GENERAL DISTRIBUTION

OCDE/GD(94)42

CENTRE FOR CO-OPERATION WITH THE EUROPEAN ECONOMIES IN TRANSITION

TAXATION AND ENVIRONMENT IN EUROPEAN ECONOMIES IN TRANSITION

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Paris 1994

FOREWORD

The use of economic instruments for environmental policies, including environmental taxes, charges and fines, is increasing in OECD Member countries. Such instruments promise greater efficiency and flexibility than the regulatory instruments currently in much wider use.

Similarly, the use of economic instruments is expanding in Central and Eastern Europe in the context of the new policies for taxation and environment. Although many countries in the region adopted charges and fines for the protection of the environment in the 1980s, these fines and charges could not create an adequate incentive in the centrally-planned economies to reduce pollution. In the transition to market economies, the new governments of the region are updating existing tax and charge systems and debating a greater role for economic instruments in their environmental policies.

On 25-26 February 1993, a workshop on taxation and environment issues was held as part of the programme of work of the OECD's Centre for Co-operation with the Economies in Transition. The workshop, hosted jointly by the Directorates for Financial, Fiscal and Enterprise Affairs and Environment:

-- provided an overview for Central and Eastern European countries of the issues that arise in using tax instruments to achieve environmental objectives;
-- examined the scope and opportunities for implementing "eco-taxes" in Central and Eastern European countries; and
-- considered case studies drawn from the experience of the Central and Eastern European countries and recommended policy options.

Representatives from thirty-three countries, including from fourteen economies in transition, participated in the meeting. Seven international and non-governmental organisations were also represented.

This monograph contains the four case studies presented at the workshop, that is those related to Poland, the Russian Federation, Hungary, and Estonia. These case studies are introduced by an overview of common problems and issues regarding the use of environmental taxes in economies in transition. The Rapporteur's Report of the workshop is also included.

The opinions expressed are those of the individual authors and do not necessarily reflect the views of their institutions or of the OECD. This monograph is published under the responsibility of the Secretary-General.

Salvatore Zecchini
Assistant Secretary-General OECD
Director of the Centre for Co-operation
with the European Economies in Transition

TABLE OF CONTENTS

PAGE

EXECUTIVE SUMMARY

Environmental taxes are increasingly used in OECD countries as a cost-effective and flexible policy instrument. A recent OECD study concludes that environmental and tax policies not only should be made compatible, but also mutually reinforcing (OECD, *Taxation and the Environment: Complementary Policies*, Paris, 1993). This experience indicates that tax instruments can also provide "a rich seam of economic efficiency" for countries in transition to tap for their environmental policies. Nonetheless, the countries of Central and Eastern Europe face many challenges in adapting existing environmental tax systems to the conditions of emerging market economies and to the goals of the new environmental policies.

Many transition countries have inherited systems of environmental taxes and charges from previous planned economies. These systems did not provide any incentive to reduce pollution, because, under central planning, enterprises were protected from the risk of bankruptcy, facing only "soft budget constraints", so they could pay fines environmental and charges without regard to the cost. In addition, state-owned enterprises in planned economies were often able to evade environmental requirements through negotiation.

Countries in transition face several difficulties in adapting existing environmental tax systems. First, problems arise from the economic, legal and administrative constraints inherited from central planning. In some countries, the inefficient organization of the agencies responsible for administering and enforcing environmental policy is largely unchanged, and no decisive break has been made with the tradition of case-by-case negotiation between government and enterprises. Many enterprises, too, remain state-owned, without a clear objective of profit-maximisation; such enterprises are likely to respond poorly to market incentives for pollution control. In addition, many enterprises, even after privatization, lack information on technological options for pollution control and their associated costs and benefits, which hinders their response to economic instruments. These problems limit the incentive role of economic instruments.

There is a second set of problems that arise from the period of transition itself. Government personnel may lack key administrative skills because government agencies are unable to offer salaries competitive with the private sector, and because of the overall shortage of those economic, financial and accountancy skills necessary for tax administration in an market system. These administrative problems suggest that tax approaches to environmental policy may be most attractive where they reduce the requirements for administrative resources. Fiscal instruments are likely to be less attractive, or to have no clear advantage over regulatory policies, where they require similar administrative operations. Taxes levied on measured emissions are unlikely to be effective during the transition phase, but introducing environmental incentives into taxes which have to be levied anyway (such as taxes on goods and services) may be a way of making the most of limited administrative resources. Also, environmental taxes can provide a useful source of revenue for financing environmental protection activities in the transition.

A third group of issues has to do with the possible interaction of environmental taxes with the processes of economic and industrial restructuring in transition. For example, effective taxes may increase enterprise bankruptcies in a period of severe economic problems. In addition, the economic problems of the transition limit the use of economic instruments: many enterprises retain monopoly power, which will erode the incentive effect of environmental taxes and charges; and high inflation can quickly reduce the weight of environmental taxes and charges. Overall, in many countries in transition economic and institutional uncertainty curtails the potential incentive effect of tax instruments -- uncertainty about future institutions and rules, about future equilibrium levels of the main economic variables such as relative prices and interest rates, and about the rights and responsibilities of different

economic agents with respect to pollution. In this context, the financial dimension of tax instruments will be more prominent than the incentive one.

Four case studies demonstrate that environmental taxes retain a financial rather than an incentive effect in economies in transition -- and are likely to continue this revenue-raising role for some time. Economic constraints, for one, make it difficult to consider raising pollution charges and taxes to those levels necessary to create an incentive effect to reduce pollution. This is true even in Poland, where tax and charge rates are among the highest in the world, though still distant from incentive levels: further increases in these rates would be onerous for many enterprises. The Polish case study suggests that a limited introduction of tradeable permits could increase the efficiency of environmental policy. Estonia first used environmental taxes and charges in the late 1960s; now, however, these are taking a more prominent role. In particular, when Estonia introduced its national currency in 1992, bringing monetary stability, the role of environmental taxes increased. This case demonstrates the importance of macroeconomic stability for the development of environmental policy. In Russia, high inflation and economic uncertainty have made the operation of environmental taxes particularly difficult. Nonetheless, the new tax system, introduced in 1992, may provide a basis for future developments.The main economic instruments in Hungary, in contrast to the three other countries, are penalties; as yet, a tax system has not been introduced.

The case studies, though they focus on four very different countries, reveal a number of important common issues concerning the use of environmental taxes. For all four, the use of environmental taxes or charges started under central planning, and these systems are being re-examined and adapted in the transition period. Common problems include the excessive complexity of charge systems and the lack of effective monitoring; often, charges are not directly tied to actual emissions. In all four countries, including Poland, where tax and charge rates are highest, economic instruments appear to have a limited incentive effect at best; their main role is that of raising revenues. Most of these revenues go to extra-budgetary environmental funds, which allocate them for environmental investments. In the transition period, enterprise resources and government budgets are severely constrained, and the environmental funds play an important role in financing environmental expenditures.

Despite the many problems, environmental taxes promise a mechanism for countries in transition to integrate economic and environmental policies. With judicious use and appropriate reforms, environmental taxes and charges provide an opportunity to pursue and effectively integrate environmental objectives in the economic restructuring process.

WORKSHOP ON TAXATION AND ENVIRONMENT IN EUROPEAN ECONOMIES IN TRANSITION: RAPPORTEURS' REPORT OF THE DISCUSSIONS AND CONCLUSIONS

by

Steven Smith, Institute for Fiscal Studies, London
and Tomasz Zylicz, University Warsaw

OECD Experience

There has been increasing interest in recent years in many OECD countries in the scope for using taxation (and other possible "market mechanisms", such as tradeable permits, deposit-refund systems and liability insurance) in environmental policy, usually to supplement existing regulatory policies ("command and control" policies). The following tax measures have been implemented, or are under discussion, in OECD countries.

Emissions taxation. Where emissions can be measured at relatively low cost, direct taxation (or "charging") for emissions may be used, either to discourage emissions (incentive effect), or in order to raise revenues for pollution monitoring, abatement, or clean-up. In general, the latter objective has dominated, and the revenues from such taxes are often earmarked to environmental agencies or particular categories of spending.

Taxation of transport. Environmental objectives are playing an increasingly important role in policy towards the taxation of motor vehicles and fuels (petrol, diesel fuel, etc). Most OECD countries levy heavy taxes on petrol; many have recently introduced a discount for lead-free petrol. In some OECD countries, more radical changes to taxation of motoring are under discussion, including possible experiments with "road pricing" - taxes levied on road users according to the use they make of congested roads. There is an increasing awareness in many countries of the interrelated nature of transport tax decisions, public transport pricing and subsidy decisions, and infrastructure investment decisions.

Changes to the taxation of energy. A "carbon tax" (an excise on fossil fuels, according to their carbon content) has been introduced by some OECD countries, notably Nordic countries, and is under consideration within the European Community. The aim is to discourage the emission of carbon dioxide, a major contributor to the problem of global warming. At the same time it is being recognized that rationalization of the structure of existing energy taxes could also make a useful contribution to environmental objectives.

Taxation of inputs to intensive agriculture, pesticides and fertilizers, is being employed in some countries as a way of discouraging excessive use. More generally, there is an awareness that both agriculture and forestry are areas where existing fiscal measures may have contributed to "government failures".

Finally, there have been a number of other tax measures applied to particular products (e.g. plastic bags in Italy, non-returnable containers, or lead/cadmium batteries in some other countries). These measures have tended to be limited in scope; complex VAT systems tend to be costly to administer.

There are a number of key advantages and disadvantages of using market mechanisms such as taxation in place of "command-and-control" regulation: The main advantages are:

- "Static efficiency" - where the costs of abating emissions vary between polluters, regulatory policies may have difficulty achieving the efficient pattern of abatement. "Pricing" pollution (e.g. through a pollution tax) encourages those polluters able to abate at lowest cost to reduce emissions more than polluters for whom abatement is more costly, thus reducing the total cost of abatement.

- "Dynamic efficiency" - because a pollution tax is paid on any remaining units of pollution, there is a permanent incentive for innovation in more efficient pollution control technologies.

- Revenues - the revenues raised from certain types of market mechanism may constitute an additional benefit.

- Possible disadvantages, or problems requiring attention, include:

Some types of market mechanisms may be unsuitable where the location of emissions matters -- there may then be a tradeoff between the greater efficiency in abatement costs, and greater inefficiency in abatement benefits, i.e. in meeting environmental policy objectives.

The burden of pollution tax payments could harm the international competitiveness of industry --- higher taxes on industrial inputs would have a first-round impact on the international competitiveness of industry. On average this may be offset by reduction in other taxes (revenue neutrality) or by subsequent exchange rate adjustment - but industries which use a lot of the taxed input would still experience a loss of competitiveness. The possible adjustment costs and problems have led to considerable political resistance from some sections of industry.

Some environmental taxes, especially on energy, may have adverse effects on the distribution of household incomes. Experience suggests that many of the distributional problems could be met by explicit packaging of tax measures, so that compensatory reductions in other taxes were made clear to taxpayers, or even better, by direct compensations provided for those most seriously affected.

Price mechanisms have an uncertain impact on pollution quantity - but the corresponding advantage of less uncertainty about the level of abatement costs. The quantity uncertainty may be a problem where policy aims to achieve a given pollution target.

Poor "linkage" between tax base and pollution. The "ideal" pollution tax is one which is linked closely to polluting emissions, so that polluters are encouraged to take actions which reduce emissions. Sometimes, however, such an ideal tax will be too costly to administer, and the taxes that would be feasible to administer may not provide an efficiently-targeted incentive to cut pollution.

General Issues Relating to Economies in Transition

Past environmental policies in many of the transition economies have been characterized by high formal standards of environmental protection; often, the standards set out in government legislation have been more stringent than in most OECD countries. Compliance with these standards has, however, been uneven and often problematic. One important reason for this has been that environmental requirements have been included in the process of negotiation and compromise between state-owned enterprises and the planning bureaucracy, and compliance with environmental standards has been frequently sacrificed in order to ensure that enterprises achieved other goals.

Many transition economies have inherited systems of environmental taxes and charges from the previous planned economies. These have played a similar role in the system to various other "incentive" mechanisms applied to state-owned enterprises, such as excess wage taxes. They have also had similar

deficiencies. Where enterprises were protected from the risk of bankruptcy by a "soft budget constraint", incentive charges did not necessarily encourage compliance; enterprises simply paid the charges, without modifying their emissions.

To the extent that state-owned enterprises in the formerly-planned economies were able to evade the requirements of environmental policy, through negotiation, or through indifference to financial incentives, there is considerable scope for improvement in environmental performance. It was noted that using tax instruments as part of environmental policy "should allow a rich seam of economic efficiency to be tapped in the countries in transition, because of the technical and economic heterogeneity of their enterprises and the gains to be had from technological modernization when the right choices are made." (O. Godard, "Introducing Environmental Taxes in Economies in Transition: Conditions and Obstacles", p.16). In economies where major structural changes are taking place under the pressure of market forces, using environmental taxes to redirect the pressure of market forces may achieve substantial environmental improvements.

On the other hand, a number of features of the transition process make it difficult to exploit fully the potential of fiscal instruments in environmental policy in transition economies. These have to do both with features inherited from the previous planned economy, and specific obstacles related to the process of transition itself.

The previous economic and legal systems of transition economies create a number of difficulties for the introduction of environmental tax measures.

In some countries, the organization of the agencies which have responsibility for administering and enforcing environmental policy is still largely unchanged from the previous system, and no decisive break has been made with procedures of negotiation between the agencies and enterprises. Many enterprises, too, remain state-owned, without a clear objective of profit-maximisation; such enterprises are likely to respond poorly to market incentives for pollution control.

Enterprises begin from a low level of awareness of the various technological options for pollution control, and their associated costs and benefits. This is partly a result of the lack of past contact between western suppliers of pollution control and other technologies and individual enterprise managers in the central and east European economies. This creates problems for decentralized mechanisms which aim to establish market incentives for the adoption of pollution control technologies - centralized decision-makers may be better informed (or may be able to become better informed) about the range of feasible options than are individual plant managers.

There are also problems specific to the period of transition itself.

One group of problems has to do with the lack of certain types of administrative skills. Some shortages may be general - if, for example, government agencies are unable to offer salaries which are competitive with those which can be earned in the private sector. There are also likely to be shortages of certain key skills, especially financial and accountancy skills, which are important in tax administration.

Where skill shortages in the public sector are general, both tax policies and environmental policies may have to be operated in the face of shortages of administrative resources of adequate calibre. This implies that tax approaches to environmental policy may be most attractive where they reduce the requirements for administrative resources. Fiscal instruments are likely to be less attractive, or to have no clear advantage over regulatory policies, where they require similar administrative operations. This suggests that taxes, levied on measured emissions, are unlikely to be worthwhile during the transition phase, but introducing environmental incentives into taxes which have to be levied anyway (e.g. taxes on goods and services) may be a way of making the most of limited administrative resources. Is it therefore possible to

find ways in which the environment can be improved as a by-product of measures implemented for fiscal reasons?

A second group of issues has to do with the possible interaction of environmental taxes with the processes of economic and industrial restructuring involved in transition. Transition economies, indeed may experience excessive bankruptcies in the short term, as a result, for example, of the absence of adequate short-term finance to cover the liquidity requirements of transition. Restructuring, of course, may involve certain automatic improvements in environmental conditions, as for example, the oldest vintages of the capital stock, and those enterprises which were most resource-intensive, are most likely to prove unprofitable in a market economy. (Equally, however, restructuring through bankruptcy and industrial closures may leave considerable environmental problems for which no current enterprise can take responsibility - problems of contaminated derelict land and industrial plant, etc.)

Throughout the period of transition, many enterprises will retain a degree of monopoly power, and would be able to pass on any environmental taxes and charges to their customers, without modifying their pollution behaviour. Environmental taxes would, in this situation, raise substantial revenues, without achieving any environmental goals.

In some countries, the transition period, is characterized by a rapid inflation which has the effects of eroding the information provided by relative prices and decreasing considerably the efficiency of the market instruments implemented if they are not rapidly levelled up. In such situations, tax instruments should not be implemented alone but together with some other instruments related to quantities (e.g. regulations, tradeable permits etc.).

Another characteristic of the transition concerns the economic and institutional uncertainty that these countries are facing. As long as there will be uncertainty about future institutions and rules, future equilibrium levels of the main economic variables (relative prices, interest rates, etc.), and the rights and responsibilities of different economic agents with respect to pollution, the incentive effect of tax instruments will be severely curtailed. In this context, the financial dimension of tax instruments will be more prominent than the incentive one.

All of the above are, in general, reasons to be cautious about the large-scale introduction of environmental taxes during transition. However, it is possible to see arguments which point in the other direction too.

During the period of transition, decision-makers in enterprises will have to come to terms with new constraints, and new procedures for making decisions. It may be argued that during this period they may be more sensitive to the financial incentives provided by environmental taxes than they would be at a later time, when enterprise management settles down to a matter of routine. It is sometimes argued, for example, that in OECD economies, firms may not react to financial incentives for pollution reduction because they have evolved routines of management in which financial matters, and the technology decisions involved in pollution control, are made in different parts of the organization, and rarely brought together.

Generally speaking, the transition to a market economy implying prices and tax adjustment provides a unique opportunity to ensure that environmental objectives are properly integrated into the economic restructuring process (see also section 4 below).

The Experience to Date of Economies in Transition

Tax instruments are in operation in a number of economies in transition. For the preparation of this workshop, four case-studies were carried out. They provide valuable insight which is summarised below.

Like Estonia and Hungary, Poland also has a system of environmental fees established under the previous economic system (Tomasz Zylicz, "Taxation and Environment in Poland", p.36). This system of fees, now more than ten years old, had initially little impact on the environment. More recently, fee levels have been increased sharply, and this, combined with the impact of market reforms, has substantially improved its effectiveness.

By comparison with OECD experience, fee levels are high, and the fee structure is complex. There are hundreds of rates, which vary across pollutant and polluter types. Although in principle the differentiation is based on environmental and health considerations, the rates have in practice been determined on a rather arbitrary basis; in addition, various rebates and reductions, motivated primarily by equity considerations, discriminate in favour of municipal polluters and water users, and thus reduce the overall efficiency of the incentives provided by the charges.

At the current level of charges, the revenues collected in Poland correspond to 40 % of the country's substantial environmental investment expenditure. This makes a reasonable public share in this effort. Hypothetically, increasing the charges to their incentive level (i.e. roughly one order of magnitude) would result, in the short run, in revenues collected much larger that what can be efficiently spent on the environment. Switching from the current moderate rates to the incentive ones would thus reduce or eliminate the scope for earmarking in the future. Presently the charges are fully earmarked and they are disbursed through 50 environmental funds (1 central and 40 regional ones).

The Polish study points at the necessity of applying non-tax instruments in order to achieve short-run environmental improvements which are so much called for. This is where, among other measures, marketable pollution permits can play a positive role in addressing inherited sectoral and regional problems in a politically feasible, cost-effective way.

Estonia has had a system of environmental fines since the mid-1980s (Tiit Kallaste, "Taxation and Environment in Estonia", p. 57). These financial instruments were levied to provide revenues for the Estonian Fund for Nature Protection and Rational Use of Natural Resources, established in 1983, which formed part of an economic experiment, whereby Estonian experience in this area was intended to provide experience for policy-making in the rest of the Soviet Union. In practice, until very recently, the Estonian Fund remained an isolated example within the Soviet Union. The Fund was financed from administrative fines for the violation of nature protection regulations and the non-rational use of resources. In practice, fines paid by polluting enterprises, agricultural farms and army establishments for the pollution of water resources, formed the major part of the fund's revenues. These were calculated on a basis which generally reflected the costs of repairing the damage caused, and for some polluters the fines were very large. Overall, the Fund's revenues were substantial, of the order of about 1 million Roubles in the late 1980s, but this was still equivalent to only some one per cent of total spending on environmental protection in Estonia.

The Fund provided revenues to be used for compensating for the damage caused by pollution at the regional level, for investments in environmental technology, projects, scientific research, training, grants, international cooperation, etc.

From 1st January 1991 geological/extraction fees have been set for the use of natural resources such as oil shale, peat, mineral building materials and water resources. In addition, emission charges on water pollution, air pollution and solid wastes emissions were subsequently established.

In 1990, the Fund was reorganised to form the Estonian Environmental Fund, a non-budgetary republican institution with the status of a legal person. It has the task of collecting revenues and using them for supplementary financing of environmental improvement. The revenues of the fund are derived mainly from emissions charges. In 1991, 91 per cent of the Fund's revenues came from this source. Emissions charges are complex, and they are calculated according to the direct emission of some 50

pollutants to the atmosphere or water systems and with tax rates reflecting health standards. In addition to emissions charges, the Fund also derives revenues from payments for damage to natural resources, fines for excessive exploitation of natural resources and for violation of laws on environmental protection, donations and grants from state and local budgets, and profits from entrepreneurial activities. The main uses of the Fund's revenues are for monitoring the environment and natural resource exploitation, for financing environmental protection measures and the clean-up of environmental disasters, for research and development, and for the development of entrepreneurship in environmental improvement aimed at increasing the assets of the fund.

The major current problem with the system of charges was the effect of the hyper inflation which, during 1991 and 1992, has almost completely wiped out the real revenues derived from environmental charges. A political decision not to increase charge rates in line with inflation has been partly to blame for this; the concern was that the charges would have intensified the bankruptcy pressures on enterprises, or that the monopoly position of many producers, would have been passed on to consumers with no effect on producers' polluting behaviour. From 1993 new rates of the charges and fines 10 times higher (nominally) than in 1991 have been implemented. There is also expected the new law on emission charges with a provision for automatic indexing. The principles of assessing royalties will be included in the mineral resource and water laws; these are expected to include a provision for indexing too.

In the Russian Federation, the emphasis of current government policy is on macroeconomic financial stabilization, privatisation and restructuring of the national economy; environmental policy has a rather lower current priority (K.G. Gofman and A.A. Gusev, "Taxation and Environment in the Russian Federation", p. 71). The process of stabilization and restructuring may itself have both positive and negative effects on environmental protection. Integrated use of administrative and economic instruments (including taxation) for environmental management forms part of a longer-term agenda.

Nevertheless, a number of taxes introduced partly for environmental purposes are in existence in the Russian Federation. These include a land tax, payments for the right to use natural resources, contributions for mineral resources exploration and prospecting, a forestry levy, and payments for industrial water consumption. In addition, pollution charges on air and water pollution and on waste disposal have been levied since 1991-92, based on permitted pollution levels and pollution in excess of those levels. They are paid at rates reflecting the pollution damage (human health risk) caused by some 300 air pollution substances and 150 water pollution substances. Regional (local) authorities have the right to exempt polluters from these charges on the basis of the local environmental condition, economic situation, and the polluter's expenditures on pollution control. The revenues these charges raise is currently very small, and is largely distributed to state non-budget ecological funds, responsible for subsidising regional environmental protection systems (municipal sewage facilities, waste disposal and treatment facilities, regional environmental monitoring systems, etc).

