of net product. A (definitive) list of a total of 35 production processes was drawn up on this basis, to which a reduced CO_2 tax rate is applicable. In addition, the effective tax rates for companies were modified depending on whether they participated in an energy audit or not. Since 1998, the rate of taxation for space heating, after an introductory phase and transition since 1996, is that of non-companies. In all there are 5 different tax rates for companies in Denmark. Comparing these values with each other, three characteristics are established:

(a) The spread of tax rate between the cases "with" and "without" energy auditing increases significantly with time–this a strongly effective behavioural factor in the 96 reform.

(b) From 1996 to 2000, for energy intensive processes, only those tax rates that became due through refusing to participate in energy auditing are increased, so the increases are avoidable.

(c) A type of indexation to keep the real value of the only nominally constant tax rates stable was not chosen. Thus the tax rates are exposed unprotected to a decline through inflation.

The tax burden per unit energy source between companies and non-companies varies depending on the energy intensity by more than a factor of 100. As a result, Denmark clearly differentiated the tax rates for energy consumption between companies and households/state. In addition, pressure to act was applied, in that all companies not carrying out an energy audit are increasingly burdened for energy intensive processes, and are more and more heavily burdened for other processes as such without energy auditing (Schlegelmilch 1998b).

This concept of the ETR in Denmark is a tailor-made one, since competitiveness is taken into account as closely as possible by being geared to the process level. In principle, such a structure and approach is a possibility for future stages of the ecological tax reform in Germany.

The Netherlands

After the Netherlands introduced increased eco-taxes some years ago (e.g. a groundwater tax), they brought in an energy tax (regulatory energy tax) at the beginning of 1996, which is generally seen as the nucleus of an ETR. An energy tax was imposed on light heating oil, natural gas, LPG and electricity, based on the example of the original 1992 EU proposal. Fuels are not additionally taxed, since they are burdened anyway via the mineral oil tax, which is adjusted annually to the rate of inflation. The new CO_2-/energy tax rates were increased to three times the starting rate from 1996 to 1998 in accordance with the 1992 EU proposal. Since the start of 1996 electricity has been burdened with the retail tax rate. As a result, in 1998 the retail price of gas for small consumers and households rose by 20 to 25 per cent, and that of electricity by about 15 per cent. The energy tax was borne mainly by households and small consumers.

Table 4: CO_2 tax rates for companies in Denmark,1996 and 2000 (DM/Gigajoule)*

Sectors	*Electricity*	*Light heating oil*	*Hard coal*
CO_2 tax: 1996			
• Energy intensive processes			
– Participation in energy auditing	0.21	0.06	0.07
– No participation	0.35	0.09	0.12
• Other processes			
– Participation in energy auditing	3.47	0.92	1.19
– No participation	3.47	0.92	1.19
• Space heating		3.71	
CO_2 tax: 2000			
• Energy intensive processes			
– Participation in energy auditing	0.21	0.06	0.07
– No participation	1.74	0.46	0.60
• Other processes			
– Participation in energy auditing	4.72	1.26	1.62
– No participation	6.25	1.67	2.15
• Space heating		11.12	

Source: Danish Ministry of Finance (1995, 13).
*The average SO_2 tax is already included in the figures.

Table 5: Regulatory Energy Tax Rates in the Netherlands

Energy sources (in DM/GJ)	*1996*	*1997*	*1998*
Natural gas	0.85	1.71	2.54
Electricity	7.21	7.21	7.21
Light heating oil	0.08	0.17	0.25
LPG	0.64	1.28	1.92

Source: Dutch Ministry of Housing, Spatial Planning and Environment 1996 (converted to DM/GJ)

In order to preserve international competitiveness, a consensus policy was agreed to organize tax as follows, so long as other neighbouring states such as Germany are not ready to draw even. Hothouses are only charged with the electricity tax. As a countermove, these must undertake to increase their energy efficiency by 50 per cent between 1980 and 2000. This should prevent relocation of production facilities and job losses.

So as not to overburden lower income groups excessively, tax-free allowances of 800 kilowatt-hours and 800 cubic meters of gas were introduced, on which neither households nor companies needed to pay tax. In order not to tax bulk consumers too heavily (rather a permanent tendency in competition), at the beginning (i.e. actually between 1996 and 1998), quantities over 170,000 cubic meters of gas and 50,000 kilowatt-hours of electricity were also exempted from the tax. Other minor adjustments were also made. However, according to information from the Netherlands Finance Ministry, the complete gas and electricity consumption by households and about 95 per cent of the corresponding company consumption are affected by the tax. A drop of five per cent is expected in CO_2 emissions by the year 2000 because of the taxation on consumption.