The case study points out a number of problems with the current operation of these pollution charges. Current monitoring and enforcement procedures are unable to cope with the information requirements of the system, and in many cases "polluters simply refuse to pay pollution charges on the basis of their poor financial position, or denying the results of pollution discharge measurements provided by local authorities." The high inflation rate has also caused problems. Although the rate of the charges has been increased by a factor of five in the second half of 1992, this may prove to have been insufficient to prevent the kind of erosion of the system through inflation which has also been experienced in Estonia and in Poland during 1989-90.

Hungary has had a system of pollution charges since the 1970s, levied in the form of penalties for air pollution, waste water pollution, generation of hazardous wastes, and noise/vibration, and a nature protection penalty (I. Pomazi and G. Zsikla, "Taxation and Environment in Hungary", p. 84). Rates of the penalties are calculated on the basis of emissions of a large number of pollutants, at rates reflecting the

health impact of the substances, and in the case of the air pollution penalty, reflecting the duration of the emissions. Since 1991 the Central Environmental Protection Fund has collected the penalty revenues.

In addition, an environmental product charge has been levied on motor vehicle fuels since May 1992, to reflect the damage caused by the use of highly-polluting materials. Other potential applications (packing materials, lead batteries, tires, etc) may be considered later. Revenues from the environmental product charge, too, is assigned to the Central Environmental Protection Fund.

Conclusions from the Discussion and Recommendations for Action

OECD policies

The potential advantages of regulating pollution problems through pricing rather than through administrative mechanisms ("command and control") are increasingly being recognized by OECD countries. Although administrative regulation remains the principal instrument used in most OECD countries, there is a steadily growing application of economic incentive mechanisms, such as environmental taxes and charges.

The impact of fiscal policies on the environment in OECD countries extends well beyond the taxes explicitly introduced as "environmental taxes". Increasingly, policy decisions regarding the structure of other taxes (such as taxes on petrol and motor vehicles, for example) reflect environmental concerns.

The OECD Task Force on Taxation and the Environment has concluded that there are substantial gains to be made from the integration of taxation and environmental policies. Environmental taxes may provide an incentive to reduce pollution, and at the same time revenues from environmental taxes can allow to reduce other, more distortionary, taxes, such as those on labour and capital.

Integrating taxation and environmental policies requires a policy dialogue between tax and environmental policy-makers. This dialogue can help to identify areas of potential conflict between environmental and fiscal policy perspectives, and can be an important factor in designing an efficient environmental tax policy.

The Polluter Pays Principle (PPP) forms the basis of environmental policies in the OECD. The PPP requires that polluters should face the costs of their polluting activity; such costs should not, as a matter of general principle, be borne by the public purse. The objective of the PPP is to ensure efficient pollution abatement decisions. In the field of environmental taxes, application of the PPP requires that fiscal incentives should be closely linked to the pollution which the tax aims to control.

Sequencing

Economies in transition are in the process of moving from an economic system where economic decisions were coordinated by administrative means (planning instructions, inter-institutional negotiation, etc), to a system where economic decisions are coordinated through pricing. Introducing environmental market mechanisms, such as environmental taxes, in the transition economies has the potential for long-run gains in the efficiency of environmental policies. However, there are important issues to be considered, mainly about the timing of such measures. Should they be introduced now, or later in the transition process?

It is unrealistic to expect that environmental tax can entirely replace regulatory policies in transition economies, any more than market mechanisms have replaced regulatory policies in OECD countries. For the foreseeable future, environmental taxes and other market mechanisms should be used to complement regulatory policies; taxes and regulations should be designed to reinforce each other. In general,

environmental taxes should be consistent with the OECD Guidelines for the Application of Economic Instruments.

There are clearly important administrative limitations which should rule out the introduction of complex schemes of environmental taxation. The resources required for effective administration and enforcement of systems of taxation in market economies are substantial. These activities require skills which are in short supply in transition economies, and are correspondingly costly. Protection of essential fiscal revenues in transition economies requires that tax systems should be designed to be simple and easily enforced; complexity and sophistication could use resources that would be better employed on basic administration and enforcement activities.

Considerable progress could be made through correction of existing "government failures". Perhaps the most significant of these is the low level of energy prices, which has encouraged wasteful use of energy in industry and by households. An important step towards better use of energy would be made by reforms to bring energy prices closer to the world price; such price reforms may be at least as important as the level and structure of energy taxes.

There may, however, be a case for a steady increase in the level of energy taxes, over and above energy price reforms. Energy taxes are cheap and easy to collect and enforce, and can contribute substantial revenues. To the extent that they reflect environmental external costs of energy use, they help to correct distortions, whilst at the same time allowing more-distortionary taxes, such as those on labour and capital, to be lower ("double dividend" argument). Many of the problems of increasing or restructuring energy taxes in OECD countries have had to do with the disruption this might cause to existing patterns of competitiveness; introducing such taxes during a period of when substantial restructuring is already taking place may be better than introducing high energy taxes later, when a second round of adjustment would be required.

There has been a concern that, as a consequence of the industrial restructuring process, transition economies may experience excessive bankruptcies in the short term. This tendency would be exacerbated by the early introduction of environmental taxes, which could impose substantial extra financial burdens, unrelated to current profit levels, on certain industrial enterprises.

Given the concerns about the financial burdens of environmental taxes on industries and households, it may be tempting for environmental policy-makers to advocate the introduction of environmental taxes in the form of tax reductions for activities that benefit the environment, rather than tax increases on activities that cause environmental damage. Such "tax expenditures" have the character of subsidies paid through the tax system, and OECD work has identified clear disadvantages to this approach. One is that the level of subsidy is less clear than if subsidy is paid directly. Another is that tax reductions require additional public revenues to be raised from other taxes, which have distortionary or disincentive effects, whilst environmental taxes which raise revenues allow other taxes to be reduced. In view of the acute revenue shortages in most transition economies, it is particularly important that environmental tax reductions or exemptions should not be introduced in a way which squanders scarce tax revenues.

The strong vertical structures deriving from central planning are an important obstacle in transition countries which must be overcome. Effective institutional arrangements must be established between Finance and Environment Ministries.

The Environmental Action Programme for Central and Eastern Europe (prepared for the Lucerne Environment Ministers' Conference, April 1993), recommends a comprehensive approach. Starting from an analysis of how macro-economic stabilization and economic restructuring affect environmental conditions, it suggests a sequence of policy measures. Such an approach applied to the tax and environment area, might suggest a hierarchy of steps:

-- removing environmentally damaging/revenue costly subsidies, e.g. energy;

-- identifying and removing environmentally damaging taxes;

-- examining how existing taxes might address environmental problems;

-- developing new eco-taxes.

This process of policy sequencing should, of course, take account of tax policy objectives as well at each stage.

There is a strong argument for advance planning and early announcement of the principles for a future system of incentive taxes and charges, even if not for early implementation. One of the major obstacles towards the introduction of pollution taxes in OECD countries has been the disruption that large-scale pollution taxes would cause, to the existing pattern of activities of the industrial sector. Even though there may be substantial gains from the point of view of the economy as a whole from moving to a system of substantial pollution taxes, vested interests of both labour and capital in sectors that would be adversely affected have lobbied against such measures. Early announcement of the system that will be applied in the future will allow enterprises to adapt well in advance to future change, and will help to avoid sudden changes in the values of business assets.

This may be a particularly persuasive argument in transition economies where a rapid auction privatisation is taking place; the values of productive assets which are auctioned will reflect the anticipated costs of environmental policy. Sudden future changes in environmental policy may be difficult since it will conflict with the implicit "property rights" sold when enterprises were auctioned.

Earmarking

Earmarking revenues from environmental taxes and charges has been common practice in many OECD economies, and may appear to have attractions to policy-makers in transition economies. In general, earmarking carries significant risks of decision-making inefficiency in the public sector; it provides the agency receiving the tax revenues with a privileged budgetary status, which may result in resources being used in the agency which would be of more value elsewhere in the government budget.

Many transition countries have environmental funds financed from earmarked revenues. Usually they predate the recent economic/political changes. In some cases resources are derived from penalties as well as taxes/charges.

The Workshop concludes that earmarking can be an acceptable transition measure. In transition economies environmental expenditures will probably contribute not more than 1 - 2 per cent of GDP in the next couple of years (i.e. much less than expenditures on other activities like education or health care, requiring budgetary support). Thus, the risk of inefficiency conventionally associated with earmarked funds is constrained by the absolute level of spending, and it is of minor importance when confronted with risks from letting the environment compete with short-term political priorities reflected in budgetary debates.

Inflation

Inflation creates severe problems for the operation of taxes or charges based on measured emission quantities in a number of transition economies; the real level of the incentive or revenue-raising potential is eroded because the rates of the charge are not adequately indexed or otherwise updated, and because taxpayers can reduce the real value of their tax payments by delaying the payment. These inflation problems reduce the incentive effectiveness of the charges. They also create problems where the revenues are earmarked as one of the principal sources of revenues for an environmental fund; this may then find

that its revenues are eroded by inflation more severely than if it had been financed out of the more buoyant general taxation.

Although the circumstances of transition economies and OECD economies are very different, there are important lessons that transition economies can learn from practice amongst OECD members and from each other. Decision-makers in transition economies have only limited experience with the processes involved in a market economy, and their unfamiliarity will often make it difficult - and potentially dangerous - to adopt highly-innovatory policy measures. In general, the experience of OECD countries provides a guide to a range of feasible measures, and to their likely effects. Transition economies should not expect - and should not be encouraged - to adopt more radical solutions than OECD countries have so far used.

Follow-up Work

A number of possibilities for follow-up work that would be of benefit to economies in transition have been suggested during the course of the discussion.

Further multilateral studies which would focus on issues concerning practical implementation rather than on general principles. One that may be of considerable value, in the light of the complex issues raised, could concern guidelines for the operation of the environmental funds in operation in many transition economies. The question of earmarking has been raised at a number of points during the present workshop, and further consideration of the advantages and disadvantages of particular forms of earmarked revenues, and of operational procedures, rules and precautions applying to the funds which receive such revenues could help policy makers in transition economies adapt the operation of these funds to the requirements of a market economy.

Other important study topics include sequencing of tax reforms, and application of market-oriented instruments (most importantly market tradeable permits) to achieve cost-effectiveness when pollution charges remain below their incentive levels.

Secondly, there may be scope for detailed case studies for individual countries. These could include studies which would identify and analyse government failures (caused e.g. by perverse incentives provided by the existing tax system) affecting current policies as well as was bilateral assistance relating to the design and drafting of legislation. Some countries identified the decentralization of permitting and charging authority as an important practical issue to be addressed in the course of policy reform.

Finally, follow-up work could make a contribution to training. Training assistance has been an important component of fiscal cooperation between the OECD and transition economies, and these arrangements could also prove useful in the field of tax policy and the environment.

INTRODUCING ENVIRONMENTAL TAXES IN ECONOMIES IN TRANSITION: CONDITIONS AND OBSTACLES

by

Olivier Godard
Centre International de Recherche sur l'Environnement et le Développement
Montrouge, France

The countries in transition to a market economy have to contend with a basic contradiction:

-- The institutions that organise a society's economic activity are interdependent; they need to rely on one another if they are to function effectively. Just as this was true of institutions in centrally-planned economies, so it is also true of those of modern market economies. Attempts at partial reform of the socialist system were in the past doomed to failure or deflected from their targets because of this "systemic effect" (Kornai, 1990; Chavance, 1991);

-- Economic and social life cannot be halted in order to establish outright the new institutions, organisations and regulations which make up a modern market economy. Economic reform therefore has to be spread over a fairly long period, during which economic institutions will not be consistent. What appear on paper to be the best solutions can produce unexpected, mediocre or even terrible results.

Already, the experience of OECD Member countries demonstrates to analysts the great distance between the outcome of theoretical policy analysis and the actual results achieved using a particular policy instrument. For example, despite the usual theoretical reference to Pigouvian efficiency, virtually no actual tax systems are a simple application of it. In practice, economic instruments are designed to combine several objectives: financial resources have to be collected, while flexibility and incentives have to be retained. It is not possible to guarantee the overall efficiency of the policy mix chosen (Opschoor and Vos, 1989).

It is important not to forget these points when considering tax reform in economies in transition or the possibility of incorporating in such reforms financial mechanisms and incentives that build environmental costs into economic choices. Reforms in this direction would achieve three important goals:

-- Find a basis for financing measures designed to clean up the natural environment. This is a long-term goal which goes hand in hand with economic recovery, the ecological catastrophe having been one of the tangible indications of the failure of the planned-economy system;

-- Encourage tax reforms necessary in the change in economic system: reducing taxes on businesses and investors, and increasing those on users and consumers. As part of this shift, it seems preferable to tax the use of scarce but wasted goods such as energy, or to tax externalities, rather than place the burden of taxation on the value of tied-up capital or on labour;

-- Introduce a set of economic incentives providing the proper framework for the adoption of economic development paths that are sustainable in the long term: this is all the more timely now that central and eastern European countries are making major efforts to rebuild and modernise their infrastructures and productive systems.

In the transition context more than in others, first-rank optima cannot be achieved. Furthermore, reconciling taxation and the environment is not an easy matter. In OECD Member countries, many of the tax measures designed to remove obstacles to economic initiative and encourage wealth production turn out to conflict with the incorporation of environmental values, without this being deliberate moreover. (For example, taxes on undeveloped properties often encourage intensive development rather than the preservation of unspoilt areas -- see PIREN, 1990, on this problem in France.)

Analysis of the links between taxation and the environment is still new in OECD countries, where it is encountering considerable reticence or hostility on the part of a number of interest groups, including: those who distrust economic arguments attributed -- wrongly -- to the ideology of economic liberalism alone; those who refuse to see the role of government extended to environmental questions; and those who, in industry, systematically reject the idea of taxes as a component of environmental policies.

In any event, environmental policies in OECD countries are still founded on administrative approaches (such as the system of prior authorisations for industrial installations) and regulatory approaches (including health standards for the quality of drinking water, environmental quality standards for water or air, technical standards for manufacturing processes and products). The recent increase in the use of economic instruments has not replaced this battery of instruments, but has added financing mechanisms and incentive schemes -- first for water problems, more recently for air pollution and waste management.

There are historical and structural reasons for the importance gained by the regulatory and administrative approach. This is why even the most "environmental" taxation imaginable could never be the sole environmental policy instrument. What is important, therefore, is to look for ways in which tax instruments and other forms of action might be complementary.

The object of this paper is to look at some of the obstacles to be overcome and the conditions to be met before environmental taxes and charges can be implemented in the countries in transition. The instruments considered are: user charges (on use of natural assets and effluent clean-up or waste processing services); taxes with a budgetary purpose -- either to finance a country's general budget or to finance specific environmental protection schemes (quasi-taxes); charges intended as incentives (adjustment of relative prices of goods on an imperfect market); subsidies and other tax incentives which go against normal market conditions or the general tax code (loans granted on favourable terms, special rules for amortizing investments, tax exemptions, etc.). (For a detailed description of these instruments, see Opschoor and Vos, 1989, and OECD, 1992.)

The common feature of these instruments is that they leave decentralised agents their freedom of choice, of decision and of trade, while at the same time affecting the schedule of advantages and disadvantages associated with the consequences of their choices.

Part 1 sets out to define the scope of the study, giving a few general pointers on taxes and on possible approaches to the transition phase. Part 2 discusses the institutional and political conditions which were one of the major causes of the deterioration of the environment in the earlier command economies, and which will have to be overcome in the transition phase if recourse to tax instruments is to have any sense. Part 3 considers the problems posed by the failings of economic organisation, first in a planned economy and then in the transition phase; these problems could obstruct efficient recourse to tax instruments for protecting the environment. Part 4 deals more specifically with how to incorporate taxes contributing to environmental protection in the transition phase. Part 5 briefly summarizes all the arguments discussed.

Taxes and Transition Defined

The different types of tax, or how to reconcile taxation and incentives

There are a number of different concepts and systems of taxation with very diverse objectives and possibilities. There are also a variety of traditions of economic analysis: for the current topic, the theory of public finance and the economic theory of the environment in particular. In many discussions they tend to be confused. Before tackling the conditions specific to transition, it will be useful to identify the different types of taxation that can be envisaged.

Three ideal types of tax

The object of economic instruments is first of all to make the consequences of an activity have an effect on the person assuming responsibility for that activity. As far as possible, the "decision-making area" and the "consequences area" must be made to coincide so that environmental externalities can be internalised. That is what the incentive side of tax instruments is designed to achieve.

The inability to arrive at this result directly and at no organisational cost -- the first-rank optimum -- means that it is usually necessary to add a financial dimension to the incentive dimension. Funds then have to be found to cover the organisational costs of the system and to secure the resources needed by the agents directly responsible for the measures aimed at improving the quality of the environment for the benefit of the community. Not all instruments are equally effective at performing these two functions.

Also, both central and general government expenditure and expenditure relating to public utilities involve taxation in the traditional sense. Amongst the various taxes, particular importance needs to be attached to excise duties the purpose of which is to finance infrastructures (roads and motorways, for example) or community services.

It is thus possible to identify three ideal types of "tax": user charges; taxes with a budgetary objective; and taxes with an incentive objective (see OECD, 1993).

User charges are for a clearly identified service, and therefore are comparable to the price of a traded good (with the two functions of covering production costs and of balancing supply and demand).

Taxes with a budgetary objective are designed to produce financial resources to fund certain types of public measure (such as a tax on waste dumping, the object of which is to finance an intervention fund) or a country's general budget (such as value added tax). The cost to the taxpayer of this type of tax is not confined to the amount levied, but also includes the alterations in choice that economic agents are prompted to make as a result of the changed structure of relative prices caused by the tax. This is called the deadweight loss cost. With this type of tax, there is no reason to establish a link between the tax basis and the uses to which the tax revenue is put. On the other hand, the usual aim is to find a tax system which minimises economic distortions by choosing as a tax basis goods for which demand is the most inelastic. (One reason for high fuels taxes in countries such as France and Italy.)

Taxes with an incentive objective are intended to modify the existing price system in such a way as to influence the behaviour of decentralised agents (incentives theory) and reduce the gap between the private optimum and the collective optimum (the idea of internalising externalities). There are, moreover, two sub-types: taxes based on flows of polluting waste (direct taxes, such as a tax on SO_2 emissions by thermal power stations); and taxes on the sale of products whose manufacture, transport or consumption pollutes the environment (indirect taxes, such as taxes on motor fuels which differentiates between leaded and unleaded petrol or a tax on electric batteries).

To be effective, an incentive tax must be as closely linked as possible with the behaviour to be influenced so as to take account of externalities. On the other hand, there is no reason why it should result overall in an additional tax on the income of economic agents to the benefit of public entities -- thus the effort to ensure "fiscal neutrality" when implementing an incentive tax.

Incentive taxes and the principle of revenue neutrality

There are two principles means of implementing the principle of "revenue neutrality":

-- First, a redistribution to all economic agents paying the tax: if the level of the tax is deemed optimal, i.e. offering a sufficient incentive in itself, redistribution must be neutral from the point of view of the externalities (turnover, or annual income for example). For example, the tax on the nitrogen oxides emitted by thermal power stations in Sweden, proportional to emissions, is redistributed across the enterprises concerned on the basis of the energy produced in the form of electricity or heat (Swedish Ministry of the Environment, 1991);

-- The second method is to reduce or abolish existing taxes if they are deemed not optimal from the point of view of the present weightings of the public utility function arguments. In this case, the proceeds of the tax are redistributed by means of a reform of the general tax system. Clearly this solution is liable to have macroeconomic and sectoral effects: amongst economic agents and sectors in general, there will be winners and losers; depending on the variants, there will also be an increase or slowdown in growth, an improvement or deterioration in employment, etc. To the extent that the taxes abolished are those with high deadweight loss costs, such as those weighing on employment or on firms' competitiveness, the macroeconomic consequences of introducing new incentive taxes may be globally positive and akin to "least regrets" or even "no regrets" measures.

Earmarked tax systems

Often, public authorities implement a specific tax to cover expenditures for clearly identified environmental protection measures. There are contrasting views about this practice.

On the plus side, the most obvious point is that the system is much more acceptable when those who pay the tax are also those who stand to benefit from the funds made available. In addition, the direct link between resources and expenditures gives the officials responsible for managing the system more incentive to collect the revenue which will go straight into the projects they are concerned with. Another advantage is that this revenue does not come up for review in annual budget discussions, with the result that the resources needed for long-term measures acquire a degree of stability and predictability. This predictability also gives economic agents a signal that the community is committed to a long lasting concern about the issue. All this helps considerably to liberate investment behaviour and channel technological research.

On the minus side, earmarking does create an element of institutional rigidity. Even if the initial level of taxation is optimal, various developments will gradually shift the mechanism from its optimal position. Expenditure of the funds available may gradually come to take precedence over economic efficiency as a criterion for deciding what measures to take. Likewise, the level of the tax may be determined on the basis of estimated financing requirements instead of the level of incentive needed to internalise the externalities.

The trade-off between these advantages and disadvantages can only be a matter of empirical appraisal. In any event, earmarked tax mechanisms need to be systematically monitored and should periodically be the subject of a global review (perhaps between five and seven years).

An earmarked tax mechanism is the basis of the water board system in France: the charges paid by industrial enterprises and local authorities on the basis of their consumption of water and their discharges of pollutants serve to finance a certain percentage of the investment undertaken by these agents when such investment improves environmental performance.

This type of mechanism, which works on the principle of a mutual insurance company scheme and is akin to an indirect market of reducing polluting emissions, can avoid the unwanted effects of a regulatory system that sets lower standards for existing installations than new ones. The risk of making it attractive to prolong, artificially, the useful life of the former is thus averted. This system also encourages firms to provide accurate information on current levels of pollution, since systematic under-reporting could reduce the amount of aid granted when making a subsequent investment.

Three ways of looking at the transition phase

The transition to a market economy may be looked at in several ways. It can be viewed from the standpoint of the intended goal of transition -- the modern market economy as understood in OECD countries. The main problem then is to lay the initial foundations of the future system and to encourage its development until the transition phase is over. Any question relates not so much to the content of the reforms as to their timing. As regards the utilisation of economic instruments for the protection of the environment, the task comes down to planning the introduction of the various components that make up a developed market economy, using the range of economic instruments available as the situation requires -- rather as tends to be done in the West at present. This approach would be appropriate in cases -- insofar as there are any -- where the transition is of short duration.