In 1998, the government noticeably raised the tax-free limits on the basis of the third and final report of the eco-tax reform commission. The limits up to which electricity and gas are taxed were increased from 50,000 kWh of electricity to 10 million kWh and from 170,000 cbm of gas to 1 million cbm respectively.

The expected revenue of 2.1 billion NLG in 1998 was refunded in proportion to the revenue to households (less than 60 per cent) and companies (more than 40 per cent). For this purpose the income tax for households was changed at three points: (1) the entry tax rate was reduced by 0.6 per cent, (2) the tax-free subsistence level minimum was increased by 80 NLG and (3) tax allowances for senior citizens were increased by 1 per cent.

Furthermore, employers' social security contributions were decreased. Small companies are able to claim higher tax reliefs, and the corporation tax was reduced by three per cent over the first 100,000 NLG. Lastly, the regenerative energy source operator obtained a full refund, and is thus exempted from the tax. Over the next three years the Netherlands doubles the tax rates introduced between 1996 and 1998 again.

ANNEX II

Environmental Taxes in Central and Eastern Europe

The opportunities for a comprehensive introduction of eco-taxes (and economic instruments in general) in Central and Eastern Europe are unique for many reasons–quite apart from the reasons not yet adduced here, which also argue in favour of its introduction in the west:

(a) In the first place, the social and economic systems are in a radical state of change in any case towards a strong free enterprise system. It only depends on influencing the direction of this change towards a forward-looking society.

(b) In order to meet the requirements for entry into the European Union (the so-called "acquis communitaire"), many rules, laws and also tax regulations, such as minimum tax rates for several mineral oils, must be adopted.

(c) Achieving the Kyoto target also requires efforts from the joining countries that should be managed as cost-effectively as possible.

(d) The integration of ecological aspects into all other policy areas got a very high priority through the Amsterdam Agreement that came into force on 1 May 1999 and the last and next EU Summit, so that the joining countries must also be appropriately active in this matter, particularly if they hope to join that much sooner.

(e) With the environment policy based strongly on market economy instruments, there is an opportunity, on the one hand to go increasingly for dynamic incentive effects and with them more cost-efficient solutions and moreover speed up the conversion of the regulatory law. At the same time the integration of environmental aspects into other policy areas could be accelerated. This would, in particular, provide the opportunity not to repeat the errors in the west but to go instead as a priority for integrated environmental care instead of predominantly "end-of-the-pipe" technologies. Finally the structures for the next decades are being set up there, that will determine very decisively the production and consumer patterns and with them the environmental consumption.

(f) As a result the overall entry of the Central and Eastern European States into the EU be noticeably less expensive than earlier assessments assume. These are based on the acceptance of the assumption that the EU environmental policy in the fields of water, air and refuse, based in the main on the disposal of harmful substances. Costs would run to 120 billion DM on estimate. With their reduction, the costs for present and future Member States would fall, and with them the pressure on their public budgets.

(g) With entry into the EU, those countries that up to now to a great extent support very environmentally harmful industries and manufacture must drastically reduce subsidies, probably after periods of transition. This reduction is required on ecological, fiscal and legal competition and EU legal grounds, and can be accepted politically relatively easily by the entry process.

(h) Positive effects on employment can be assumed, not least because often old industries are kept alive by subsidy payments, their contributions to employment are low and will be even lower in future because of mostly declining importance. At the same time, funds will be freed up to offer tax relief to innovative companies.

(i) An EU consisting of 25 Member States is hardly governable under the principle of consensus. It is therefore not improbable that a at least a qualified majority (3/4) will be agreed on. But then it will depend decisively on building up sufficient coalition partners for voting on eco and energy taxes. The Central and Eastern European states are absolutely predestined for this. However, the extension of the harmonization principle must first be agreed by consensus. And here there could be a high political price to pay (and that also probably means economic).

Expectations for a clearly stronger use of economic instruments in Central and Eastern European states are indeed high. When you look at table 6 below, it is evident that these will be fulfilled. However, various organizations leave a lot to be desired in terms of efficiency. Thus, on the one hand, not all markets are fully functioning, to allow the price signals to come into effect. Adequate privatization and deregulation is therefore prerequisite. At least the first step, that is to say the complete shifting of administrative costs onto prices has been taken in most countries. This is not always quite the case in the areas of energy and transport. Other important social and political constraints cannot be addressed at this point. Instead, an incomplete mention of some aspects must suffice. Environmental awareness, responsibility for the environment is the state's affair, lack of experience with a decentralization process, new institutions and responsibilities (Klarer and Moldan, 1997).

An internationally accepted approach for combating environmental problems was presented as part of an environmental action programme for Central and Eastern European states in Lucerne at the beginning of the 1990s, emphasizing the importance of economic instruments. The countries did indeed take in the message, but the focus of most eco-taxes is on clearly achieving the greatest possible revenue, that–often via environmental funds–can be used specifically for the environment. Table 6 gives an overview of the present application of economic instruments Central and Eastern European States.

Table 6: Overview of some economic instruments in Central and Eastern European States

	B&H	*BUL*	*CRO*	*TR*	*EST*	*HUN*	*LAT*	*LIT*	*MAC*	*POL*	*ROM*	*SR*	*SLO*	*YUG*
Air emissions														
- Emissions tax				•	•		•	•		•		•		
- Residual pollution tax*		•	•	•	•	•	•	•		•	•	•		•
- CO_2 tax													•	
Water pollution														
- Sewage tax			•	•	•		•	•		•	•	•	•	•
- Residual pollution tax		•	•	•	•	•	•	•		•	•	•		•
- Sewage charges		•	•	•	•	•	•	•	•	•	•	•	•	•
Refuse														
- Communal refuse charges	•	•	•	•	•	•	•	•	•	**?**	•	•	•	•
- Refuse taxes				•	•		•			•		•		
- Residual pollution tax		•	•	•	•	•	•	•		•		•		•
- Deposit regulations for drink packaging	•		•	•	•	•		•		•	•	•		•
Refuse related product taxes														
- Fuels						•								
- Packaging material					•	•	•			•				
- Batteries/Accumulators						•	•							
- Refrigerators and coolants						•								
- Lubricating oils						•	•							
- Car tyres						•	•							
- Ozone damaging substances (CFCs etc.)												•		
- Mineral oils							•							

Table 6. (continued)

	B&H	*BUL*	*CRO*	*TR*	*EST*	*HUN*	*LAT*	*LIT*	*MAC*	*POL*	*ROM*	*SR*	*SLO*	*YUG*
Transport														
- Lower tax rates on lead-free petrol	•	•	•			•			•	•	•	•	?	
- Higher import duty on cars without catalyzers	•			?		•		•	•	•	•	?	?	
- Road tolls			•	•		•	•		•			•	•	?
- Noise/air pollution taxes in air traffic				•										
Nature conservation and biodiversity														
- Nature conservation residual pollution taxes		•	•		•	•		•		•		•		•
Natural resources and raw materials														
- Raw material taxes and transport charges			•	•	•	•	•	•		•				
- Water tax		?	•	•	•	•	•	•	•	•	•	•	•	•
Other														
- Income tax/VAT reduction for environmental technologies		?		•	•	•	?		•	•	•	•	?	•
- Reduced import duty on conservation technologies		•	•	?	•	?	?	?	•	?	•	?	?	?
Environmental funds [2]														
- at national level		•		•	•	•	•	•	•	•		•	•	•
- at regional level					•					•				
- at communal level		•						•		•				
- Funds for debt relief for nature conservation measures		•								•				

Source: Klarer (1999), author's translation.
***Notes*:** B&H = Bosnia and Herzegovina; BUL = Bulgaria; CRO = Croatia; CR–Czech Republic; EST = Estonia; HUN = Hungary; LAT = Latvia; LIT = Lithuania; MAC–Former Yugoslav Republic of Macedonia; POL = Poland; ROM = Romania; SR = Slovak Republic; SLO = Slovenia; YUG–Federal Republic of Yugoslavia; ? = unclear if such instruments are in use at present. Comment: (i) Only those raw materials taxes and transport charges that have been introduced on environmental grounds, or whose revenue is spent at least in part for environmental purposes are listed. (ii) According to different classifications, environmental funds are viewed as environmental policy economic instruments and are therefore included here. (iii) Residual pollution tax means that only a part of the emissions that exceeds a specified limit is subject to tax.

The table shows that emission taxes and residual pollution taxes–most linked to limiting values set by law–come into use very frequently. Product taxes on the other hand are only used in isolated cases. The ratio of these types of taxes is reversed in the OECD. Moreover, the taxes in Central and Eastern European states mostly contain a large variety of harmful substances, which complicates their administration. They often still result from the start of their use in the 1970s and 1980s when efficiency was no criterion in the policy of a planned economy. On the whole, higher rates had the effect of drawing level with inflation. Eco-taxes served mainly to procure money for environmental measures. The associated subsidy payments were relatively effective. Residual pollution taxes, which should have resulted in limiting values being kept to, were in fact far too low to have the appropriate effect.