A second approach is to focus on the initial situation of an economy which is centrally planned and its resulting dysfunctions. The main problem in this case is to arrive at a strategy to overcome each obstacle, to stop perverse mechanisms, and to make up for various shortcomings: finding a series of solutions, selected problem by problem, for the path of the transition. This second approach is based on the conviction that several features of the old system will have a lasting influence on the transition, and indeed on the type of economic organisation resulting from the transition phase. This approach is more suitable in cases where the transition to a modern market economy is gradual, slow, difficult and conflictual. Where environmental policies are concerned, the question is to know how taxation can be of real assistance in finding concrete solutions to the problems inherited from the command-economy system.

Finally, a third approach focuses on the specific characteristics of the transition situation itself. The transition does more than just amalgamate some of the components of the old (centrally-planned) system with some of the components of the new (market) system. It is a unique situation whose features and problems determine the impact that reforms, such as a more extensive use of tax instruments in environmental policy, might have. Problems can include a fall in output; high inflation; and overlapping of public and private responsibilities, including conflicts of interest for civil servants and heads of public enterprises.

This discussion endeavours to encompass all three approaches. Without neglecting the first, which centres on the characteristic features of a market economy, it will focus more especially on the last two. The present state of the environment in the European countries in transition was not a chance occurrence, but derives from the way their previous regimes were organised economically and politically. These factors are not simply of historical interest; some will persist through the transition period and will have to be taken into account, or else ways will have to be found to overcome them.

There are of course appreciable differences between countries: historical, geographical and demographic. In some, certain reforms were introduced before 1990. In addition, choices about the speed

of transition have differed significantly one country to another. In this discussion, it has not been possible to take these differences explicitly into account.

Organising the Transition to a Modern Rule of Law

The experience of the last few years has shown the extent to which the difficulties of transition reflect the lasting influence of the previous regime. No discussion of tax instruments can ignore this, since these features will either influence the effect they are expected to have or prevent them being introduced.

The planned-economy system

The organisation that used to prevail in the Eastern European countries cannot be described solely in terms of its economic status as a "centrally-planned economy". With a single party system controlling every level of the administration, the rule of law was encouraged to only a limited extent over and above outside appearances.

An arbitrary State that did not ensure the legal security of civil and economic rights

The main foundations of the rule of law (separation of powers, legal security of goods and persons, law based on justice as the principle for solving conflicts between individuals and between individuals and the State) remained under-developed. In lieu of the law, there was in fact discretionary and arbitrary appraisal by a political bureaucracy.

That being the case, the values of good citizenship underpinning the legal system had lost their meaning as far as most parties were concerned, whether individuals, economic decision-makers or civil servants (Kornai, 1990). This state of affairs gave rise to major discrepancies between the formal or official manner in which the system was organised (stated objectives and rules, responsibilities assigned, information given) and the actual way it operated and resources were allocated. Astonishing as it might seem, for example, given the scale of the problems, investment funds intended for environmental protection might often be used for other purposes, such as financing corporate or local government deficits, quite apart from criminal uses (Goldman, 1985; Wilczynski, 1990). Obviously this general context did not lend itself to environmental improvement schemes, which depend first of all on a set of administrative procedures and technological or ambient quality standards. As a result, safety regulations for hazardous substances were contravened, pollution standards were systematically exceeded and natural resources were wasted.

The scale and extent of arbitrary action by the State was accentuated, moreover, by the lack of any clear separation between the bodies responsible for implementing environmental protection measures and those whose purpose was to expand the productive activity of state enterprises (branch ministries). The overlapping objectives and interests made for laxity and tolerance in the application of the rules, and even encouraged complicity in their systematic violation. This is why measures to stop such practices must place the emphasis on the separation of responsibilities, particularly where police powers regarding breaches of environmental regulations are concerned.

The political authorities and the environment

Despite statements to the contrary, the authorities were uninterested in and suspicious or even hostile towards environmental questions. The protection of the environment was seen above all as a threat to the economic and political priorities of those in power. This explains the low level of investment set aside for such problems, the lack of incentive to ensure compliance with the standards laid down, the desire to keep information on the state of the environment secret (Russell, 1990) and the profound mistrust towards popular movements expressing concern about pollution of the environment (French, 1991).

Yet the effectiveness of a regulatory system depends to a great extent on the degree of interest shown by the authorities in ensuring that it functions properly and, in particular, in checking the actual application of the rules and triggering the system of penalties when breaches are observed. If this lack of interest were to last through the transition phase, in view of the economic and political difficulties, it would be difficult to set up or adequately manage a tax system, and this would give rise to substantial tax avoidance and a poor environmental performance.

Inadequate information

Economic and environmental information, as all statistical data, suffered from numerous defects. There were serious gaps in information on anything not directly relating to production levels; data circulated little because of obsessive secrecy; it was unreliable because official information was manipulated and because there were all sorts of distortions in exchanges of information between production units and central planning bodies; it was impossible to check official sources of information; and there were no alternative sources of information and there was no open discussion. The way the Plan was applied, which had become established over the years, in fact meant that conflicts and compromises were masked and choices rejected simply by massaging the figures (Chavance, 1989).

As a result of this situation, decentralised agents found themselves under-informed and lacking reliable guidelines; this obliged them to fall back on narrow and partial local frames of reference of which they had direct knowledge. This resulted in inconsistencies and overall losses of efficiency, and also in absurd situations which arose as a result of being masked by this mixture of secrecy and the helplessness of the populations who were victims of environmental pollution. There are a number of extreme examples of these situations, such as the illegal discharge of radioactive waste at a site later used to build a school (French, 1991).

Ideological roots

The institutional and political situation referred to above had ideological roots which proved particularly inimical to environmental protection: an obsession with output growth "at any cost" (Goldman, 1985), a fixation on heavy industrial activity, an ideology based on sacrificing the present for a grandiose future (Fleischer et alii, 1991).

These ideological factors help to explain why the planned-economy countries, which in theory had the ability to harmonize economic development, the conservation of the environment and the sustainable exploitation of natural resources, failed to do so to a much greater extent than the OECD countries even, though the latter were subject to the market externality failings and problems stemming from private economic agents' interest in internalising profits and externalising costs (Kapp, 1950).

Modernising the administration

Paradoxically, the State inherited from the socialist regime is under-equipped and under-informed for the traditional general government and public utility provision functions relating to the environment and milieu. Also, the public sector has a lot to answer for with regard to management practices in industry. While at the start of the transition phase it was hoped, in some quarters, that public sector enterprises would soon be privatised, the likelihood now is that many will remain in government hands for years (at least two decades).

All environmental policies need to be backed by competent administration with the information and supervisory powers needed to implement the instruments chosen by the authorities. This applies in particular to tax instruments which do, however, have certain advantages in this respect.

Information

Whether they have a fiscal objective or are intended as an incentive, tax instruments can only be economically and environmentally effective if economic agents have adequate information. In the case of taxes with a fiscal objective, information is needed to make the best possible use of tax revenues (project selection, efficient functioning of systems such as waste collection and processing); in the case of incentive-type taxes, tax-payers need information on their actual emissions, their cost functions, and the technological options for abatement at their disposal.

Establishing credible information systems is of prime importance during the transition period, both as a means of rationalising collective choices and in order to restore the credibility of government in the eyes of the public. Moreover, this priority is the same whatever the instruments used. All of them (administrative authorisations, taxes, tradeable permits) require a minimum amount of information: taxpayers' files, up-to-date statistics on tax bases (flows of polluting emissions, flows of products consumed or sold), procedures for checking information, procedures for checking payments, etc. However, taxes are in general known to be the type of instrument which requires the least information from the administration in order to be effective. In an economy in which the markets function reasonably well, it is not necessary for the supervisory body to be informed of the cost functions of each enterprise for the tax to act as a principle of economic efficiency.

It is also important to use instruments which encourage economic agents to reveal the information they have, or which at least do not strengthen any strategic tendency to with hold or to bias information. (A system such as that of the French water agencies works in this way.)

When designing information systems, however, it is important to take realistic account of the problems that collecting, transmitting and storing information involve. In the case of sources which are numerous and small in scale, for example, it is reasonable to use indirect or statistical methods (polls), or methods involving conventional elements (emission tables from various technologies).

Setting up this sort of administration cannot be achieved overnight. It would perhaps be preferable to begin by setting up mechanisms which are simple in design and easy to monitor. Extensive use might, for example, be made of flat-rate systems and indirect taxation of products usually accompanied by environmental externalities (energy in particular) (Eskeland and Jimenez, 1991). In this case, it would be up to tax authorities manage of such excise taxes in addition to those taxes whose purpose is purely fiscal (VAT or sales tax, depending on the mechanisms in force).

Personnel management

Central and local government is not going to be modernised if the most competent staff feel obliged to leave public service because of inadequate pay or poor working conditions. It is true that the population traditionally mistrusts the administration which is seen as having all the failings of bureaucracy and enjoying numerous privileges. These shortcomings need to be countered if the economic transition is to progress satisfactorily, and it will be necessary to build up a competent, efficient, modern and, for this purpose, sufficiently well paid administration for it to be possible to expect civil servants not to have other "principal" activities.

Ensuring that incentive systems continue to perform

All institutional mechanisms sooner or later undergo change necessitated by actual experience. There is a positive side, i.e. the learning effect. But there is also a negative side which is the tendency towards bureaucratisation and reduced efficiency. If this sort of attrition and deterioration is to be stopped, it is essential to have the means to ensure that a particular system continues to perform well beyond the initial start-up phase. It is important, for example, to see that the level of taxes or penalties applied in a

context of very high inflation is regularly raised, or to check that the periodical statistical data used to set the flat-rate scales are updated.

Developing the rule of law and defining responsibilities

Combatting ecological delinquency

Unclear responsibilities and legal uncertainties over property rights are two well-known causes of resource mismanagment and environmental deterioration. Both can be found in economies in transition. In addition, in many countries there are pockets of anomie or disorganisation which, for periods of varying length, escape social regulation by law or the ordinary market. This results in further uncertainty as to property rights and the rules of responsibility. These features reflect the state of crisis in collective organisation that the transition to a market economy cannot hope to overcome from one day to the next. They result in the unleashing of quasi-legal or even illegal practices, as advantage is taken of legal voids and uncertainties or of the practical difficulties of establishing or ensuring compliance with the rule of law. All this encourages the development of ecological delinquency: private appropriation of common land, for example in protected natural sites; dealing in hazardous products (imports of toxic waste, resale of banned products for food purposes); and the misappropriation of funds earmarked for environmental protection.

Establishing responsible players

In the framework of transition, one of the important challenges is the transformation of government-owned manufacturing units into genuine enterprises with clear identities and definite responsibilities, capable of entering into contracts and carrying out economic calculations. The same holds for local authorities, with their services and their enterprises which have to become economically responsible entities. These transformations require clarifying and tightening both budget constraints and the legal constraints that require contracts to be honoured.

Where the environment is concerned, the creation of financial agencies allows decentralised bodies to be set up which can operate according to the rules of budgetary equilibrium. In addition to the enhanced efficiency deriving from the emergence of clearly identified centres which assume responsibility, this sort of approach also gives a powerful stimulus to public utilities by establishing a link between the projects to be realized and the resources to be collected.

Guarding against arbitrary administrative decisions

In return for being answerable, economic agents need to be protected against arbitrary administrative decisions, this being all the more necessary because arbitrariness is symbolic of the preceding socialist regimes. As far as environmental policies are concerned, this means seeking to limit the powers of discretionary appraisal possessed by officials, as seen in the the practice of case-by-case negotiations of the application of environmental laws.

Avoiding this same arbitrariness is a reason for wanting to divide the main administrative functions between different entities: information and file management, case investigations, authorisations, fund allocation decisions, standard-setting, payments collections, penalty calculations, etc.

The use of tax instruments can introduce a substantial degree of automaticity and impose a constraint which is neither negotiable nor avoidable by either the administration responsible for implementing them or taxpayers. An example would be an incentive tax scheme with a simple base and which could be waived in only very few cases, clearly defined in advance.

Defining the areas that remain outside the responsibility of asset-holders

Defining the responsibility of economic agents also means spelling out what they cannot be held responsible for. This is decisive to the success of both privatisation and any policy designed to attract new, and particularly foreign investors. The scale of accumulated pollution in the environment (soil, lake bottoms, river beds, coastal areas, groundwater) and of dangerous and illegal storage of hazardous substances can make imprecise rules regarding liability a major obstacle to industrial restructuring policy, potential buyers refusing to risk responsibility for very high clean-up costs in respect to pollution not known at the time of the transactions. It is essential to lay down clear rules and procedures regarding responsibility for the environmental clean-up necessitated by past negligence. From the point of view of the success of economic reforms, it might be preferable to set up a collective system for financing clean-ups, rather than making those with the rights of ownership liable.

Ceasing to make breaches of the rules a normal component of environmental regulations

The establishment of the rule of law also means seeking, where the environment is concerned, to put a stop to those mechanisms which make contravening standards and legal requirements an accepted part of the way relations between government and business operate (Godard, 1993a). This will mean revising the concept of standards, distinguishing between long-term reference objectives and more realistic standards setting out minimum requirements of an imperative nature and for immediate application. It could also involve calling in question the system of penalties for exceeding permit authorisations: for example, more frequent use could be made of physical constraints (suspension of activity, the obligation to make amends in kind, the execution of work) rather than financial penalties. Poland has apparently opted for this course, only penalising accidental exceedences of permit limits (Zylicz, 1990). Financial instruments ought in that case to be confined to incentives applying within the framework of legal authorisations.

Lastly, breaking the rules on pollution discharges should be seen primarily as undermining the rule of law, not just as an attack on the environment. It might therefore be better to have penalties and fines exacted for illegal behaviour paid into the general government budget rather than into special funds for environmental measures. The latter's resources should come exclusively from sources consistent with compliance with legal standards.

Environmental Incentives: The Failings of the Planned-Economy System

A feature of command economies, in addition to being centralised, was that economic co-ordination was achieved in terms of quantities rather than prices. From the technical standpoint, this requirement resulted in a substantial increase in the amount of information that had to be handled in order to ensure coherent management. A limited capacity to collect and process information led the planning departments to focus exchanges of information between the plan and decentralised production units on manufacturing indices. The discrepancy between the information theoretically required and the information that was accessible and actually taken into account resulted in a build-up of inconsistencies and unwanted effects.

The information base was too narrow for the dynamic interplay between supply and demand, which is a feature of complex economies, and for the internalisation of environmental externalities needed to ensure sustainable growth. Since supply/demand pressures could not be balanced via price mechanisms, they were resolved by other mechanisms: chronic shortage, segmentation of resource access channels (Kornai, 1984). Since externalities were ignored, much greater harm was done to the environment than in the western industrial countries.

The financial constraint weighing on public enterprises was elastic and no longer had any incentive effect; deficits were systematically covered out of public funds since the enterprises in question were part of the State system and could not go bankrupt. This situation engendered a lack of awareness as regards

costs and incentives in the form of taxes or penalties, and gave rise to a series of investment projects, each disproportionately larger than its predecessor. On the size of an enterprise or sector depended, in fact, the positions of power enjoyed by those running them in the apparatus of State (Kornai, 1984).

The obsession with quantitative output performance acted as a big incentive not to take the risk of innovating. Being technologically backward is, however, unfavourable from the environmental standpoint, judging from the experience of the OECD countries where technological modernisation has played a decisive role in reducing industrial pollution.

The belief in an optimum which could be defined in advance also meant that economic agents had very little variety to choose from. City dwellers, for example, usually had no opportunity to make informed choices about their consumption of water or energy for heating purposes, as these resources were usually not metered. As for heating, they could neither regulate their consumption when heating was provided collectively, nor seek alternative ways of achieving thermal comfort, such as by having their homes thermally insulated.

The incentive effect of an economic instrument requires a range of choices be available to decentralised agents, and also the latter have the capacity -- including information, skills, and materials -- to take advantage of them. The broader the range of choices, resulting in very elastic demand functions, the greater the influence that an economic incentive can have. Conversely, the more tightly agents are hemmed in by constraints they can do nothing to alter (low elasticity), the less will be the impact of economic incentives.

The vertical organisation of the economy

With the economy organised vertically and sectorally, there was a low level of horizontal co-operation between production units (for example, between large combines and small service enterprises); difficulty in combining several different objectives (such as achieving production targets, making more effective use of natural resources, and protecting the environment); and a low level of exchange between the scientific research community and industry. These three elements ensured that very little consideration could be given to transverse problems such as environmental protection or energy efficiency (Goldman, 1985; Chandler et alii, 1990; Cooper and Schipper, 1991).

Despite central planning, which was intended to ensure the overall consistency of the choices made, an intellectual and institutional division had taken place between, on one hand, the question of the formulation and organisation of environmental protection measures and, on the other, the definition and implementation of economic development objectives. Because of this division, environmental questions continued to be set apart, as can be seen from the way choices were ranked and from the lack of funds devoted to them (Bulla and Juhasz, 1990; Fleischer et alii, 1991).

The underdevelopment of the economic role of prices

For doctrinal reasons, the use of natural resources and environmental goods in centrally planned economies were not evaluated or considered in price systems (Goldman, 1985). This affected the economic calculations on which investment or operating decisions were based. As a result, no information was forthcoming on the scarcity of these resources, how they should best be used, or the constraints weighing on their renewal.

The prices of goods were, in any event, largely arbitrary by comparison with costs and did not reflect the economic pressures on different goods. In particular, the decision was taken to dispose of raw materials and energy goods at very low price levels (Wilczinski, 1990). This increased the intensity of energy and raw material consumption per unit of output to much higher levels than those of OECD economies. The energy inefficiency of formerly centrally planned economies is the result both of low

energy and raw materials prices, and of all the other inefficiencies that existed in the organisation of the economy (Cooper and Schipper, 1991).

In the last ten or so years, a number of countries in Central and Eastern Europe adopted systems for environment policy which, in form, resemble those operating in the OECD countries, in particular the introduction of tax instruments. These systems have unfortunately not been able to function effectively.

This was because, first, the level of taxes and charges was much too low to influence behaviour and to provide funding commensurate with the investment requirements for effective pollution abatement. In some cases, taxes and charges would have needed to be 100 greater in order to have an incentive effect.

Second, as explained above, state production units were very insensitive to the prices paid. Payment of charges or penalties was incorporated in prices (suppliers' markets) and could even have a counter-incentive effect in cases where the equity capital margin kept by the production unit was defined as a percentage of expenditure.

A penalty system with undesirable consequences

Penalties imposed for exceeding administrative permits can have unwanted consequences when such systems form the backbone of the regulatory system. When there are no charges for authorised use of natural assets, the system in fact encourages systematic infringement of the authorisations.

First, budgetisation of the payment of penalties neutralises any possible incentive effect on polluters (Russell, 1990). Second, the proceeds of penalties are usually paid into funds used to finance environmental schemes, and they account for a not insignificant proportion of such funds. This financial aspect gives government an interest in seeing emissions exceed permit standards, as then there is no need to release funds from other sources, such as the general budget, where competition for them is keen. This sort of mechanism is likely to be even more prevalent in a transition context in that policies aimed at cutting budget deficits and reducing government spending in order to achieve macroeconomic stabilisation sharply increase competition for public funds.

Obstacles to the Use of Tax Instruments in the Transition

To the obstacles deriving from a planned economy are added those that can be encountered in a transition context.

Hyperinflation

Periods of hyperinflation have the effect of eroding the information provided by relative prices and ruining the incentive effect that a system of charges or taxes can have when they are not rapidly levelled up. Specifically, one of the measures adopted by governments to control inflation is to freeze taxes and charges and challenge all indexation systems. In the case of Poland, prices rose eighteen-fold between 1988 and 1990, but the level of water charges increased on twofold (Hughes, 1990). In such situations, it is preferable not to count on tax instruments alone, but to introduce other instruments relating to quantities (regulations, tradeable permits, and "voluntary agreements").

Industrial restructuring

The decline in the level of output caused by industrial restructuring automatically results in a reduction in current flows of discharged pollutants. On the other hand, it magnifies the problems of waste management, particularly in the case of toxic wastes and hazardous substances left untended. The populations concerned may then have nobody responsible to turn to. The disappearance of large numbers

of enterprises limits the scope of incentive instruments which, to be effective, need clearly identified economic agents with a certain degree of stability of ownership.

Restructuring also accentuates administrative problems (updating files, monitoring emission trends or industrial safety, registering new enterprises, and handling administrative requests).

The arbitrary aspect of newly freed prices

For a fairly long period, enterprises of very different levels will coexist without marginal costs of production being remotely equalised. During this period, deregulated prices reflect sectoral inconsistencies and disequilibria, monopoly positions and situation rents. In this sort of context, the breakdown of incomes, profits and losses is to a large extent arbitrary from the economic standpoint. Tax instruments designed to have an incentive effect must take this into account:

-- To try to bring taxes on pollutant emissions immediately to an economically effective level can cause unjustified bankruptcies among many enterprises which do not enjoy economic conditions corresponding to the value of their share capital. A better solution in such cases may be to combine taxes below incentive levels with subsidies for the extra costs of investment in environmental protection;

-- In those sectors were monopolies still exist, it would be preferable not to raise the prices of goods via taxation. Instead, taxes on pollution could be combined with production subsidies; but this option implies a public medium-term industrial strategy from defining efficient conditions of central control still needed.

The coexistence of a sizeable public sector alongside the private sector

Throughout this transition period, a substantial number of publicly owned enterprises can be expected to coexist with the private sector (Kornai, 1990). The difference between the two sectors does not only reflect a difference in legal status. (In fact, some publicly owned enterprises may operate mainly by market rules, whereas some privatized companies may retain monopoly power.) The public sector will continue to be governed, to a greater or lesser extent, by specific mechanisms and rules concerning access to investment funds and credit, the calculation of remuneration (wage control), the appointment of managers, taxation (high taxation and a substantial contribution to fiscal revenue), etc. In the way it relates to the market, it will tend to continue to benefit from dominant or monopoly positions, or from special advantages compared with the private sector (access to resources and funds in an economic context marked by shortage and extremely segmented access channels). This situation poses a specific problem.

Allocative efficiency requires the principles of equality and universality be applied to all enterprises, public and private. Distributive aspects apart, the fact that the enterprises subject to incentive mechanisms are technologically and economically very disparate (production function, marginal clean-up cost curve) argues not against but in favour of a single mechanism. However, the incentive strength of monetary instruments depends on the comparative sensitiveness of economic agents to incentives and for some time to come, this will be greater for the private than for the public sector. It is fortunate in a way that this is so because the private sector is at present the main engine of investment. Nonetheless, problems will remain:

-- there is at present considerable tax avoidance in the private sector;

-- private investment mainly goes to the services sector and consumer industries, not to heavy industry which is responsible for the bulk of pollution;

-- in view of its size, the public sector cannot remain outside the system of environmental incentives.

The solution involves first of all setting up the nucleus of a common scheme which could, by stages, become the predominant part of the regulatory system. Temporarily, however, it would be supplemented by provisions specific to each sector. Special conditions for access to loans to finance environmental investment could, for example, be made available to the private sector which generally has difficulty in gaining access to the banking sector. Similarly, there could be "environmental plan contracts" negotiated between the agency responsible for the environment, the regulatory authority in charge of public enterprises and the latter's managers. Such contracts should cover factors of importance in the objective/function of public enterprise managers.

Laying the Foundations for a System of Environmental Taxes

Theoretical analysis of economic instruments rests, as is to be expected, on models built on the basis of a small number of abstract assumptions incorporating the essential attributes of phenomena: respect for property rights, profit-maximising behaviour, and the availability of accurate information on opportunities and costs. These assumptions correspond to the functioning of a virtually perfect market economy; they are indicative of what is at present largely lacking in the economies in transition. What advantage is there to be had, therefore, in using tax instruments when these conditions are by no means fulfilled?

The opportunity to develop environmental taxes early in the transition

A more extensive use of tax instruments in environmental policy in transition countries may not seem essential, for at least two reasons:

-- The early years of transition began by causing a sharp drop in output, which was worse in these countries than that which they experienced in the 1930s! The economic priority was thus to stop the downward spiral, restore production and investment, and begin improving the desperately poor living conditions of the majority of people;

-- Industrial restructuring, rather than specific environmental policies, may provide the greatest improvements in environmental conditions. Increases in the prices of raw materials and energy will be a major force driving this structural reform, which should bring much greater production efficiency (Hughes, 1990).

This makes it tempting to leave aside environmental policies and, in particular, not to opt for taxation as a tool for such policies. Yet, there are at least two reasons for not choosing this solution:

-- Without the appropriate incentives, the technological choices underlying new investment, which are going to form the basis of future productive structures, will continue to overlook environmental externalities. Once they are tolerated, practices which are environmentally damaging very soon become the polluters' acquired rights, making it difficult and costly for the community to take any subsequent action to reduce them. The technological options adopted thus become irreversible on two counts: material and institutional, and will result in productive structures that will be difficult subsequently to eliminate (Boyer et al, 1991);

-- With enterprises about to attach growing importance to price and market signals and various monetary incentives, they will tend to treat as negligible any considerations which are not expressed in the form of a price to be paid or an income to be earned.

Further, countries in transition, even more than others, are experiencing two distinct types of environmental problem, each of which has to be tackled in the appropriate manner.

First, there is a high level of natural resource consumption, of emissions of polluting effluent and of waste disposal per unit of national income. This is attributable to the great inefficiency and to the tendency of all economic agents to externalise environment costs. It requires general incentives, affecting all economic agents, aimed at encouraging more efficient use of resources.

Second, some problems are very localised by virtue of the concentration of industrial activities. As a result, there are marked regional disparities between areas where water and air pollution is extreme, areas where the quality of the natural environment is still satisfactory, and areas which are nearly pristine.

The economic incentive systems to be set up therefore need to be designed to cope with these issues. This could be achieved by combining general incentives both for the production and consumption system, based on taxes on goods, with localised measures based on taxes on pollution and polluting discharges from industrial installations and local authorities.

Ensuring the acceptability of tax instruments for environmental protection

The introduction and development of environmental policies are bound on occasion to be opposed, sometimes virulently, by those to whom they apply. It is known from experience, however, that what happens in the phase prior to the introduction of policy instruments, (relations between the main players enterprises, administrative services, political leaders, scientific experts, groups defending general interests, public opinion and the media) can have a major influence on the way the system subsequently functions, because of the conflicts, negotiations, and information exchanges that are built up at this stage (Bressers and Klok, 1988; Majone, 1989; OECD, 1992). This tie is all the stronger in that the implementation of the instruments in question practically depends on decentralised agents' perceptions, expectations and strategies. This is why the OECD (1991a) stresses the importance of the equity, feasibility and acceptability of such instruments; in its eyes, strong opposition from the target groups "would make economic instruments ineffective".

Thus, to implement economic instruments for the protection of the environment it is necessary, first, to have a strong political commitment from the government and second, public support and the recognition that such instruments can really improve the quality of specific features of the environment to which public opinion is the most sensitive. Institutional procedures that have been used to promote public involvement in OECD countries include public hearings, public inquiries, environmental impact statements, and advisory committees.

In the longer term, environmental policies cannot develop without the permanent backing of large sections of public opinion and without the gradual creation of a network of enterprises whose activities depend on the existence of such policies (from pollution abatement and energy efficiency engineering to "eco-product" industries).

Financing Environmental Expenditures

In a first-rank optimum situation, implying the full internalisation of external costs, there is no need for specific means to provide public finance for the treatment of pollution. As for public environmental services (waste collection and processing), the ideal solution would be to finance them from user charges. There are, however, a lot of obstacles before this can happen. As a result, the community as a whole has to take responsibility for organising these environmental protection or management-related activities and finding the corresponding funds. In view of the size of the investments and the length of time involved,

stable and predictable means of financing need to be set up. Experience in the OECD countries has shown that environmental protection measures are sensitive to any instability in financial channels and flows, and that it is perhaps advisable to ensure that these channels are taken out of the annual discussions characteristic of the more vulnerable sectors of public expenditure.

The first role that tax instruments are expected to fulfill is the creation of these financing mechanisms. For this reason, the pricing of access to water and heating supplies, taxes on polluting effluent, charges for waste processing and deposit-refund systems are destined to be among the basic components of environmental policy. An advantage with this method is that fees, fines and charges structures are set up which can be gradually increased until they became an economically efficient incentive.

Tackling economic and institutional uncertainty

Uncertainty creates divisions between economic instruments which, if the information situation were perfect, would tend to be considered equivalent. The imperfect nature of information on marginal abatement costs and pollution damage costs is one the most vital considerations in selecting an instrument. It is preferable to use norms or tradeable permits rather than taxes when the slope of the marginal damage curve is steeper than that of the marginal abatement costs. This is particularly true when there are thresholds or levels of constraint which absolutely have to be complied with (safety or health standards for example, especially for toxic substances and radioactive waste). On the other hand, if the economic cost of pollution abatement is not well known, using a tax gives the assurance to decentralised agents that expenditure on specific environmental targets may have to consider as being capped.

From an inter-temporal standpoint, it may be best to begin with one approach (standards, for example) and then switch to the other (taxes) as the schedule of marginal costs and benefits changes:

-- initially, when pollution is severe, the harm done to health and to the environment is high and marginal pollution abatement costs fairly low; a regulatory approach can be defended provided it is effectively applied and monitored;

-- subsequently, the marginal damage done by pollution will be more limited, while the costs entailed by additional pollution reduction may be appreciably higher; it will then be more prudent to resort to taxes (Watson and Ridker, 1984).

The conclusions arrived at depend directly on the respective assessments made of pollution damage and the relevant abatement costs. In practice, this all depends on the instances of pollution or the technological risks under consideration: nuclear safety problems are not to be solved in the same way as ordinary water pollution.

One essential variable in any policy is the predictability, for those affected, of the institutional machinery. This affects their capacity to adapt and the possibility of making economic calculations and investing. Where taxation is concerned, predictibility requires transparency, simplicity and automaticity -- three criteria which guarantee the equity and authority of the tax (OECD, 1991b). Where the economy is concerned, as long as there is uncertainty about future institutions and rules, the future equilibrium levels of the main economic variables (relative prices, interest rates, etc.), and the rights and responsibilities incumbent on economic agents with respect to pollution, the incentive effect of tax instruments will be severely curtailed: the resources available for investment purposes will be used first for more immediate and more certain openings. This appears to be the case for the economies in transition. While taxes can, nevertheless, have an incentive effect, this would only be in the case of measures with a very short pay-back period. Until economic and institutional uncertainties are reduced, the financial dimension of tax instruments will loom much larger than the incentive dimension.

Box 1. SUMMARY -- The Obstacles

Obstacles inherited from the planned-economy system

A low level of legal security of civil and economic rights and the frequent acceptance of violations of the rule of law;

A lack of any separation between the bodies responsible for planning the growth of production and the development of infrastructures and those charged with the protection and management of the environment; also, between the executive and the supervisory bodies;

A lack of information, concerning both technological options and their cost and impact on the environment, that is reliable and deemed credible by all the parties involved;

A productivist ideology targeting output growth "at any cost";

Economic agents' unresponsiveness to price-related incentives (elastic financial constraint for public production units, lack of consumer choice);

A price system whose role has faded and which is organised in an economically arbitrary fashion (under-assessment of energy and commodity prices, lack of prices for the natural resources consumed, too low a level of pollution charges);

A low level of technical innovation (division between research and industry);

The vertical organisation of the economy and the low level of horizontal co-operation between economic units;

A system of penalties with unwanted consequences (environmental authorities having a budgetary interest in enterprises infringing the standards).

Obstacles specific to the transition phase

Monetary incentives eroded by hyperinflation;

The arbitrary nature of recently freed prices, preventing any thought of setting taxes directly at an incentive level;

The consequences of industrial restructuring (the discontinuation of activities results in safety measures being dropped and in the development of irresponsible behaviour regarding toxic waste and hazardous substances);

The continuing existence of a public sector which, compared with the expanding private sector, is less sensitive to monetary incentives;

Institutional and political instability, making future economic conditions less predictable.

Box 2. Surmounting the obstacles

Actions Required

Strengthening the rule of law, with property rights and the rules governing the liability of economic agents and bodies implementing environmental policies being clarified (model of agencies operating under the rule of fiscal equilibrium); the stiffening of the legal and budgetary constraints; on the other hand, the demarcation of this responsibility in the case of problems and risks inherited from the old system (hidden deposits of toxic waste, contaminated soil, etc.);

Modernising the administration: preserving human skills, setting up suitable statistical and economic information systems, making agents answerable, regularly adjusting incentive mechanisms, protecting taxpayers from arbitrary administrative decisions, dividing the main administrative functions between the different bodies;

Selecting of tax instruments sufficiently simple to be compatible with the attainable level of administrative performance (for example, excise duties on mass-market goods which are easy to monitor);

Introducing financing mechanisms for specific areas (water, waste, atmospheric pollution, etc) when incentive taxes are not yet economically or administratively feasible; for the regeneration of the environment damaged by past activities, the creation of systems similar, in basic principles, to the American 'Superfund';

Using tax instruments mainly to give an incentive to agents operating within the legal standards, not as a means of penalising infringements of standards and authorisations;

Ensuring the acceptability of tax instruments, which can be increased if the population is able to appreciate what it gains in return, particularly in the health field;

Increasing the predictability of the institutional context of environmental management, the aim being to make investment in environmental protection more secure;

Adopting incentive-based tax mechanisms as the range of choices available to economic agents broadens (the existence of competition between products with contrasting effects on the environment, such as for motor fuels and vehicles).

Conclusions

The use of tax instruments to implement environmental policies should allow a rich seam of economic efficiency to be tapped in the countries in transition, because of the technical and economic heterogeneity of their enterprises and the gains to be had from technological modernisation when the right choices are made. There are, however, a number of features of the transition situation restricting the possibilities of exploiting this seam (see Boxes 1 and 2). These need to be overcome.

The introduction of tax instruments for environmental policies should not wait until the last stage in achieving a market economy. Tax reforms provide an excellent opportunity to introduce taxes which more satisfactorily combine objectives relating to the quality of the environment and objectives relating to economic and social development. However, the incentive aspect is liable initially to be less important than the financial dimension. It can, on the other hand, be developed as more satisfactory sectoral equilibria are gradually achieved, the range of choices available to economic agents widens, information becomes more easily available, and administrative performance improves.

REFERENCES

BOYER, R., CHAVANCE, B & GODARD, O (Eds.)(1991). *Les figures de l'irréversibilité en économie*. Ed. de l'Ecole des Hautes Etudes en Sciences Sociales, Paris.

BULLA, M. & JUHASZ, I. (1990). *State of the Environment in Hungary and Environmental Policy.* Institute for Environmental Development, Institute for Environmental Management, Budapest.

BRESSERS, H. & KLOK, P.J. (1988). "Fundamentals for a Theory of Policy Instruments", *International Journal of Social Economics*, Vol. 15, Nos.3/4, pp. 22-41.

CHANDLER, W.U., MAKAROV, A.A. & DADI, Z. (1990). "Energy for the Soviet Union, Eastern Europe and China", *Scientific American*, September, pp. 121-127.

CHAVANCE, B. (1989). *Le système économique soviétique de Brejnev à Gorbachev*. Nathan, Paris.

CHAVANCE, B. (1991). "Rigidité et flexibilité systémiques: l'expérience des réformes dans les économies socialistes", in R. Boyer, B. Chavance and O. Godard (Eds.), *op.cit*., pp. 357-372.

CHAVANCE, B. (1992). *Transition et dépression en Europe de l'Est.* Centre d'Etudes des Modes d'Industrialisation (CEMI), Paris.

COOPER, R.C. & SCHIPPER, L. (1991). "The Soviet Energy Conservation Dilemma", *Energy Policy*, May, pp. 344-363.

DOWER, R.C. (1990). "Hazardous Wastes", in P.R. Portney (Ed.). *Public Policies for Environmental Protection*. Washington DC, Resources for the Future, Washington DC, pp. 151-194.

ESKELAND, G.S. & JIMENEZ, E. (1991). *Choosing Policy Instruments for Pollution Control. A Review.* Washington, The World Bank, Policy, Research and External Affairs Working Papers No. 624. Washington D.C.

FLEISCHER, T., POMAZI, I., & TOMBACZ, E. (1993). "Pour une économie soucieuse de l'environnement en Hongrie", in K. Vinaver, *op.cit*, pp25-32.

FRENCH, H.F. (1991). "Green Revolutions: Environmental Reconstruction in Eastern Europe and the Soviet Union", *The Columbia Journal of World Business, 26,* (1), Spring, pp. 28-51.

GODARD, O. (1993a). "Politiques de l'environnement et transition vers l'économie de marché dans les sociétés de l'Europe centrale et orientale: questions guidées par l'expérience française", in K. Vinaver, *op.cit*, pp. 161-188.

GODARD, O. (1993b). "Taxes", in OECD, *International Economic Instruments and Climate Change.* Paris, OECD, pp 43-99.

GOLDMAN, M.I. (1985). Economics of Environment and Renewable Resources in Socialist Systems. Part I: Russia", in A.V. Kneese and J.L. Sweeney Eds. *Handbook of Natural Resource and Energy Economics,* Vol. II. Elsevier Science Publishers, pp. 725-745.

HAHN, R.W. & HESTER, G.L. (1989). "Marketable Permits: Lessons for Theory and Practice", *Ecology Law Quarterly, 16,* (2), pp. 361-406.

HUGHES, G. (1990). *Are the Costs of Cleaning up Eastern Europe Exaggerated? Economic Reform and the Environment.* Centre for Economic Policy Research, Discussion Paper No. 482, London.

KAPP, K.W. (1950). *The Social Costs of Private Enterprise.* Harvard University Press, Cambridge, Mass.

KORNAI, J. (1984). *Socialisme et économie de la pénurie.* Economica Paris.

KORNAI, J. (1990). *The Road to a Free Economy. Shifting from a Socialist System: The Example of Hungary.* W.W. Norton & Co., London.

MAJONE, G. (1989). *Evidence, Argument and Persuasion in the Policy Process.* Yale University Press, London.

OECD (1991a). "Guidelines for the Application of Economic Instruments in Environmental Policy", in *Environmental Policy: How to Apply Economic Instruments.* OECD, Paris.

OECD (1991b). *The Role of Tax Reform in Central and Eastern European Economies.* OECD, Paris.

OECD (1992). *Climate Change. Designing a Tradeable Permit System.* OECD, Paris.

OECD (1993). *Taxation and Environment: Complimentary Policies.* OECD, Paris.

OPSCHOOR, J.B. & VOS, H.B. (1989). *Economic Instruments for Environmental Protection.* OECD, Paris.

PIREN (1990). *Le droit et l'environnement. Actes des Journées de l'Environnement du CNRS, 30 novembre - 1 décembre 1988.* Centre National de la Recherche Scientifique, Paris.

REPETTO, R., DOWER, R., JENKINS, R. & GEOGHEGAN, J. (1992). *Green Fees: How a Tax Shift Can Work for the Environment and the Economy.* World Resources Institute, Washington DC.

RUSSELL, J. (1990). *Environmental Issues in Eastern Europe: Setting an Agenda.* The Royal Institute of International Affairs, London.

SWEDISH MINISTRY OF THE ENVIRONMENT (1991). *Economic Instruments in Sweden with Emphasis on the Energy Sector.* Stockholm.

VINAVER, K. (Ed.) (1993). *La Crise de l'environnement à l'Est.* l'Harmattan (Coll. "Pays de l'Est"), Paris.

WATSON, W.D. & RIDKER, R.G. (1984). "Losses from Effluent Taxes and Quotas under Uncertainty", *Journal of Environmental Economics and Management, Vol. 11,* pp. 310-326.

WILCZYNSKI, P. (1990). *Environmental Management in Centrally-Planned Non-Market Economies of Eastern Europe.* The World Bank, Environment Working Paper No. 35, Washington DC.

ZYLICZ, T. (1990). "Environmental Reform in Poland: Theories Meet Reality," paper presented at the International Workshop on Institutional Design, Bialowieza (Poland), September 17-20.

ZYLICZ, T. (1991). "The Greening of Poland's Economy," paper presented at the Rencontres internationales de Nantes, "L'environnement: France - Pays de l'Est", Nantes, Forum International de Politique, 23-24 Mai.

TAXATION AND ENVIRONMENT IN POLAND

by

Tomasz Żylicz
University of Warsaw[1]

Environmental Management in Poland

Unlike in many other countries, environmental and natural resource management in Poland is overseen by one agency - the Ministry of Environmental Protection, Natural Resources, and Forestry (hereafter the Ministry of Environment, MoE). The following fields fall within the authority of MoE:

-- environmental protection, abatement, and monitoring;
-- nature conservation, and national park administration;
-- forestry;
-- water abstractions, river basin management, and anti-flood measures; and
-- mining concessions.

Thus, Poland's MoE is an agency with a domain ranging from "traditional" environmental programmes to national parks and forests (which in many countries fall within the jurisdiction of Departments of Agriculture or Interior), to natural resources like water and mineral deposits (which in most countries are overseen by separate agencies).

This, however, does not imply that all the government control has been centralised in one unit. First, some environmental policy aspects are predominantly dealt with by other government agencies. The Ministry of Labour and Social Affairs is in charge of occupational safety; the Ministry of Construction and Municipal Administration is in charge of municipal water supply and sewage collection systems, as well as spatial planning and development; the Ministry of Health, ambient environmental quality monitoring and food and drug monitoring; the Ministry of Agriculture, pesticide control; and the Ministry of Industry, energy efficiency. The Ministry of Industry is also responsible for the overall development of extractive industries, including coal mines (both deep and open-cast). This division of responsibilities is occasionally a source of friction and disputes.

Second, most environmental management decisions are left to regional or local authorities, and MoE merely processes appeals, should a decision be contested by an interested party. Water and air pollution permits, as well as permits for waste disposal and water abstractions, are issued by the 49 regional administrators, who are appointed by and report to the Prime Minister.[2] They also collect pollution fees and water abstraction charges. Municipal authorities[3] issue permits for tree cutting (outside state forests) and make factory siting decisions. They also collect fees for tree cutting.

---

[1] This paper was prepared while the author was Valfrid Paulsson Guest Professor at the Beijer International Institute of Ecological Economics (The Royal Swedish Academy of Sciences, Stockholm). The author wishes to thank his colleagues in Poland's Ministry of Environment, and, in particular, Ms. Joanna Spyrka of the Economics Department, for keeping him updated on recent developments in the areas discussed in this paper.

[2] Poland is divided into 49 regional administrative units (województwo). There are no elective bodies at this level of government.

[3] Poland has approximately 3000 municipalities (gmina), governed by elected councils.

Third, there are several central agencies operating outside the regular MoE structures, even though they report to the Minister of Environment. These are:

-- The State Environmental Protection Inspectorate, the agency responsible for enforcement of environmental regulations, and most of environmental monitoring;

-- The State Forest Administration, the state-owned concern responsible for commercially managing state forests (78 per cent of the country's forest land), and for inspecting privately owned forests to enforce relevant regulations;

-- The National Park Authority, a small unit established mainly to coordinate budgetary allocations among all 18 national parks;

-- The Geological Concessions Office, a small administration in charge of granting concessions and negotiating fees;

-- The National Fund for Environmental Protection and Water Resource Management (hereafter the National Fund, NF), which receives and reallocates the major share of "environmental" and geological fees (there are several smaller specialised funds as well);

-- The seven Directorates of the Water Resource Administration, whose mission is to maintain river courses, coordinate anti-flood activities, and collect river-transport fees.

Finally, water resource management is now being transferred to Poland's seven newly established river basin authorities. These agencies, whose juridiction more or less corresponds to the seven Directorates mentioned above, are being established to take over most of MoE's authority in the field of water permits. It is also envisaged that in the future these agencies -- each including locally elected consumer and industry representatives in its structures -- will collect and allocate funds from water fees (for both water use and water pollution) within their respective basins. With this reform, inter-basin water transfers and pollution externalities would be the only major domain of water management still falling within the interests of the central state administration.

The National Fund has been the most important agency for environmental taxes. Most of the revenues from environmental taxes, charges, and fines go to this Fund, although some are spent at the regional level or go to several smaller funds. The Ministry of Environment plays a role in setting environment fees, as it drafts fee regulations, which must be accepted by the Council of Ministers. These two institutions, MoE and the National Fund, thus have been responsible for most of what can be viewed as "environmental taxes" in Poland.

Some general taxes or duties can be classified as "environmental" as well, since it would be difficult to contemplate a fiscal regulation fully neutral with respect to natural resource scarcity. However, for the time being, these taxes have had only minor environmental effects, and their introduction and design were motivated almost entirely by non-environmental considerations.

Environmental and Resource Fees

Environmental fees have existed in Poland since the 1970's. They were introduced to motivate polluters to adjust their behaviour to environmental protection requirements, and many environmental analysts in Poland insisted that such fees were not only superior to alternative instruments, but also a prerequisite for a rational management system. The analysts seemed to overlook the fact that financial instruments were doomed to failure in an economy where all essential inputs were allocated administratively and plant managers had little incentive to pay attention to price stimuli. Instead of addressing the real

issues, environmental policy makers complained that the fees were too low, and poor environmental performance was linked to the inadequate level of these fees.