That is why there is a great potential for introducing eco-taxes that are independent of limiting values and that have a strongly incentive-oriented function. Considerably more use could be made of other economic instruments such as deposit regulations and emission certificates in addition to eco-taxes as part of an appropriate mixture of instruments. In the end, it is only in this way the "level of the playing field" can be changed. The entry into the EU aimed at by the Central and Eastern European states should, like the target of new initiatives from different sides, be used to integrate environmental policy with other policy areas, to make considerably greater use of economic instruments in the EU than before and thus reduce the estimated costs of entry.

An overview of the use of environmental taxes by accession candidates is described in more detail below. Environmental policy in the accession candidates is often underestimated. In a recent survey on 'Economic Instruments for Pollution Control and Natural Resources Management' the OECD OECD (1999, 77) comes to the conclusion: "The accession countries apply environmental taxes and charges to a significant level. The Czech Republic and Poland appear to have full-grown charges-cum-subsidy schemes which play a structural part in bringing environment investments to substantially higher levels (in particular in the context of environmental funds). The number of pollutants in the charge schemes is larger than found on the average in the OECD countries. Hungary is operating many environmentally-related taxes." The following more detailed remarks are based on Peszko and Klarer (1999, 127-141 and 202-216).

Emission charges and non-compliance fees are very extensively used in the accession candidates. In the past they often took the form of fees, non-compliance charges and fines and have been closely linked to environmental facility permits. The emission charges applied are mostly very comprehensive. Each charge covers as many as 200 pollutants, for example in the case of the Polish charges. Here, all emissions are subject to fees, and exceeding the maximum hourly emission rate set in the authorisation, if detected, is subject to fines, which are generally ten times higher than the corresponding fees (Pototschnig, 216).

The extensive use of emission charges and non-compliance fees in Central and Eastern Europe originates in the 1970s and early 1980s. In the economic and institutional context of centrally planned economies, charges did not play an effective incentive role. The major function was to raise revenue into earmarked funds (national and local), because subsidies often constituted the only effective enforcement tool in the hand of environmental authorities at that time. After transformation started, it required political strength to defend and develop the charge level under new economic conditions.

Product charges are less often used, but they can be considered to be the emerging set of new instruments. Product charges are applied in Hungary, Latvia, Estonia and Slovakia, being most extensively used in Hungary where no emission charges are in force.

Since 1990 a number of product charges have been introduced in Hungary. First, in 1992, an environmental charge was levied on the sales of gasoline. According to the Hungarian Environmental Framework Act of 1995, the purpose of the existing levies is "de facto to create revenue for subsidies that can be used to lure polluters into compliance" (Lehoczki 1999, p.159). In 1995, after long negotiations, four new product charges were introduced. These charges are levied on the sales of tires, refrigerators, batteries and packaging materials. In addition, new or substantially revised natural resource access charges (rents on mining and water abstraction) were included in the system which includes the re-establishment of the Central Environmental Protection Fund as an extra-budgetary fund.

Although the Hungarian system is oriented to charges and subsidies, there are opportunities for an ecological tax reform. There are tax rates that could be considered as a burden for competitiveness and employment: the 25 per cent VAT rate is among the highest in Europe, the tax rate on marginal income is around 45 per cent and social contributions eat up more than 50 per cent of the gross wage. Considerations in connection with economic efficiency, OECD membership, EU accession and WTO negotiations are likely to require reduced taxation on labour. The budgetary deficit will nevertheless demand sufficient revenue for the state budget. This could create momentum to shift the tax burden on labour to the environment (Lehoczki 1999, p.160). In fact, the Hungarian government is currently considering intensively how to implement either an input or an output-based tax as part of an ecological tax reform.

The budget of Slovenia–taking also into account the expenditure side of it and thus applying a newly developed methodology–had shown a slight tendency towards a greener budget on the revenue side between 1992 and 1996 (Markovic-Hribernik/Schlegelmilch 1999, p. 293). However, in 1997, this trend was offset. A CO_2 tax, introduced in 1997 (EUR 5.5/t CO_2) and tripled in 1998 (EUR 15.5/t CO_2), and the waste water charge, introduced in September 1995, raise most of the revenues from 'bads', whereas smaller environmental taxes comprise a water charge

and water concessions, a levy for the decommission of the Krsko nuclear power plant, a duty on the use of agricultural land, a car registration fee, a road tax, tolls and a 'gasoline tolar'. Revenues from the CO_2 tax alone, though levied only on some parts of energy consumption, amount to EUR 97.3 million which equals 2.1 per cent of the central government budget. Options for tax relief are provided if capital is spent for combating CO_2 emissions (Radej 1999). Tax relief led to investment which reduced CO_2 emissions in the amount of 1.4 million tons (0.09 per cent of Slovene total emissions). Slovenia used the opportunity to adapt its tax system to EU standards and increased the tax on electricity by 9 percentage points.