Initially, Poland's environmental fees were indeed rather low. However, they were revalued several times to reach their peak pre-reform level in 1987. It should have been obvious though that even this relatively high level was of little significance without market conditions.

In 1989, with the collapse of the former regime as well as the advent of galloping inflation, environmentalists managed to introduce legislation pegging fee rates to the official inflation index. Their intention was to make sure that fees were not left at the mercy of politicians. Unfortunately, the proponents of this measure did not realise that the fees were pegged to the ex post inflation index which -- at best -- becomes available by the middle of the year after the one the fees apply to. As a result, three-digit inflation in the second half of the 1989 made the real value of fee rates negligible in 1990.

In 1990, MoE convinced the Parliament to decouple fee rates from the inflation index. At the same time, it convinced the Council of Ministers to significantly increase these rates, not only to make up for the inflation losses thus far, but also to match the predicted inflation rate. The argument proved good enough to arrive at fees even higher than in 1987. The new rates became effective in July 1990. Next the MoE convinced the Parliament to revise the legislation on the collection of fees. The fees used to be collected after the end of the year they were assessed for, another factor that made the system vulnerable to inflation. With the next fee revisions, which became effective in January 1991, the Environmental Act was amended to allow an optional collection of instalments every quarter (this clause allows regional authorities to apply the quarterly procedure only to the largest polluters, reducing associated administrative costs).[4]

The third major fee increase became effective in January 1992. The rates for water and air pollution and solid waste disposal and for water abstractions are shown in Tables 1 to 5 (converted to US dollars using the exchange rate of 13,500 złoty per US$ 1, the prevailing exchange rate of the Polish currency in mid-1992). In addition to those listed in the tables, fees are also charged for tree cutting, for water transport, for mining concessions and for conversions of forest land to non-forest uses and agricultural land to non-agricultural uses. (Information on these other fees and charges can be found in the technical note at the end of this chapter.) These revenues, however, are smaller than those from pollution and water use fees, and whereas almost one-half of the revenues from the charges listed in Tables 1 to 5 go to the National Fund, some of these other charges go to specialized funds -- for example, for forestry and farmland protection.

Because of a series of chaotic political developments in 1992, both charging principles and charging rates were changed, reducing revenues by 32 percent.[5] On April 1, 1993, however, new rates became effective, which revoked most of the changes. The new rates are only slightly lower, in terms of real values, than their January 1992 levels. For example, the SO_2 charge -- the single most important source of revenue for the environmental funds -- decreased from $80 to $72 per tonne (using, for the latter figure, the mid-April exchange rate of 16,600 zloty per US$).

---

[4] Typically in a region, less than ten polluters out of up to several hundred provide a majority of all revenues. It is here where most of the administrative effort -- monitoring, assessment, and enforcement -- should be targeted.

[5] Contrary to some interpretations, the roll-back in fee rates for air pollutants was not caused by the political pressure of "an industrial lobby": instead, it resulted from informal pressures exerted by suburban greenhouse owners whose contribution to both production and employment in local economies is marginal (even though they are the major local air pollution source). Nevertheless, taking advantage of the chaos and poor leadership in MoE and other relevant public bodies, greenhouse owners were successful at reducing these rates.

Table 1. Fees for the discharge of waste water and saline (coal-mining) water [$/tonne]

		BOD_5	COD	SS	C&S	HM	VP
1	Power generation, fuel processing, chemical, metallurgical, machine, and light industries	1489	1027	64	5	7407	2963
2	Paper and pulp industries	617	398	64	5	7407	2963
3	Food industries	384	257	64	5	7407	2963
4	Urban municipal sewage	144	87	64	5	7407	2963
5	Rural municipal sewage, hospitals, and social care institutions	129	77	64	5	7407	2963
6	Other (except saline coal-mining waters)	720	411	64	5	7407	2963
7	Saline coal-mining waters discharged directly to an aquifer	-	-	-	41	7407	-
8	Saline coal-mining waters discharged from dosing reservoirs	-	-	-	5	7407	-

Notes: For discharges into lakes and retention reservoirs, double rates apply. Fees applied in the Katowice administrative region are twice as high as in the table.

BOD_5 = Biochemical oxygen demand during the first 5 days
COD = Chemical oxygen demand
SS = Suspended solids
C&S = Chloride and sulphate ions
HM = Heavy metals (total mass)
VP = Volatile phenols

The total payment is calculated as the maximum of amounts due for BOD_5, COD, SS, and C&S, plus where applicable, HM and VP.

Table 2. Fees for the emission of atmospheric pollutants [$/tonne]

1	Acrylonitrile (aerosol), asbestos, benzene, benzo(a)pyrene, and chlorinated vinyl (gaseous)	74074
2	Arsenium, chromium, nickel (fee rates apply to the metal content)	74074
3	Bismuth, cadmium, cerium, cobalt, lead, manganese, mercury, molybdenum, tin, and zinc (fee rates apply to the metal content)	37037
4	Dioxines, freons, halons, and polychlorinated biphenyls	37037
5	Sulphur dioxide and nitrogen oxides (calculated as nitrogen dioxide)	80
6	Carbon monoxide, and aliphatic hydrocarbons and their derivatives	22
7	Other hydrocarbons	222
8	Particulate matter emitted from combustion processes	44
9	Polymers (particulate matter)	74
10	Other particulate matter (5 categories)	222
11	Oils	74
12	Other (18 categories)	148 to 1852

Note: Rates for Katowice and Kraków administrative regions were double those of above (this principle was discountinued in mid-1992)

Table 3. Fees for the disposal of solid and toxic wastes [$/tonne]

1	The most toxic wastes (60 categories) including e.g. waste with high heavy metal concentrations, used lubricants, asbestos, hospital waste, sludge from primary treatment of urban municipal sewage, etc.	18.52
2	Medium toxic wastes (40 categories) including e.g. waste with low heavy metal concentrations, polychlorinated biphenyls, used pharmaceuticals, rotten foodstuffs and feedstock, etc.	7.41
3	Low toxic wastes (35 categories) including e.g. ashes, flue gas desulphurisation sludge, fruit-and-vegetable processing waste, etc.	2.96
4	Non-toxic wastes (17 categories) including e.g. coal-washing sludge, glass, paper, building demolition debris, etc.	1.48

Note: In the Katowice administrative region, double rates applied (this principle was discountinued in mid-1992)

Table 4. Fees for surface water abstractions [$ / 1000 m^3]

		A	B	C	D
1	Industrial uses other than electricity and heat	117.04	58.52	23.33	23.33
2	Electricity and heat*	23.70	11.85	5.19	5.19
3	Household, municipal, and agricultural uses	3.70	3.70	3.70	3.70

* In the case of cooling water, the fee applies only to the difference between the volume of inflow and outflow

Table 5. Fees for ground water abstractions [$ / 1000 m^3]

		A	B	C	D
1	Industrial uses other than food and drugs	174.81	174.81	174.81	70.00
2	Food and drug production*	58.52	58.52	58.52	23.33
3	Household, municipal, and agricultural uses	3.70	3.70	3.70	3.70

* Only direct technological uses

Regions (in tables 4 and 5):
A = Katowice
B = Bielsko-Biała, Częstochowa, Jelenia Góra, Kielce, Kraków, Legnica, Nowy Sącz, Opole, Tarnów, Wałbrzych, and Wrocław
C = Chełm, and Lublin
D = Other (i.e. the remaining 35 administrative regions)

To the extent that environmental fees are subtracted from taxable income and most of their revenues are allocated for environmental policy purposes in the form of subsidies, they can be viewed as an indirect budgetary contribution of the state to environmental investment programmes.

Poland also has a system of non-compliance fees, for all discharges above legally or administratively set limits. In contrast to the regular fees, these non-compliance fees are payable from after-tax incomes. These latter instruments thus have a stronger incentive effect.

Non-compliance fees are assessed on all the same pollutants for which regular fees are collected. In the case of water pollutants, a very complicated formula is applied which gives a result in the order of the regular fees for pollutants listed in table 3. In addition, violations of the following terms of a water permit result in a non-compliance fee (in $/1000 m^3):

-- exceeding the allowable temperature of discharged cooling waters by up to 5°C:	10.37
-- exceeding the allowable temperature of discharged cooling waters by over 5°C:	210.00
-- exceeding the allowable acidity/alkalinity limit for effluent by up to 0.5 pH:	210.00
-- exceeding the allowable acidity/alkalinity limit for effluent by more than 0.5 pH:	420.00
-- exceeding the allowable level of radioactivity of effluent:	1051.85

Municipalities, however, pay only 25 per cent of these fines.

In the case of air pollutants, the non-compliance fee (charged per every unit above allowable emissions) is 10 times the regular fee listed in Table 2. Polluters who emit without a valid permit (i.e. without an allowable level of emissions) are charged double rates per every unit of emissions.

Non-compliance fees for waste disposal are related to the regular fees from Table 3. They are assessed as 1/20 of the latter per every day of depositing the waste without a valid permit. In the case of wastes which are not explicitly listed in table 5, $0.07 per tonne per day (i.e. 1/20 of the non-toxic waste regular fee) applies. There are also non-compliance fees for tree removal and for exceeding allowable noise levels (described in the technical note).

The non-compliance fees applied in the Katowice administrative region -- just as the regular fees -- used to be twice as high as those elsewhere. In the Kraków administrative region, air pollution non-compliance fees were twice as high. These surcharges were discontinued for air pollutants in mid-1992. In the case of "chronic" non-compliance with air and noise pollution permits, which is defined as lasting more than 3 years, the rates are doubled.

Effectiveness, Efficiency, and Equity of the Fee System

The extensive system outlined in section 2 has evolved since the 1970s. While it hardly makes a consistent model for environmental management, it does attempt to address some fundamental questions of effectiveness, efficiency, and equity. Its basic rate structure has remained more or less stable since it was introduced. Most of the changes over time were simply to rescale the rates to inflation indices or to include new pollutants (and relate these to similar ones covered before). The only major exception were significant relative increases in charges for some volatile organic compounds, which took place in 1990-91 (but were then moderated in 1992).

It has been well documented that pollution fee systems failed to protect the environment in Poland and elsewhere in Central and Eastern Europe (see, for example, Żylicz, 1993). Their effectiveness was thus low. Two factors were responsible for this: low rates, and the lack of incentives for economic actors to save on costs. Both impediments have now been removed or at least lowered, and one can observe how the pollution fee system in Poland has started to bring first positive results. These, however, cannot be entirely attributed to the increased fees and the emergence of cost-minimising behaviour. Rather, they are a combined outcome of the overall market reform, a more consistent use of direct regulations, and higher fees.

First of all, switching to a market-based system has eliminated some of the most outrageous examples of wasteful use of resources. This, in turn, has contributed to lower emissions of many pollutants (Żylicz 1993). Also, after the 1989 revolution, the government attempted to improve enforcement by making more courageous use of administrative instruments, including forced plant shut-downs. In 1990, roughly 100 heavy industrial polluters were forced to shut down either completely or in part (leaving only their less polluting operations). The government also tried to change the concept of the non-compliance fee so that most cases of violating environmental requirements would trigger an administrative action, leaving non-compliance fees to be assessed only in cases of accidental spills and emissions. This move turned out to be more difficult than expected, and non-compliance fees still are collected in some "chronic" cases. An effective alternative to a shut-down would be a marketable permit option. However, because of the insufficiency of the existing legal framework, exercises of that kind can be done on an "experimental basis" only (see Dudek, Kulczyński and Żylicz, 1992 for a description and assessment of Poland's first emissions trading project).

Poland has become a country with fairly high pollution fees -- in fact, they rank among the highest in the world. Despite the recession, the public environmental funds financed by fees each year now collect and spend 15 to 20 times more, in real terms, than they did in 1990. In 1991 these funds paid for about

40 per cent of Poland's environmental expenditures, the rest being financed mostly from polluters' own sources. In 1992, the slight overall increase in pollution fees meant that their revenues were equivalent to about 0.5 per cent of the country's GDP.

Some fees already provide strong incentives to abate. The sulphur dioxide rate, even at only US$ 72 per tonne of emissions, is higher than almost anywhere else in the world. A number of mines are reported to have undertaken investment in coal-washing equipment, as a result of the decline of demand for high-sulphur coal. With respect to other pollutants, charge rates are also high in comparison to the OECD practice. However, even this high sulphur dioxide fee is still lower than the marginal costs of, say, a permanent 30 percent reduction in emissions, estimated at almost US$ 600 per tonne of sulphur dioxide abated.

The efficient or "Pigouvian" level, as understood by policy theorists -- that is, equal to the marginal cost of abatement needed to meet policy objectives -- would be roughly 8 times higher than the current level of sulphur dioxide fees in Poland. Average abatement costs, although several times lower than marginal ones, are still higher than the rates charged. The current level of rates thus serves mainly as a means to raise revenues rather than a means to create incentives for reduction in pollution (as in most applications worldwide). It is simply aimed at raising funds to secure an adequate public share in financing protection and recovery. This share should be kept within reasonable limits. The needs for public fund involvement, however, are rather wide in the period of recovery, because of the backlog of past problems.

As a result of policy steps taken in 1990 and 1991, environmental investment expenditure in Poland reached US$1.3 billion in 1991. Of this sum, US$840 million were spent on the environment *sensu stricto*, that is, excluding investments in water retention and water supply systems.[6] The remainder of the analysis is confined to this narrow definition of environmental protection.

The 1991 expenditure in real terms was almost 50 per cent higher than that of 1990 (the previous highest year). Its percentage share in the country's national income grew from 1.1 to 1.6 per cent according to the statistical methodology applied in previous years (MPS, constant 1984 prices). It turns out, however, that prices for environmental protection goods and services grew at a slower pace than the overall inflation index. Thus, if evaluated at current prices, the percentage share increased only from 0.9 to 1.3 per cent. Finally, Poland's Gross Domestic Product (according to the SNA methodology) is larger than earlier estimates. Taking this into consideration, it can be concluded that the environmental investment expenditure grew from 0.7 per cent of GDP in 1990 to 1.1 per cent in 1991. Anyway, for the first time, the share of Poland's GDP spent on environmental investments reached levels similar to those in OECD Member countries.

The increase of expenditures was achieved despite eliminating, as economically inefficient, major tax allowances (which have existed since long ago) for environmental investors. In 1990, Polish enterprises faced for the first time hard budget constraints, instead of the "soft" budget constraints of a centrally planned economy; soft budget constraints (described in Kornai, 1985) are those on physical flows or administratively allocated resources, rather than on finances. That year, 1990, was also the last year that firms could receive income tax allowances for environmental investments. Thus, 1990 was the only year ever for those allowances to work. Large numbers of allowances were granted by tax authorities. Occasionally, MoE was consulted whether an investment complied with the definition of an "environmental project." Since the Tax Law was vague on that issue, all modernization projects that somewhat improve plant environmental performance could have been considered for the allowance. On the other hand, a too

[6] Many environmentalists would insist that water retention and water supply is more an environmental problem than a solution. It is therefore better to exclude these from this analysis. All figures quoted in this section are the author's estimates based on information from the Central Statistical Office in Warsaw, checked against data collected by various departments of the Ministry of Environment.

liberal interpretation of the Law would have resulted in a collapse of the State Budget. And so, its actual application had to be a compromise.[7] Interestingly, the elimination of these tax allowances in 1991 turned out to be more than compensated by the activities of environmental funds.

The recent incremental expenditures correspond thus to the rapid increase in pollution charges and non-compliance fees which are recirculated through the National Fund, and its 49 regional counterparts (administered by regional administrators as parts of their respective budgets). The estimated breakdown of financing the overall investment of US$840 million was in 1991 as follows:

State budget (grants)	5%
National Fund (grants + soft loans)	15%
Regional environmental funds (grants)	25%
Enterprises (polluters' own resources + commercial loans)	30%
Municipalities (municipal budgets + commercial loans)	20%
Foreign assistance (grants + development loans)	5%

It should be noted that 95 per cent of environmental expenditures was financed from various domestic sources. Another interesting feature is the low contribution of the state budget, which in principle can only finance nature conservation projects and some afforestation projects. However, for historical reasons there are still some municipal sewage treatment plants being financed from the budget (at least partially). In contrast, municipal budgets directly contributed -- net any loans municipal entities took out -- almost 14 per cent of environmental investment expenditures in 1991.

In 1992 -- despite problems with maintaining the initially planned level of fees -- environmental funds managed to collect and spend US$ 483 million, 44 per cent more than in 1991. Preliminary estimates suggest that the high level of investment was sustained, although there was no significant increase. As a result, the environmental funds' share has now become more than 50 per cent. On the one hand, this underscores the critical role of the Polish pollution fee system in environmental recovery process. On the other hand, however, it reveals how fragile is the enforcement of environmental protection measures: the direct expenditures from polluters own sources decreased immediately in response to a period of political turbulence in 1992 that reduced the competence and prestige of the MoE.

It is too early to observe any spectacular effects of the newly implemented policies: the government has not succeeded in restoring the environment yet. Nevertheless, in all regions which succeeded in recovering from ecological catastrophe, including London, Pittsburgh and the Ruhr Basin, success was achieved gradually as a result of lengthy investment programmes. In this light, the pollution fee system in Poland has become an effective fund-raising mechanism, and thus a key element of environmental recovery.

However, the efficiency of this mechanism is questionable on several grounds. *First*, the fee lists -- especially those for air pollutants -- are excessive if confronted with the country's monitoring capacity. More than 50 substances are covered in Table 2. Of these, only a fraction can be monitored regularly. It is thus costly and administratively cumbersome to attempt the collection of fees which are routinely challenged by the polluters as not justified in terms of actual emissions. However, the picture is more complex, because while the lists may fail to provide instruments for immediate pollution control, they do contribute to the development of environmental monitoring by offering incentives for inspectors to upgrade

[7] The Economics Department at MoE developed an interpretation of the law referring to two criteria: *technology* and *impact*. The former was satisfied if the investment project in question introduced an environmentally sound technology whose acquisition or development was of interest to Poland; the latter took into account the population affected. Despite the fact that many projects were deprived of a potential subsidy, this interpretation was not challenged.

their monitoring skills. Hence, the overall impact of these lists should be viewed from a broader institutional perspective.

Second, the differentials in fee rates across various pollutants are not necessarily justified in terms of their marginal damages. Even a quick look at Tables 1, 2, and 3 shows that fee rates vary widely. In the case of water pollutants their per-tonne ratios exceed 10,000:1; for air pollutants, 1000:1. Such large differences certainly reflect in part the differences in environmental harm various substances can be responsible for. But there is absolutely no evidence that these fees reflect any estimated damage functions. At the same time, damages are highly site-specific, which the fee system does not take into account in a satisfactory way. Even though there are some site-specific qualifications in the rate structure, these are much too simplistic to be relied on. As a result, inefficiency is caused by the fact that polluters are pushed along their marginal abatement cost curves to the same level, even though respective marginal damages may be quite different.

Third, equity measures this system incorporates impair its efficiency even further. The most evident equity-motivated rate differentiation is applied in the case of fees for water use (see Tables 4 and 5). Differences between the regions (columns A-D) reflect varying scarcity of water, they were dictated by efficiency considerations, and they do not exceed the ratio of 5:1. On the contrary, differences between various uses and users (rows 1-3) are much larger -- almost 50:1 in some regions. The policy manifested by these rates was to favour households and farmers. The medium rates for power plants and food and drug manufacturers are part of this system. (For example, food and drug manufacturers pay lower rates for the use of ground water, presumably which should be cleaner than surface water, for health reasons.) There was, however, no serious research effort to test whether this intuitively appealing differentiation has any merit on the grounds of a general model of the economy. Moreover, the rates currently applied for households are in the order of 1 percent of the prices (that is, the user fees) charged by water supply companies. The policy of keeping the former at such a low level seems to be an excessive precaution even under the most socially sensitive policies.

Additional distortions result from the method of recirculation of fees. Three categories are earmarked for the uses they originate from: saline coal-mining waters (Table 1, rows 7-8), and air emissions of sulphur dioxide and nitrogen oxides (Table 2, row 5). The distortion[8] is, however, mitigated by the freedom of choosing any abatement project in any region. Thus, for instance, fees collected from a power plant do not have to be spent on expensive end-of-pipe treatment, but, instead, may be used to co-finance a coal-washing project elsewhere. Much more severe distortions are caused by the fact that, in net terms, Poland's environmental funds have acted as agencies transferring resources from manufacturing industries to municipalities thus reinforcing wrong signals sent to the household sector. This is yet another example of how equity concerns interfere with the efficiency of the fee mechanism. On top of that there are poor project screening and assessment procedures which sometimes lead to selecting projects that are not cost-effective even in their respective narrow category of abatement.

To sum up, Poland's extensive resource and pollution fee system makes a key contribution to environmental policy. Fee rates are high by the OECD standards, but still below their respective Pigouvian levels. As a result they primarily act as fund-raising tools. In so doing, they have been instrumental in dramatically increasing the country's environmental investment expenditures they now contribute 40% of (or more). Since they are typically below efficient levels they cannot be relied on as exclusive guides for carrying out environmental policies. Their inefficiency is further impaired by insufficient spatial differentiation of fee rates, and their excessive differentiation (motivated by equity considerations) across uses and users.

[8] Assuming that fee rate differentials across various pollutants do not necessarily correspond to the differentials in marginal damages from pollution.

Other Taxes and Duties

Virtually any tax has an environmental impact. While there are no studies to assess this aspect of taxation in Poland, several observations can be made on the basis of the tax rules, rates, and exemptions.

Generous tax allowances for environmental investments were discontinued in 1991. Nevertheless, there are still some allowances which marginally improve the profitability of recycling, conservation, and other environmental measures. The following is the list of such provisions (based on Paradysz, 1992):

-- donations for environmental purposes are deductible from income tax (up to 10 per cent of pre-tax income in most cases);

-- corporate taxpayers buying recycled materials (other than precious metals) receive income tax allowance up to 5 per cent of the value of the recyclables bought;

-- farmers who invest in, or modernise, environmental protection equipment receive income tax allowances;

-- several categories of products are exempt from sales tax:

- environmental protection goods (both domestically produced and imported);
- goods recycled (regenerated) by the seller;
- goods produced from recycled materials (other than precious metals), provided that these materials exceed 40 per cent of inputs;

-- non-profit organisations whose charter activity is environmental protection are exempt from income taxes on income earned from environmental protection activities and from various administrative fees;

-- several categories of property are exempt from real estate tax:

- water supply and sewage collection installations;
- land used for water retention reservoirs, and hydro-power stations;
- various types of forest land;

-- sales required under the Environmental Protection Act are exempt from real estate sales tax;

-- donations of real estate for environmental protection purposes are exempt from income tax;

-- and farmers taking out loans for the adoption of more environmentally friendly farming practices receive interest rate subsidies of up to 90 per cent.

The sales tax in Poland (replaced by a value added tax in July 1993) differentiated among various product and service categories. As a rule, basic consumption goods were taxed lower than alcohol, cigarettes, and items considered luxuries (such as consumer electronics). Liquid fuels were and remain subject to higher taxes, with petrol taxes that reach about 50 percent of the retail prices. In October 1992, the per-litre price of leaded petrol (94 octane) was $0.55 (7700 zł), lead-free petrol, $0.54 (7600 zł), and diesel oil, $0.41 (5800 zł) -- certainly higher than in the United States, but still lower than in the European Community. The differentiation between leaded and lead-free petrol was introduced only in 1992, as before the government did not have the capacity to check the lead content of imported fuels.

Although MoE has suggested setting lower tariff duties on the import of environmentally friendly products, the government decided not to introduce new allowances into an already very liberal tariff system.

Tariffs for automobile imports should encourage the import of newer, less polluting cars, as the amount of duty on imported cars increases with their age. There is a complete ban on the import of cars over 10 years old.

In 1992, the National Fund started receiving a portion of mining fees, most of which are recirculated to the mining sector to finance exploration and prospecting, as well as environmental protection. The mining fees play an important revenue-raising role: given the substantial role of the mining sector in Poland's economy, even the modest share and imperfectly collected fees provided 12 per cent of the revenues of the National Fund. This sum should speed the implementation of environmental projects at coal mines. These fees are too low, however, to provide a significant incentive for conserving exhaustible resources.

This section has shown that a number of fiscal measures act as de facto environmental taxes or subsidies. Whilst they have a low incentive role, they help raise revenues for environmental investments and activities. Since these measures can be seen as indirect subsidies, their efficiency requires serious analysis. Given the fact that many of these measures were introduced either on an ad hoc basis, as "green" ornaments to various bills and regulations or as a quick compromise between various government departments, their efficiency seems to be questionable (even though no rigorous studies exist to prove this). So is their equity and effectiveness.

An Outlook for the Future

In 1992, environmental expenditures in Poland sustained the same real level achieved in 1991. However, pollution fees in Poland have become very high, and the economy is close to the limits of what it can spend on the environment from domestic resources. The conclusions are, therefore, twofold. First of all, the time has come to scrutinize environmental expenditures carefully and apply various innovative instruments (in addition to fees) in order to obtain maximum physical effects per dollar spent. Second, any additional spending -- especially for projects with mainly transboundary or global benefits -- requires some form of international cooperation.

The contribution of the state budget, as well as that of foreign assistance programmes will remain marginal. Poland's state budget claims roughly 30 per cent of the country's GDP, and this share is not expected to increase. Environmental assistance from OECD Member countries and the Commission of European Communities to Poland has probably reached its peak. So far, Poland has received by far the largest share of bilateral assistance, and foreign aid will probably shift toward other post-communist countries in coming years.

Debt-for-environment swaps are a different story. They provide a source of assistance which will last potentially longer -- up to 18 years, the time horizon of Poland's debt agreement with the Paris Club of foreign government creditors. In 1991, Poland achieved 50 per cent reduction of its outstanding official foreign debt (that is, debt owed to foreign governments). Simultaneously the Paris Club decided that an additional 10 per cent may be swapped in voluntary, bilateral agreements with each of the 17 creditor countries. The Polish government used this opportunity to launch a large scale debt-for-environment swap initiative. The initiative envisages supporting, in particular, those projects which have transboundary and global significance. If all the creditors approved the 10 per cent clause, then Poland would gain an additional $3 billion to be spent on the environment over the next 18 years. The time profile of debt service is not uniform: if the full 10 per cent were swapped, it would have provided $120 million per annum from 1991 to 93, and up to $400 million around the year 2000, when the peak payments are due. However, not all the creditors are ready even to discuss this opportunity.

In 1992 Poland's Minister of Finance established EcoFund, a foundation to administer whatever resources become available as a result of debt-for-environment swaps. Ecofund started by administering

the US$ 6.5 million swapped by the United States. However, even under the most optimistic scenario, if all Poland's official creditors were to contribute 10 per cent, EcoFund would never account for more than 15 per cent of Poland's environmental investment expenditures. One can expect that debt-for-environment swaps will grow to substitute other forms of foreign assistance. Nevertheless, these external sources will always contribute only a fraction of the domestic funds that go for environmental expenditures. This reinforces the need for designing mechanisms to radically improve cost-effectiveness of expenditures.

New Market-Oriented Instruments

Estimates of the cost to put Poland on the path to sustainable development go as high as the hard-to-contemplate sum of US$ 260 billion, more or less triple the current GDP figure, for all necessary economic changes, including (but not confined to) environmental protection investments. It is difficult to expect that the economy can bear such a burden, even over 30 years. If, however, market forces can be effectively "harnessed", necessary investment expenditures may turn out to be much lower. This task -- to the extent it implies emphasis on financial criteria in decision-making -- is not easy for a country like Poland.

Striking the balance between sectoral and regional versus financial (macroeconomic) approaches is, perhaps, the major challenge environmental and industrial policies are to meet. On the one hand, discretionalism has to be avoided, in order to achieve the necessary psychological breakthrough in the attitudes of industrial managers accustomed to central planning and a strongly paternalistic state administration. Since the beginning of the post-1989 reforms, such managers have been seeking individual or sectoral subsidies, exemptions, tariff protection, and other special measures. To yield to such pressures would lead to the instant decay of the emerging market system. On the other hand, an over-reliance on financial measures in the absence of well-established market structures and wide-spread entrepreneurial attitudes has led to an economic collapse much deeper than initially expected, and, perhaps, deeper than necessary.

Is there any way to reconcile the need for sectorally and regionally customized policies with the necessity to stick to firm financial rigors? One option is to use marketable permits for both regional and sectoral problems. Successful examples of regional implementation of marketable permits are provided by the numerous "bubbles", found to be the only practical and cost-effective way to meet ambient standards in many non-attainment areas in the United States. The textbook example of a successful sectoral programme is the phasing-out of lead additives in American refineries. Finally, combined sectoral/regional efforts were observed in cases where industry-specific pollutants (such as volatile organic compounds released from laundries) were tackled on a municipal basis (see Tietenberg, 1993).

So far, practical implementation of marketable permits has been almost entirely confined to the United States. Despite their obvious advantages, environmental policy in Europe has largely ignored this option. The legal and administrative tradition in many Western European countries may be the main obstacle to introducing marketable permits there. Thus, it is both likely and desirable that Central and Eastern Europe will apply these instruments sooner than the rest of the continent.

Economic policies in post-communist countries need to be based on firm, system-wide solutions, but the new system itself is in statu nascendi; thus some discretionary measures are unavoidable. A careful balance between necessary state intervention and general system development is therefore of paramount importance. Policy steps to provide a "critical mass" of both environmental and economic reforms should be identified and implemented, to produce the necessary momentum for change. Otherwise, environmental interventionism could be an obstacle to successful reform of the economic system. It is possible, however, to design a set of policy instruments that improve environmental policy and promote markets simultaneously, which is a prerequisite for sustainable development. Economic instruments have a particularly important role to play in this context, and their role has been acknowledged by the Polish MoE since the very beginning of current reforms (see Ministry of the Environment, 1990).

Economic instruments include, first of all, fees and marketable permits. These are supplemented by subsidies (distributed in the form of grants, tax allowances, soft-loans etc.); budget-neutral instruments (e.g. tax differentiation and deposits on harmful products); and finally, non-compliance fees. Economic instruments perform a number of useful functions. Theoretically, their most important task is to minimize overall costs of environmental protection through an efficient differentiation of control requirements; namely, those agents with the lowest abatement costs should be given the most stringent requirements. In practice, however, the most typical function performed by economic instruments is to raise funds to be spent on environmental management needs. Only marketable permits -- wherever they are applied -- have the explicit objective of achieving cost-effectiveness.

Economic theory suggests that the efficient results yielded by marketable permits can also be achieved by Pigouvian taxes. The alternative is thus either to raise the existing pollution fees to their Pigouvian levels, or to leave them as basically fund-raising instruments, and introduce marketable permits. It was indicated in previous sections that even now -- at sub-Pigouvian levels -- emissions fees in Poland provide a very high percentage of environmental investment expenditures, though there is likely little potential for further dramatic growth. Raising the fees to the level of marginal abatement costs would imply that virtually all environmental protection costs could be met with the funds collected. In order not to eliminate private environmental expenditure, not all the revenues should be earmarked for environmental projects; they may well substitute for other taxes. While theoretically possible, and, perhaps even desirable, such a tax reform clearly would be a major pioneering endeavour, and cannot be a viable environmental policy option in Poland for the next couple of years.

There is yet another option which can combine rising taxes to their efficient levels without implying excessive financial transfers: a set of Pigouvian taxes charged for "incremental" emissions only, where the volume of benchmark (uncharged) emissions can be adjusted to meet any equity criteria [Pezzey 1989]. This system, however, must include an initial allocation of benchmarks with "grandfathering" being the easiest way to go. But if the problem of initial allocation is solved satisfactorily, then the road is also paved to apply permit markets, which are more likely to achieve the desired environmental effect (in a least-cost way) than taxes.

The "Polluter Pays" and "User Pays" Principles

According to the Polluter Pays Principle (PPP) as interpreted by OECD Member countries, the polluter is financially responsible for meeting environmental standards set by government authorities. OECD countries acknowledge the need to bypass this principle in special circumstances, especially in the case of prior environmental neglect for which the polluter may not have been fully responsible. Moreover, in some OECD countries the PPP is considered not to be violated if the polluters are financially supported through funds collected from pollution fees.

When the strict responsibility of a given polluter is hard to enforce, some OECD countries apply an alternative Polluters Pay Principle (note the plural). The direct relationship between environmental stress and payment is relaxed, but this modified principle provides a compromise that is often better than charging the general taxpayer. In Poland, the Polluters Pay Principle is implemented largely through the fees and fines whose revenues are allocated by the National Fund and its 49 regional counterparts.

The Polish government does not intend to increase further the overall real level of environmental charges destined for the environmental funds, as their share in environmental financing is now quite significant. It is expected that polluters' direct spending on environment will grow -- in accordance with the original PPP -- while the absolute amount of public funds for environmental investment should remain more or less stable in real terms.

This expected stabilization of emission fees has to be distinguished from the necessary flexibility in setting user fees for environment-related services, such as drinking water supplies, sewage treatment services and waste collection. These should not be controlled by state authorities. In the process of privatization (or, at least, liberalisation) of such services, their prices may rise as municipal subsidies, a common practice up to now, are removed.

To the extent that privatized plants can achieve economic efficiencies higher than state-owned ones, the privatization process, a cornerstone of Poland's economic reforms, is welcomed by most environmentalists. In addition, MoE endorses the privatization of abatement-related activities in its official documents. Whenever municipal authorities enquire about financing for sewage treatment, waste disposal, and other services, MoE encourages them to adopt the User Pays Principle. This approach not only identifies a source of finance to run such facilities smoothly but also it can attract private investment, solving the problems of capital and management. As a result, parts of municipal water and sewage systems have already been privatized in several towns, including Gdansk. In addition, private firms have begun to operate in waste collection systems, for example in Warsaw. (It is too early to judge whether these changes have indeed improved the quality of environmental services or reduced their costs.)

The Politics of Environmental Policy Reform

Improving the environmental performance of an economy -- especially one in transition -- is not a simple technical question, but rather a difficult political process. There is no doubt that the unsound environmental policies of the old system had to be abandoned. But in Poland there is also too much faith in the benign environmental impacts of the market economy. A lot of confusion has arisen regarding the characteristics of the system to be built.

In the case of general economic reform, a more or less well-identified minimum set of institutions must be established. These institutions characterize every developed market economy and serve as a reference point for the reformers. As far as other sectors are concerned, experience in other countries has been much more varied. It would be difficult to find a "common denominator" for the institutions in fields such as education, culture, health care, urban policy, or environmental management. Thus, the design of new environmental policies is bound to be controversial. (For a more detailed discussion of whether a generally accepted reference point exists for environmental policy, see Żylicz, 1991.)

A number of important actors are active in Poland's environmental arena. The configuration is far from the simple dichotomy of environmentalists versus business, as the weakness of both these groups results in a much more diversified pattern of conflict.

It would be unfair to completely disregard the importance of environmental lobbies. Occasionally they file complaints, organize on-site events, give embarrassing media interviews -- yet without any serious effect, due to the low overall public awareness about environmental problems. The most complete summary of the views of Polish environmentalists is included in the Protocol of the Round-Table of 1989. Two topics in this document have proved to be lasting issues in the political dialogue, despite the rapid political changes since. First is the preference for regional decentralization of environmental authority (starting with river basin management agencies). Second is the separation of the National Fund from the MoE, implemented in 1989.

As for business or entrepreneurs, few are involved in environmental debates in Poland. In 1990, a number of regional administrators -- acting on behalf of suburban coal-fired greenhouse owners -- filed complaints about the excessive level of emission fees. Apart from that, industry has stayed rather quiet except for complaints about its financial predicament.

The greenhouse owners' complaints, however, unexpectedly culminated at the Supreme Constitutional Court in 1991, in a case against the Government of Poland. A section of the Court found it unconstitutional to make regional differences in pollution fees. Even though the judgment relates to air emission fees (which were the ones challenged by the greenhouse owners), it is just a matter of time before the other ones are also challenged, unless the government is successful at its appeal before the full court. If the government loses again, the case would seriously undermine efforts to establish a rational system of economic instruments for environmental protection in Poland.

While the institutional make-up for environmental policy reform was designed at the time of the Round-Table, the concepts of efficiency and the rational use of market mechanisms were introduced later. Here MoE had to confront a plethora of amateur economists in Parliament, NGOs, academia, and various parts of the government, who strongly advocated Pigouvian taxation (though the term itself was not referred to explicitly).[9] Most of them asserted that market economies rely on price incentives when managing environmental quality. This view has been so widespread that the MoE decided to publish (and distribute free of charge) a Polish translation of the OECD's 1989 report on economic instruments (OECD, 1989) which proved the contrary. Several other translations of western documents were carried out or are under way in order to correct the false image of Western environmental policies.

Experimenting with Pigouvian taxation can be dangerous. It would clearly be difficult to increase emission fees to their efficient levels, as most enterprises would then be eliminated from the market. Under these circumstances, to claim that setting environmental charges according to incentives is a prerequisite for environmental protection is equivalent to admitting that the protection is premature. Indeed, it looks as if some proponents of "solving" the problem through price mechanisms were tacitly expecting such a bottom line.

There is also a common belief held in Poland that environmental protection does not require expenditures, provided that the polluters are given the "right" price incentives. As a result, people resist the idea of bearing the burden of abatement. Meanwhile, the communists are expected to pay for the clean-up of "the mess for which they are responsible". Nobody is outspoken against environmental protection. However, when it comes to money, even moderate proposals meet with resistance. For example, in 1990, the MoE tried to introduce a 4 percent (ad valorem) fuel charge earmarked for environmental protection, which, for petrol, would have come on top of the 50 percent excise tax. Such a charge on liquid fuels, natural gas, and lignites could raise as much as US$300 million per year (hard coal should be added to the list above as soon as its price is fully freed from state subsidies). A certain degree of rate differentiation was also suggested so as to account for different qualities of fuels (e.g. 8% for leaded vs. 2% for unleaded petrol, and so on). The proposal met with almost unanimous opposition from political groups. The official opinion of the trade union Solidarity was typical. It read: "While the union is for environmental protection, it will not approve any such burden laid on the impoverished society".

The resistance to introducing product charges as a source of revenues for the National Fund is inconsistent with the widespread expectation that 100 per cent of emission fees and non-compliance fees should be retained at the regional level. As long as it is also expected that financing is needed from a central fund (and the role of the National Fund is indispensible, especially for projects whose benefits transcend any single region), the only way to reconcile the two propositions without totally ignoring the PPP and placing all financial burdens on the general taxpayer is through product charges. Charges levied on environmentally harmful goods, which cannot be convincingly claimed by any single regional

[9] The ruling of the Constitutional Court reflects the intellectual disarray of the Polish academic community which was not able to provide the Court with sufficient expertise related to the rationale of using pollution fees. The extensive interpretation of the fee system which accompanied the decision is extremely weak in terms of professional argument (when judged against the literature and current academic discussions). This explains why MoE puts so much effort in disseminating information on environmental and resource economics.

administration, make a natural source of centrally managed revenues. Therefore, MoE has proposed that emission fees be fully decentralized as soon as product charges are established to make up for the National Fund's resulting loss in revenue.

Such charges are resisted on several grounds. The reluctance to accept an additional burden was already identified, but more sophisticated arguments are also made. There is an active group of lawyers that has been working on drafts of environmental protection legislation (e.g. the general Environmental Protection Act and "sectoral" laws on water, forestry, waste, inspection, etc.). The lawyers, encouraged by the conceptual vacuum left by the communists, looked to building new legislation from scratch. As a result, they tended to disregard practical experience, and focussed on abstract concepts. They were fond of emission fees, but the idea of a product charge, more closely resembling a tax, apparently did not fit into their ideal framework, under which "no earmarked taxes should exist".

Overall, the current environmental reform includes most of the relevant opinions of the "environmental opposition" of the 1980's (now making up the environmental lobbies). As a result, there are no clear alternatives (with the one possible exception for Pigouvian taxes) to the proposals of the government, and in particular MoE. In short, these offer an array of direct regulations supplemented with marketable permits, and a revenue-raising mechanism to support environmental abatement projects where PPP cannot be fully enforced. Nevertheless, implementation of these reforms has progressed slowly, because a large number of peripheral issues and loosely-involved actors have entered the political arena and clouded the issue. These delays can be considered as manifestations either of society's reluctance to pay the costs of environmental protection or of the attempts by various professional groups to implement something monumental without considering the economic efficiency and administrative viability of their proposals.

Summary and Conclusions

Poland's system of environmental fees is more than 10 years old. Its effectiveness, initially negligible, improved as the fee rates were significantly increased and elements of a market economy were introduced. The rates rank high when judged by the OECD standards, but as a rule they are still below Pigouvian levels. The positive impact of fees is accomplished through the operation of environmental funds, which were the key element boosting environmental protection investment expenditures in 1991.

The efficiency of this system is questionable. Overall, there are hundreds of rates which vary widely (both across pollutant and polluter types). In principle, this differentiation is based on environmental considerations, such as the local scarcity of water, the toxicity of a pollutant, or the ecological value of a species of tree. The whole system, however, is by far not an efficient one, as the rates were determined rather arbitrarily. A number of equity-motivated coefficients or rebates, discriminating in favour of municipal polluters and water users, impair efficiency even further. Whilst it is easy to point to numerous inconsistencies inherent in the Polish fee system, fine-tuning it does not seem to be an urgent task. Rather, one should take a pragmatic approach, and get maximum leverage from the existing mechanism. This applies to the resource and pollution fee system, as well as to the other tax mechanisms which were described above.

Three improvements would enhance the efficiency of Poland's environmental policy, without compromising its apparent short-term effectiveness:

-- combining the decentralization of emission fees with the introduction of centralized product charges to mobilize local initiatives, letting the National Fund continue its mission;

-- scrutinizing the National Fund project selection and operations procedures to promote the most cost-effective spending; and

-- introducing marketable permits as an option to achieve cost-effectiveness in solving local problems involving environment, restructuring, employment, and development issues.

The decentralization of emission fees would make it possible to experiment with Pigouvian taxes without too much risk of economic disturbances or large-scale environmental failures. However, in order not to eliminate the National Fund, an alternative fund-raising mechanism should be established. Product charges suit this purpose ideally -- a modest fuel charge would provide sufficient income for a reasonable public financing role in programmes of supra-regional significance, where this share can be justified on equity grounds.

At present, and in the reforms suggested, the National Fund has a prominent role in environmental expenditures. Government agencies in former centrally planned economies are not well-prepared to professionally (i.e. efficiently) administer public funds they are entrusted. Neither are individual investors well-trained to professionally appraise projects and select those that best suit their economic objectives. Thus, any public spending agency in Poland has to upgrade its own performance on project appraisal, selection, monitoring, and assessment, while assisting its potential grantees to carry out their own roles in a professional way.

It should be acknowledged that, in the long run, Pigouvian taxes may prove to be a practical instrument capable of fulfilling the tasks economic theory predicts. Meanwhile -- that is, throughout the 1990's -- environmental taxes cannot be expected to reliably guide all decision-makers towards optimal, let alone satisfactory, solutions. While a role for direct regulations is inevitable, the hardships and inefficiency of these can be largely alleviated by applying marketable permits within regions and/or industrial sectors.

The system of pollution fees is accompanied by numerous natural resource taxes effecting on forestry, water use, mining, and agriculture. Even though they were often thought as incentive measures, their most important role is that of raising funds to be spent on protection and conservation. Tree removal fees are an exception to this rule: on the one hand, their level has an incentive effect, and on the other hand they are claimed by general (municipal) budgets. In all the other cases at least a partial earmarking is applied.

However, despite earmarking, disbursements are often decoupled from environmental protection and resource conservation, or at least from the sector from which they were collected:

-- water fees are recirculated through environmental funds, but are not earmarked for water resource management;

-- only half of the revenues from geological fees go to the National Fund;

-- logging fees are not earmarked for nature protection at all (moreover, municipal administrators are notorious for their liberal permitting policies);

-- The Farmland Protection Fund finances development rather than conservation (and thus contributes to environmental problems rather than solving them)

The last two mechanisms operate through separate funds, and thus are completely outside the National Fund and its 49 regional counterparts.

Poland's natural resource tax system is very heterogeneous despite the fact that a single Ministry, at least since 1990, oversees both environmental protection and most resource use and extraction issues. Although no major resources are free any more, the royalties charged by the state as the principal owner are rather low (but rising). On the othert hand, with most farmland in private hands, soil is an important resource not owned by the state, and its conservation is not sufficiently promoted.

The system can be improved first of all by making sectoral policy objectives clear and explicit (in areas such as water management, mining, forestry and agriculture). An adequate level of centralisation for each sector, and an adequate (pragmatically designed) mix of direct versus financial instruments to achieve policy objectives should be determined. Then resource tax rates and rules should be revised accordingly. There is no reason to expect that an "optimal" system of resource taxes can substitute for a sound policy.

REFERENCES

Dudek, D J, Z Kulczyński, and T Żylicz (1992), "Implementing Tradeable Pollution Rights in Poland", paper presented at the Third Annual Conference of the European Association of Environmental and Resource Economists, Cracow.

Howe, C W (1992), "Taxes *versus* Tradable Discharge Permits: A Review in the Light of the U.S. and European Experience", unpublished paper, Institute of Behavioral Science, University of Colorado, Boulder.

Kornai, J (1986), "The Soft Budget Constraint", *Kyklos*, vol. 39, pp 3-30.

Ministry of Environment (1990), "National Environmental Policy - Outline of Economic Instruments", unpublished paper, Ministry of Environment, Warsaw.

OECD (1989), *Economic Instruments for Environmental Protection*, OECD, Paris.

Paradysz, J (1992), "Economic Instrument in Environmental Protection in Poland", unpublished paper, Ministry of Environment, Warsaw.

Pezzey, J (1989), Efficient and Politically Acceptable Pollution: The Property Rights Approach, Paper presented at the Eastern Economic Association Fifteenth Annual Convention, Baltimore.

Protocol of the Round-Table, Ecology Subgroup (1989), Warsaw.

Tietenberg, T (1993), Market-Based Mechanisms for Controlling Pollution: Lessons from the U.S., in: T Sterner (ed.), *Economic Policies for Sustainable Development*, Kluwer, Dordrecht.

Żylicz, T (1991), Environmental Reform in Poland: Theories Meet Reality, *European Environment*, vol. 1, Part 1, pp 16-18.

Żylicz, T (1993), Environmental Policy Reform in Poland, in: T Sterner (ed.), *Economic Policies for Sustainable Development*, Kluwer, Dordrecht.

TECHNICAL NOTE

Further Information on Environmental Fees and Charges in Poland

Poland's complex system of environmental charges and funds includes several components not described in the main text. For example, when it comes to petrol storage tanks (both stationary and mobile) where monitoring actual emissions would be cumbersome, air pollution fees are collected on the basis of

weight. They range from $0.37 to $5.93 per tonne of petrol, depending on the type of the tank (7 types), and are paid to the environmental funds as other air-pollution fees.

Boat and barge traffic along some rivers and canals is subject to water transport fees. These more closely resemble user fees than environmental or resource ones, as they correspond to the costs of maintenance of waterways. The rates are from $0.74 to $0.89 for each 1000 tonne-kilometre of cargo or floated timber, and from $0.89 to $1.78 per hour of operation of canal locks. Passenger boats and empty barges are charged $0.15 per 1000 tonne-kilometre of their registered tonnage. All fees are paid to the respective Regional Directorates of Water Resource Administration.

Mining concession fees are collected on the basis of the estimated deposit value net of exploration costs. (Because the regulatory framework was not yet complete, they were not collected in 1992). Mining (extraction) fees are based on the price of extracted minerals.[10] According to the Mining Act, 50% of these fees go to municipal budgets (and are not earmarked); the other 50% is channelled to the National Fund and earmarked in the following way:

40% to be spent on geological exploration and prospecting;
40% to be spent on assisting the mining sector to meet environmental requirements;
20% to be spent on any environmental objectives of the National Fund.

In 1992 the National Fund collected $21 million from mining fees, only 56 per cent of the amount due. The financial problems of coal mines were the main cause of this poor collection rate.

The Forestry Fund has been operated by the State Forest Administration. The main sources of the Fund's revenues are: fees for converting forest land to non-forest uses, top-soil sales, a surcharge on state forest operations costs, and other payments stipulated by the Forestry Act of 1991. The Fund spends money on afforestation and reforestation projects, as well as the remediation of pollution damages. In 1991 it spent $296 million, a part of which can be considered an environmental protection or nature conservation expenditure (even though it is not under Poland's statistical classification rules).

The Farmland Protection Fund collects its revenues from: soil fees, mostly for converting agricultural land to non-farm uses (which in 1991 yielded $9 million); top-soil sales; and other fees and fines stipulated by the Farmland Protection Act (of 1982). The Ministry of Agriculture distributes about 20 percent of the Fund's revenues, and regional administrations the remaining 80 percent. The 1991 disbursements (of $6.3 million) went for:

road construction	69%
land development (e.g. draining wetlands)	10%
construction & maintenance of fish ponds	9%
soil improvement	2%
anti-erosion measures	<0.1%
other (mostly development) activities	10%

As seen from this breakdown, these expenditures can only marginally be linked to environmental and resource protection activities.

[10] Throughout the 1980's a fund collecting "extraction fees" was operated. Fee rates applied (as percentage of sales) were: 0.5% for coal, and 1.5% for oil and gas. The fund sponsored geological exploration and prospecting activities channelling approximately $10 million per year. In 1991 the fund was discontinued as inefficient, and mining was financed mostly from the state budget. In 1992 fees were reestablished, but principles of their collection have changed, and their rates have increased.

There are also non-compliance fees for exceeding allowable noise levels. The rates (in dollars per day of non-compliance) are:

from 1 to 5 dB(A)	2.96
from 6 to 10 dB(A)	4.96
from 11 to 15 dB(A)	8.00
more than 15 dB(A)	12.00

There are no fees for noise which meets the terms of a valid permit.

Table 6 Tree cutting fees [$ / cm of perimeter]

		Perimeter of the tree [cm]				
		≤ 25	26 - 50	51 - 100	101 - 200	> 200
1	Alder, bird-cherry, maple (fastest-growing species), poplar, robinia, willow	2	4	8	11	8
2	Ash, birch (fast-growing species), chestnut, Douglas fir, Eastern hemlock, larch, maple (other fast-growing species), mulberry, pine, spruce	5	10	20	20	20
3	Beech, birch (other species), decorative varieties of fruit trees (apple, cherry, plum), elm, fir (common), hawthorn tree, hazel, honey locust, hornbeam, linden, maple (slow-growing species), oak, plane-tree, sorb, spruce (slow-growing species), thuja, walnut	13	33	67	100	133
4	Cypress, fir (other species), magnolia, maidenhair tree, metasequoia, phellodendron, tulip tree, yew	13	100	133	200	267
5	Other fruit trees	4	4	7	4	3

Notes: Tree-cutting fees are collected by municipal budgets and are not earmarked. Perimeter measured at the height of 130 cm. For removing trees in protected areas - such as health resotrs, cultural heritage sites, and urban parks - double rates apply. Fees applied in Katowice administrative region are twice as high as in the table. Non-compliance fees for removing trees are 80% higher than the regular ones listed in the table. Fees for removing bushes and destroying grass and flowers without a permit are assessed on a per area basis: \$40.00/m^2 of bushes, \$8.00/m^2 of grass, and \$80.00/m^2 of flowers. These rates are doubled in protected areas such as health resorts, cultural heritage sites, and urban parks. There are no fees if a permit was given.

TAXATION AND ENVIRONMENT IN ESTONIA

By

Tiit Kallaste
Senior Research Associate,
Stockholm Environment Institute, Tallinn, Estonia

Introduction

During the fifty years of socialist rule, there was little effective control of pollution in Estonia. In this period, 90 percent of Estonian industry was controlled by the central government of the USSR. Local authorities had little influence in planning investment or in determining the structure of local production, and expenditures on pollution control were low.

The worst environmental damage occurred in the north-east of Estonia, the site of intensive phosphate mining and of oil shale extraction and combustion. As a result, human health is worse there than in other areas of the country. (For details on Estonia's environment, see Ministry of the Environment, 1991; National Board, 1992, and Kallaste, 1991). In the Soviet economy, natural resources were not priced: they were fixed to the appropriate ministry free of charge. Thus, Estonia's oil-shale deposits belonged to the USSR Ministry of Coal Mining and was mined by ministry enterprises. The ministry's only concern was the output of shale oil for electric power. Regional and local authorities had no authority to demand environmental measures at the shale oil mines and power plants (the complex accounted for one-third of Estonia's fixed capital). Over half of the power generated in Estonia's two oil-shale based power plants was "exported," primarily to Russia and Latvia, at very low prices.[1]

Thus, environmental protection policies had many handicaps under socialism:

-- There was little effective responsibility for, incentives for, or interest in protecting the environment and using natural resources efficiently. Enterprises had no economic incentive to invest in pollution reduction or control. No government agences had effective authority for environmental protection.

-- Many of Estonia's environmental problems were due to the historical domination of the central economic ministries over regional authorities.

-- Environmental regulations, used in combination with some elements of economic instruments, were until recently quite ineffective.

Estonia was nonetheless one of the most advanced republics in the former Soviet Union in terms of environmental protection. In some activities, such as the introduction of environmental charges and the development of an environmental fund, the republic took a leading role.

Since the collapse of the USSR and its centrally planned economy, however, the independent Republic of Estonia has introduced a new system of environmental regulations; this new system, however, is still weak, and some old socialist regulations and legislation remain. Estonia today uses both economic instruments and resource pricing in its environmental policy. Among economic instruments, the charge

[1] The new government plants to reduce significantly oil-shale mining and related electricity production. Negotiations over this aspect of Estonia's energy policy are being held with the Russian Federation.

system plays the most important role, and the charges of the greatest significance are emission charges for air and water pollution and for waste disposal. Resource prices are charged for the use of natural resources (including their irrational exploitation and their wasteage), and for changes in land use.

Estonia has a pressing need for environmental investments, as few were made over the last decades. In addition, Estonia has made international commitments to reduce SO_2 and NO_x emissions and pollution of coastal waters, for which modern pollution control equipment and waste reduction technologies should be introduced quickly.

The Development of Economic Instruments and the Environmental Fund

Estonia was the smallest republic, by area as well as by population, of the former Soviet Union, but, beginning in the late 1960s, it was also the first to introduce fines and non-compliance fees for water pollution, as well as payments for the use of fresh water. These fees and fines were collected by local nature protection officers; about 90 per cent of the revenues, however, went to the all-union budget of the USSR, and only 10 per cent remained in Estonia.

Estonia took another pioneering step in 1983 with the foundation of the Estonian Fund for Nature Protection and Rational Use of Natural Resources. The central government of the USSR accepted this Estonian Fund as an all-union experiment for environmental protection. When the fund started operations in 1984, 90 percent of the fees and fines collected in Estonia remained in the country. Similar funds were established in other republics of the USSR only towards the end of the Union's existence.

Fines for water pollution, paid by industry, agriculture, and the armed forces formed the major part of the Fund's revenues. Money in the fund could be used for pollution damage compensations and for environmental investments. Until independence, however, the Fund remained comparatevely small. Fund revenues reached 950,000 rubles in 1988 and 1.2 million rubles in 1989 (including 1988 fines paid late). Even at these levels, the Fund provided only a small share of environmental protection expenditures in Estonia: in the five-year plan for 1986 to 1990, total environmental investments were set at over 125 million rubles. In 1990, payments to the fund still reached only 3.7 million rubles (Ministry of Environment, 1991).

The next step in environmental policy in Estonia, beginning in 1985, was the establishment of basic principles for setting the prices of natural resources, including oil shale, peat, stone building materials, and water resources.

In 1990, the Environment Fund was reorganized into the extra-budgetary Estonian Environmental Fund (hereafter, referred to as the Fund). The new fund is divided into: a centralized Republican Fund; 19 local (county or municipal) funds; and special, earmarked funds. The Republican Fund is attached to the Estonian Ministry of Environment; local Funds to the local county or municipal environmental protection boards. The activities of the Fund are run by the Council of the Fund, the composition of which is determined by the Estonian Government according to recommendations from the Ministry of Environment.

Estonia's New Economic Instruments

In January 1991 a new system of economic instruments for environmental policy was introduced. The main goals of this system were:

-- in concert with market forces, to decrease high emissions of pollution, especially in critical areas, reducing environmental damages;

The Estonian Environment Fund

The assets of the Fund can be used --

- -- To finance national, county and town environmental protection programmes and activities;
- -- To establish a national environmental monitoring system and purchase necessary technical equipment;
- -- To establish a comprehensive accounting system for natural resources;
- -- To train personnel;
- -- To provide environmental scholarships and other prizes;
- -- To promote international environmental cooperation and to help finance the costs of Estonia's international environmental obligations;
- -- To perform research and development for the introduction of environmentally benign technologies and equipment;
- -- To clean up accidents and catastrophes;
- -- To encourage environmental entrepreneurship through investments, with the aim to increase the assets of the Fund;
- -- To provide special bonus payments to highly qualified employees and specialists in environmentally benign enterprises.

- -- to help implement the polluter-pays-principle and to encourage enterprises to use more and lower waste production technologies;

- -- to set prices for key natural resources, replacing the free-input approach that encouraged waste;

- -- to accumulate earmarked money for environmental investments.

Under the OECD classification system (Opschoor and Vos, 1989; Nicolaisen and Hoeller, 1990), there are five main types of economic instruments: charge systems; subsidies; deposit-refund systems; market creation, including the redefinition of property rights; and enforcement incentives tied to regulatory measures, such as non-compliance fees. In Estonia today, there are examples for each category except one (market creation).

Charge systems

The emission charges introduced in January 1991 replaced a previous system of taxes on air and water pollutants and on solid waste disposal. Polluters pay charges on emissions below the negotiated emissions limit; for emissions above that limit there are non-compliance fees (see below). Water pollution charges have been established for discharges of suspended solids, oil products, BOD_{total}, total nitrogen, total phosphorus, phenols, sulphates and fats. Air pollution charges have been established for emissions of SO_2, NO_x, CO, non-toxic dust, oil shale fly ash and soot. For about 50 other pollutants, charges are calculated on the basis of health standards. Special coefficients for calculating the charge rates take into account the character of the area polluted (see the Technical Annex). Non-point source polluters, households, and institutions financed from the state-budget do not have to pay emission charges.

Local governments set and collect the emission charges. Polluters are supposed to pay their previously confirmed regular emission charges by the the middle of every three month period. The local authorities can increase or decrease the charge limits established by the government by 20 per cent,

according to local conditions and the economic situation of an enterprise. Local authorities can also make proposals for emission charge rates and for projects on which to spend the revenues.

When an enterprise agrees to install pollution reduction or treatment equipment, the local government may grant a reduction in emissions charches. To qualify, the enterprise must reduce the emissions in question at least 25 per cent; it can then qualify for a reduction in charges over that year equivalent to 150 per cent or more of the investment cost.

User charges are paid on the collection and treatment of waste water. They have been in use in a modified form for several decades already. Charge rates depend on the category of consumer: manufacturing enterprises pay 20 to 30 times (and, in cases, even 60 times) higher than households, state institutions, and the service sector. The rate was set high for manufacturing enterprises to create an incentive for to reduce consumption of fresh water. These charges can differ significantly by county; revenues, however, are partially redistributed to counties that do not cover their water treatment expenses.

User charges are also paid for waste disposal. The tax rate is different for manufacturing, the service sector, state institutions, municipal housing, and private sector. The charge also depends on the toxicity of wastes, which are dividied into five categories. The tax rates for more toxic wastes have been estimated by experts so that every next toxicity group has a tenfold higher charge rate as compared to the lower group. These charges are also differentiated regionally.

Administrative charges are not yet used widely. One example where they are used is are the fees for yearly inspection of transport vehicle exhaust gases to check their carbon monoxide content. This fee system has been in place for over ten years.

Tax differentiation on petrol has been planned, as a tool to encourage the use of lead-free fuels, but due to the continuing difficulties in obtaining a regular supply of motor vehicle fuels from other parts of the former Soviet Union, this measure has failed.

Subsidies

Subsidies have been used extensively in combination with regulatory instruments. Under central planning, direct grants from the state budget were the main form of subsidy, and most environmental investments were made straight from the state budget. Enterprise profits were centralized and redistributed among the enterprises of each ministries, so investment decisions were made by government agencies in Moscow or in Estonia. Environmental investments were financed from ministry funds or from the state budget. In the second half of the 1980s, about 25 million rubles were spent each year from the government budget on environmental investments. Investments were chosen by expert assessments, but were divided quite unequally between water pollution control, air pollution control, waste management, and other activities. Cost-efficiency analyses of different projects were not often made, and overall, centralized environmental investment policy was inefficient.

Beginning in 1991, the Republican Fund has distributed grants for environmental protection purposes to local county or municipal authorities. The Republican Fund can make recommendations for the use of this money.

There are also cross-subsides for water use and disposal, as enterprises pay significantly more per cubic meter than households or state institutions, in this way subsidizing them. In the same sense, counties with significantly lower costs of wastewater treatment and disposal subsidize those with higher costs. There are also subsidies in the form of tax allowances, specifically the emission charge exemptions discussed above, for enterprises investing in pollution reduction or control equipment.

Deposit-refund systems

A system for recirculating glass bottles and food jars has been in operation for some time. The economic incentives are quite strong, guaranteeing a high rate of return. (In addition, plastic and paper packages have not yet reached wide-scale use). However, the system has always been quite inconvenient for the consumer, as the system for buying back glass bottles and jars has been poorly organised. In 1992, the system reached a crisis, and its reform is planned for the near future. Overall, the share of single-use packages will probably increase considerably over the transition period.

Enforcement incentives

Compensation payments for water pollution damages and for violations of fishing and hunting regulations were the first category of economic instruments implemented in Estonia, in use since the 1970s. Pollution fines were the largest form of these payments, and were calculated on the basis of the costs of repairing the damage, for example to the water body polluted. This damage assessment was based on an estimate of the fish resources and aquatic life lost. The low retail prices of fish were used for these calculations. Nonetheless, fines usually ranged from 10,000 to 100,000 rubles per case, a rather large sum of money at the time. The maximum fine levied on a single polluter reached 900,000 rubles for heavy fuel oil that leaked into a river. From 1991 this system was replaced by emission charges.

Non-compliance fees were introduced in 1991 in connection with emission charges. If the previously confirmed emission limits for a given polluter are exceeded, a non-compliance fee is charged, set according to the toxicity of the waste. For air pollution there are four toxicity classes, five for water pollution, and five for solid wastes. These non-compliance fees also are charged for accidental waste emissions.

Resource Pricing

Another new category of market forces -- resource pricing -- was introduced in January 1991. There are two main categories of resource pricing in Estonia:

-- Resource payments for the use of land, water, and mineral resources such as building materials, oil shale, and peat.
-- Compensation charges for changing the type of land use in urban areas, in rural areas and in forest areas.

Resource payments go to both the local and the Republican budgets. Payments for the use of mining resources and water resources are paid both to the state and local county or municipality budget: for example, 80 per cent of the payments for oil shale and for water resources go to the Republican budget and the remaining 20 per cent to the local budget; for peat and for mineral building materials, only 30 per cent is paid to the republican budget and 70 per cent to the local budget.

Resource payments are charged not only for the resource extracted, but also for the use of a resource deposits. This approach should provide an incentive for enterprises to reduce production losses, as they are charged for the use of a whole deposit of a resource. Above all, it is hoped that oil shale mining and peat production will become more efficient. Payments for the use of fixed amount of natural resources are imposed by executive bodies of the local governments on the basis of the special agreements with enterprises.

Table 1. Revenues from Economic Instruments in 1991

SOURCE	Sum, million of rubles	%
Emission charge revenues to the Fund	54.2	60.2
Other revenues to the Fund	5.5	6.2
Resource taxes to local goverments	13.8	15.4
Resource taxes to the central budget	16.4	18.2
TOTAL	89.9	100

Source: National Board, 1993

Monitoring and Economic Instruments

In order to put all the market instruments described above into force, proper environmental monitoring is needed. The Estonian Nature Management Information Centre has created databases for this purpose, in particular for tracking fresh water use, waste water disposal, and air pollutant emissions. Statistical data is collected from each enterprise. The GIS-based information provides local authorities with information on the location of natural resources, the state of environmental pollution, and the optimal use of resources (Kallaste and Saare, 1991).

Initial Results of Economic Instruments

The new system of economic instruments collected, in 1991, just under 90 million rubles (see Table 1). Of this amount, 59.7 million rubles went to the Estonian Environmental Fund -- considerably more than the revenues of the previous year (3.7 million rubles).

Emissions charges accounted for 54.2 million rubles of the Fund's revenues, over 90.7 per cent of the total. In addition, three local areas accounted for over three quarters of the total revenues, Ida-Virumaa, Narva and Tallinn. Estonia's 15 other local areas accounted for less than one fourth. In addition, of the 59.7 million rubles that went to the Fund, 23.2 million rubles, or about 40 per cent, went to the centralised Republican Fund.

The revenues of resource pricing were also quite large. Resource payments to local budgets reached 13.83 million rubles, and 16.41 million rubles went to the national budget, for a total of 30.2 million rubles.

These levels were, however, lower than hoped. The economic situation worsened quickly over the second half of 1991 and throughout all of 1992. Therefore, total revenues to the Fund were quite small in this period compared to investment needs. Another difficult factor has been the high inflation of the ruble, which made the Fund's revenues almost non-existent in real terms in 1992, as the rates for pollution charges were unchanged. The ruble remained in use in Estonia until June 20th, 1992.

Table 2. Charges on Major Air Pollutants (set January 1993)
(for emissions below permitted limits)

No	Pollutant	Tax rate: US$/ton
1	Sulphur dioxide	0.05
2	Carbon monoxide	0.008
3	Non toxic dust	0.04
4	Oil-shale fly ash	0.05
5	Soot	0.08
6	Nitrogen oxides accounted as nitrogen dioxide	0.1

Source: Republic of Estonia, 1993

The decision not to increase emission charge rates and the rates of other economic instruments in 1991 and early 1992 was political. Amid the economic difficulties, a significant rise in pollution taxes might have led to a fast increase of costs for many sectors of production and even to the bankruptcy of some important industrial enterprises. Since there was no real competition in the market yet most of the increases in the charges would simply have been passed on to consumers.

Inflation was, however, taken into consideration for resource pricing, and higher prices were set, for example for oil shale. Since 1991, the price has been raised several times, as has the price of electricity produced from shale oil. The rates for water supply and wastewater disposal have also risen. In addition, beginning in 1992 state institutions and the housing sector, which were previously exempt, had to pay emission charges on a small number of pollutants.

Mid-way through 1992, however, Estonia adopted a new currency unit, Estonian kroons (EKr). It is difficult, however, to compare prices in kroons with those in rubles. Although the ruble/kroon exchange rate was initially set at 1 kroon = 10 rubles, the kroon rapidly appreciated against the ruble, which remained beset with high inflation in 1992 and 1993. At the same time, the overall price level in Estonia appreciated rapidly in dollar terms. In 1992, the total revenues of the Estonian Environmental Fund reached 6.29 million kroons, of which 5.48 million come from emission charges.

Table 3. Charges on Water Pollutants (set January 1993)
(for emissions above permitted limits)

No	Pollutant	Tax rate: US$/ton
1	BOD	19
2	Suspending solids	12
3	Oil products	92
4	Phenols	323
5	Total phosphorus	69
6	Total nitrogen	38
7	Fats	69

In January 1993, the Estonian government set new rates for natural resource use, air and water pollution, and solid waste disposal; major rates are shown in Tables 2, 3, and 4 (converted into US dollars at EEK 13 = US $ 1). These are nominally about 10 times higher than the 1992 rates, although comparisons between previously used rubles and present kroons are misleading, for the reasons mentioned above.

Table 4. Charges On Waste Disposal (January 1993)

No	Level of Hazard	Tax rate: US$/ton
1	Inert wastes (nontoxic)	0.008
2	Low toxic wastes (hazard class IV)	0.023
3	Moderately toxic (hazard class III)	0.23
4	Toxic (hazard class II)	2.3
5	Very toxic (hazard class I)	23.1

Environmental Expenditures

In 1991, the Republican Fund's revenues were equivalent to only about 0.7 per cent of Estonia's central budget, suggesting that basic environmental improvement investments should come from the main budget as in the past. This means in practice that, due to the difficult economic situation and tight restrictions on the budget, the share of environmental investments will probably remain much smaller than in previous years.

Table 5. 1991 Spending of The Republican Fund

No.	Purpose	Rubles, millions	%
1	Pollution control/Environmental Protection	15.9	68.4
2	Nature reserves	13.6	5.9
3	Research, data collection, legislation, rad. studies	0.9	3.9
4	Equipment (computers, monitoring devices, etc.)	3.2	13.7
5	Conferences, support for NGOs, education, international relations	0.6	2.6
6	Remainder on January 1, 1992	1.3	5.5
	TOTAL	23.2	100

Source: Environmental Data Center, 1992

The Board of the Fund decided not to finance large new environmental projects, but rather to spend Fund revenues on completing unfinished ones, mostly in the field of water pollution as well as some for environmental monitoring and data processing. Nonetheless, there are some examples of financing new projects -- in Tallinn municipality, several small firms dealing with the treatment of extremely toxic wastes received significant subsidies (more than 1 million rubles in 1991) from the local Tallinn Environmental Protection Fund for purchases of equipment to treat of noxious substances, including waste oil and oil products.

Table 6. 1992 Spending of The Estonian Environmental Fund
(in thousands of kroons)

No	Purpose/Use	County or Municipal Funds	Republican Fund	Total
1	Environmental protection	1523.1	500.8	2023.9
2	Nature reserves	153.6	199.6	353.2
3	Supervision	558.7	377.2	935.9
4	Monitoring and research	274.6	963.2	1237.8
5	Equipment and arrangement	783.7	174.1	950.2
6	Education, propaganda, publications	101.3	60.6	161.9
7	International cooperation	132.8	123.1	255.9
8	Bonuses and supports	269.7	35.5	305.2
9	Detachments to earmarked funds, loans, etc.	465.8	9.0	474.8
10	Env. technology and entrepreneurship	304.1	21.3	325.4
11	Other	175.3	-	175.3
	TOTAL	4735.1	2464.4	7199.5

Source: Environmental Data Center, 1993

In 1992, the Environmental Fund received 6.29 million kroons in revenues, plus about 1.2 millions kroons remaining from 1991. Of this 7.2 million of this total 7.5 million kroons was spent in 1992 (Table 6). Compared to all sources of funding for environmental investments, the total share of the Estonian Environmental Fund is, however, only about 10 per cent (Table 7).

Table 7. Environmental Investments by Source of Funding (1992)
in thousands of kroons

Source of funding	Water Pollution	Air Pollution	Solid Waste	Other	TOTAL
Enterprise funds	14,996	13,726	337	26	29,085
Local governments	7,603	0	0	173	7,776
Environmental Fund	2,489	99	327	1,659	4,574
Foreign capital	110	2,830	0	0	2,940
Private capital	72	0	0	0	72
TOTAL	25,271	16,655	664	1,857	44,447

Conclusions

The use of market instruments remains a kind of economic experiment in Estonia. Since the whole economic system itself is in transition, economic instruments cannot have a significant effect. However, through economic instruments and other measures, Estonia has started to try to stop further deterioration of the environment.

The new system of economic control of environmental protection is a "mixed approach", combining elements of economic instruments and resource pricing with direct regulations. The charge rates are, however, set somewhat arbitrarly by environmental experts, without recourse to economic theory. This ad-hoc system may be one reason for relatively big differences in revenues between economic instruments for air pollution, for water use, and for and waste disposal. Nonetheless, the pollution problems and inefficient use of natural resources that characterised Estonia under a command economy suggest that there was no time left to postpone the introduction of economic instruments or resource pricing.

The rates of economic instruments have been too low to have an incentive effect, except possibly for water management, where the greatest revenues have been collected. For air pollution, however, charges and fines have not had a large impact on the economic behaviour of polluting enterprises. Thus, the revenue raising character of economic instruments has dominated. National resource payments do not create significant incentives to change resource -- they are not high enough to achieve environmental goals. Further, the great changes in political and economic life as well as the galloping inflation before the introduction of the kroon called for continuous updating and revising of the economic instruments, which was not considered politically possible. Economic instruments and resource prices set according to the ruble's value in 1989 and 1990 had a relatively small influence in the beginning that diminished quickly. This experience shows the importance, however, of taking inflation into consideration when revising the emission charge rates and natural resource payments.

Estonia's environmental protection authorities probably overestimated the role and possibilities of market instruments. The difficult transition from a centrally planned to a market-oriented economic system reduced the efficiency of market instruments considerably. Soft rather than hard budget constraints on enterprises, centrally fixed prices in many important sectors, and centrally planned and granted investments, have been changed slowly since 1990. Both administrative regulations and economic instruments for environmental policy still have a long way to go, and this is only the beginning of their use.

REFERENCES

Bye, B., Bye, T., Lorentsen, L. "Taxation of fossil fuels: The impacts on economic activity, energy markets and pollution." *Nordic Workshop on integrated energy and Environmental modelling* (Riso/ National Laboratory, 15-16 February 1990), Edited by K. Halsnaes and G.A.Mackenzie. Nord 1990:74. Nordic Council of Ministers, Roskilde.

Organisation for Economic Co-operation and Development. *Environment and Economics: A survey of OECD Work.* OECD, Paris, 1992.

Organisation for Economic Co-operation and Development. *Environmental Policy: How to Apply Economic Instruments*. OECD, Paris 1991.

Environment '89. (1990). Estonian Nature Management Scientific Information Centre. Tallinn.

Environment '90. (1991). Ministry of the Environment. Tallinn.

Estonian Environment 1991. (1992). Environmental Report No. 4. Environmental Data Centre. National Board of Waters and the Environment. Helsinki.

Kallaste, T. (1989). "How to assess the level of pollution". Fennia, Vol.167, No 1, Helsinki.

Kallaste, T., Saare,L. (1991). "Control and assessment of the environmental pollution situation in Estonia". in J. Feuger et al, eds., *Environment, Energy and Natural Resource Management in the*

Baltic Region - (Third International Conference on System Analysis), Nordic Council of Ministers, Copenhagen.

Kallaste, T. (1991). "The environmental problems in Estonia and some ways to solve them". Working Paper, No. 76. Research Institute of Northern Finland. University of Oulu. Oulu.

Kallaste, T., Roots, O., Saar, J., Saare, L. (1992). *Air Pollution in Estonia 1985-1990*. Environment Data Centre. National Board of Waters and the Environment. Helsinki.

Mäkelä, K. (1990). "Eestin tieliikenteen pakokaasupäästojen laskentajärjestelma ELIISA. Tie- ja liikennelaboratorio". Tutkimusselostus 802, Valtion Teknillinen Tutkimuskeskus, Tallinnan Teknillinen Korkeakoulu. Espoo.

National Report of Estonia to UNCED (1992), Ministry of the Environment, Republic of Estonia, Tallinn, Estonia.

Nicolaisen, J., Hoeller, P. (1990). "Economics and the environment: A survey of issues and policy options". OECD Working Paper No.82. Department of Economics and Statistics, Paris.

Opschoor, J.B., Vos, H.B. (1989). *Economic instruments for environmental protection*. OECD, Paris.

Rajasalu, T. (1990). "Estonian economy and its development problems". Preprint No 26. Estonian Academy of Sciences. Department of Humanities and Social Sciences. Institute of Economics. Tallinn.

Republic of Estonia, "Regulations concerning the system of fines and payments for nature management" Government Regulation No 237 of 20 Nov 1990, Tallinn, (in Estonian).

Republic of Estonia, "On Changing Regulation 237 of the Government of Estonia from 20 Nov 1990, Government Regulation No 7. of 9 Jan 1992," RT, 1992, No 2, Art 31. Tallinn, (in Estonian).

Reinsalu,E. (1990). "New principles of the Estonian energy policy." in *Industry and Environment.* Kohtla-Järve, Tallinn (in Estonian).

Yearbook of the Tallinn Board of Environmental Protection, 1991. (1992), (in Estonian).

ANNEX:
The Application of Economic Instruments for Air Pollution Control

In 1991, over 300 stationary sources of pollution in Estonia had to pay air pollution emissions charges.[2] Of these, over 80 were in the city of Tallinn. Emission charges are levied on polluters whose air emissions reach more than 200 tons of pollutants a year or include very hazardous substances classified in the first or second toxicity class.

Emission taxes are calculated on the basis of polluter type, stack gas volume, nature of the polluted area, and the content of up to 50 pollutants in it, which means that the actual emissions are not measured. Regular emission charges are imposed by local governments, usually the municipal or county environmental protection board, on the basis of contracts with the polluting enterprises. Polluters are supposed to pay the previously confirmed regular emission taxes not later than the middle of each three month period. Payments in advance are possible. In fact, polluters are informed beforehand of their total yearly taxes.

The following economic instruments are used for air pollution.

There are regular, confirmed Emission charges, based on stack emissions of about 50 pollutants whose ambient air concentrations must not violate the 24-hour health standard -- the daily Maximum Permissible Concentration (MPC);

Polluters that invest in cleaner technology or pollution control equipment receive subsidies in the form of tax allowances -- an exemption from the emissions charge of at least 1.5 times the investment cost. Still, there are no standard procedures for granting this allowance. Each case is decided individually on the basis of expert assessments.

The main form of enforcement incentives are the non-compliance fees charged for exceeding the emissions limit over a fixed period. These fees are an exponential tax whose exponent is determined arbitrarily, on the basis of toxicity class of the pollutant: the tax levied may be 5, 50 or 500 times higher than the regular tax for 3 and 4, 2 and 1 class respectively. Accidental emissions, disasters, and explosions are also penalised by a non-compliance fee, determined on an exponential tax basis.

The emissions charge levied on a polluter is based on the following factors:

- -- the amount of pollutants emitted;
- -- their toxicity class;
- -- the size of the polluted area, which is considered a circle with a radius of 80 times the stack height of the polluter;
- -- the type of land use in the polluted area.

The 50 major air pollutants are classified in four toxicity classes, class 1 being those most hazardous to human health (for more details see Kallaste, 1989). Table 8 shows the MPC levels, toxicity classes, and emissions rates for major pollutants. The base emissions rates are shown in kroons; the much higher emissions rates applied in the city of Tallinn are converted into dollars.

---

[2] It has been estimated (on the basis of fuel consumption) that motor vehicles account for about 45 per cent of total air pollution in Estonia. Strict controls on motor vehicle air pollutant emissions have been discussed, but are not yet in use.

Table 8. Essential Data for Calculating Charges on Air Pollution Emissions (January 1993 Rates)

	Pollutant	MPC 24 hours (mg/m^3)	MPC: Work area (mg/m^3)	Tox. class	P_i Base EKr/ton	P_i Tallinn US$/ton
1	Sulphur dioxide (SO_2)	0.05	10.0	3	1.00	2.3
2	Nitrogen dioxide (NO_2)	0.04	2.0	2	2.50	5.8
3	Sulphuric acid (H_2SO_4)	0.1	1.0	2	2.24	5.2
4	Hydrogen sulphide (H_2S)	0.0008	10.0	2	7.91	18.3
5	Ammonia (NH_3)	0.04	20.0	4	0.79	1.8
6	Hydrogen fluoride (HF)	0.005	0.05	2	44.72	103.2
7	Formalaldehyde (HCHO)	0.003	0.5	2	18.26	42.1
8	Oil-shale phenol	0.0007	0.5	3	37.80	87.2
9	Soot (C)	0.05	4.0	3	1.58	3.6
10	Cement dust	0.1	6.0	4	0.91	2.1
11	Particulates	0.15	6.0	3	0.75	1.73
12	Oil-shale flue ash	0.1	4.0	3	1.12	2.6
13	Petrol	1.5	100.0	4	0.06	0.1
14	Carbon monoxide (CO)	3.0	20.0	4	0.09	0.2
15	Phenol (C_6H_5OH)	0.003	0.3	2	23.57	54.4
16	Lead (Pb)	0.0003	0.01	1	408.25	942.7
17	Bens(a)pyren	0.000001	0.00015	1	57735.03	1332347

EKr - Estonian *kroon.* US$ 1 = 13 EKr

Tax is calculated for each individual pollutant emitted. The total tax for each pollution source to be paid in a year is the sum of individual taxes for each specific pollutant, calculated according to the formula:

$$T=\sum_{i=1}^{z} P_i M_i K_a$$

where

T = total emissions tax for a stationary pollution source, in kroons;

p_i = the tax rate for emmitting one ton of a particular pollutant ***i*** into the ambient air, in kroons. The tax rate is calculated as a root-mean value of two extreme standards, for working area and for 24-hours (see Table 1). For accidents, disasters, etc. the pollutants' class of toxicity will be taken into account -- the emissions tax may grow up to relatively high values as the multiple 5, 50 or 500 is applied accordingly to the 4 and 3, 2 and 1 class of toxicity.

M_i = actual emissions of a pollutant ***i*** in tons per year;

z = number of pollutants under study;

K_a = a coefficient calculated by the spatial analysis of the territory effected by the stack emissions. Different types of land use are estimated by different weights, depending on the potential impact of the pollutants. For example, open land in a rural area carries a weight of 1, industrial areas carry a weight of 20, and recreation areas, which are the most sensitive to pollution, carry a weight of 50. For towns and other settlements, the weight depends on the size (number of inhabitants) of the area. For the city of Tallinn, this coefficient is about 30.

At present, the emissions inventory data for all of Estonia are available in the computerized data base of the Estonian Nature Management Information Centre. Pollution charges have been calculated for the emissions of about 50 pollutants in up to 500 enterprises all over Estonia. More than 300 enterprises were actually charged in 1991.

For the control of air pollution from stationary sources, the greatest attention should be paid to a relatively small number of large polluters. As an illustration, Table 9 lists the ten major payers of emission charges in the city of Tallinn in 1991. There are three heat-producing enterprises, and their emissions are relatively large, about half of the total sum. The reason is that they used heavy fuel oil, rich in sulphur, and had no purification technology for the desulphurization of their stack gases.

Nonetheless, some of the polluters with relatively low emissions in tons paid high charges because they contained more noxious emissions.

Table 9. Air Pollution Payments in Tallinn: the Ten Largest Polluters in 1991

Enterprise	Total pollutant emissions (tons)	Annual payment to the fund (roubles)
Thermal Power Plant "Iru"	12 609.0	313 533.8
Heavy Machinery Plant	494.4	155 261.7
Municipal Heating Enterprise A	5 478.5	126 103.7
Enterprise "Estonian Phosphorite"	3 161.0	95 342.2
Baltic shipyard	525.5	34 024.1
Enterprise "Silikaat"	1 806.2	28 174.6
Tallinn Metal Works	429.9	26 118.9
Estonian Fish Treatment Enterprise	148.8	20 700.8
Municipal Heating Enterprise B	923.2	15 063.0
Pharmaceutical Plant	75.4	11 217.4
TOTAL	25 651.9	825 540.2

Source: Tallinn Board of Environmental Protection

TAXATION AND ENVIRONMENT IN THE RUSSIAN FEDERATION

by

K. G. Gofman and A. A. Gusev
Institute for Market Economy Problems,
Russian Academy of Sciences

Environmental Problems and Priorities

According to the government's recent report on the state of the environment, more than 15 per cent of the Russian Federation's territory, covering 2.5 million square kilometers and a population of nearly 40 million people, is an ecological disaster zone (*Ministry of Ecology, 1992*). The severity of "classic" environmental and corresponding human health problems in many Russian regions is incomparable to current situations in OECD Member countries. On a world-wide scale of the average life expectancy, the Russian Federation ranks 51st; poor environmental conditions (mainly air pollution) are a major cause of higher illness and mortality in the country. Last year, 84 Russian cities (including Moscow, St. Petersburg, and Ekaterinburg) had maximum single concentrations of key air pollutants that were 10 or more times greater than permissible levels.

One cause of Russia's pollution problems is that energy consumption per unit of the GDP in former USSR republics was, at the end of the 1980s, at least twice as high as that in OECD countries. Energy overuse, due to artificially low fuel prices and a lack of incentives to save energy, is an essential part of both the economic as well as the environmental crisis in Russia. In addition, due to the poor condition of municipal and industrial sewage systems, nearly half of drinking water from water pipelines is dangerous for human health (*Ministry of Ecology, 1992*). Recent studies have also shown that there there are high concentrations of dangerous pollutants such as dioxins, benz(a)pyrene, polychlorobyphenyls (PCBs). Radioactive pollution over a large area of land is a grave reality in Russia: the total area contaminated by cesium-137 (at 1 curie/sq.km and higher) as a result of the Chernobyl disaster was, in 1991, nearly 55,000 square kilometers, and an additional 4000 square kilometers are contaminated in the Eastern Ural region, much of it from radioactive fallout that occurred 30 to 40 years ago (*Ministry of Ecology, 1992*). Motor vehicles are often obsolete and fuel quality poor, and motorised transport is responsible for 70 to 80 per cent of air pollution in many large cities (*Ministry of Ecology, 1992*), even though the number of automobiles is relatively small compared to the west.

The severity of Russia's environmental situation is clear, as well as its ultimate cause: the authoritarian, centrally planned system. A transition to democracy and to a free market system are widely assumed to be necessary for tackling Russia's environmental problems. However, during the difficult transition period, and particularly its initial stages, environmental problems are not on the list of the nation's urgent priorities. Public opinion studies reveal a decrease in concern about environmental problems since the beginning of "perestroika", displaced by worries about social instability, inflation and the decline in economic welfare, although public opinion still rates environmental problems as important, particularly in highly polluted regions as the Moscow area, the Ural industrial region, and the Western Siberian oil producing regions.

A similar situation may be observed in official documents. The Working Programme adopted by the government in August 1993, "Development of Reforms and Stabilization of the Russian Economy", sets crisis provisions for the period to mid-1994. The main priorities are to control inflation control and achieve financial stabilisation, creating stable conditions for investment and for an improvement in production and

business activity. For the subsequent period -- the second half of 1994 and all of 1995 -- the programme envisages institutional reforms and investment promotion. Economic recovery should begin in 1996.

Environmental issues are not explicitly included in this list of national priorities. Taken as a whole, this programme is intended to provide the basis for economic recovery and consequently for future environmental investments. But the first and most urgent priority -- macroeconomic stabilisation -- will create serious problems for current environmental protection activities: already, environmental investments fell in real terms in both 1991 and 1992 after increasing each year from 1975 to 1990.

Much of the responsibility for environment is being transferred to regional and local authorities, except for Russia's international obligations (for example, for the phase-out of ozone-depleting substances), and for the restoration of areas affected by the Chernobyl disaster and other large-scale environmental problems.

The environmental policy of the Russian Government is moving from a situation in which environmental problems were declared a priority but were ignored (typical for planned economies), to one where efforts are made to achieve "second best", stabilizing solutions for a limited list of the most urgent problems, though with very low financial support from the federal budget.

At the same time, some efforts are being made to provide an institutional base for future environmental improvements, once the most critical period of the current economic crisis has been passed. The short-term goals of these measures are to provide: 1) stable (although necessarily limited) extra-budgetary financial resources for environmental protection measures; and 2) a better economic "climate" for environmentally efficient use of these resources. Environmental restoration and sustainable development -- based on both of administrative and economic instruments for environmental management and on regional and international cooperation -- may be considered as Russia's long term goal. Taxation and other economic instruments are considered very important for achieving these goals.

Mechanisms for environmental protection: environmental taxes

The Russian Federation's new Environmental Protection Law (EPL), adopted in December 1991, was intended to create the institutional framework for a new system of environmental management for the period of transition to a market economy.

In terms of the use of economic instruments for environmental policy, the first key feature of this system is that environmental management is based on environmental quality standards and corresponding pollution permits. Violation of these permits results in penalties, and in the financial (and in some cases criminal) responsibility of the violators. There are two basic types of environmental standards and corresponding permits:

-- Maximum permitted concentrations (MPC) of pollutants in environmental media (air, water, soil, foods) and corresponding maximum pollution permits (MPP) for each polluter (source of pollution) for a given time period. These types of standards and permits are based on the concept of zero human health damage from environmental pollution (in a few cases the impact on ecosystems is also taken into consideration);

-- Temporary permitted concentrations (TPC) and corresponding temporary pollution permits (TPP), which are regarded as intermediate steps for achieving MPC levels and MPP and are based on current technical and economic opportunities (and limitations).

These two types of standards and permits are the basis for regulatory policy, which covers official - requirements for production, construction and transportation technologies and for different kinds of commercial and non-commercial activities.

The MPC system set in 1991 included 479 rates for air polluting substances, 2679 rates for water pollutants (including 1050 rates for fish breeding water basins) and 109 rates for soil polluting substances. TPC rates (tentative safe levels) were set for 1138 air pollutants and 69 soil pollutants (*Ministry of Ecology, 1992*). The MPP system, essential for current environmental regulation, is still under-developed and in many cases is substituted with TPP rates, sometimes based on vague concepts of technical feasibility. Many sources of pollution are not governed even by TPP rates.

The second key feature of national environmental policy is the central role of the Russian Federation's Ministry of Environmental Protection and Natural Resources. This Ministry and its regional divisions are responsible for the setting environmental standards and requirements, granting permits, and monitoring environmental quality and pollution sources. The system of ambient environmental quality monitoring is relatively well-developed, but possibilities for monitoring pollution sources are still very limited, mainly due to lack of measuring equipment.

The third important feature is that the expenditures for achieving environmental policy goals should be financed by a system of taxation on pollution and on natural resources use. Although the 1991 Environment Law provides for the participation of the government budget as well as polluters in financing environmental protection capital expenditures, extra-budgetary ecological funds based on receipts from pollution charges will be the principal source of financing environmental protection for the near and medium-term.

The adoption of environmental pollution charges and independent (extra-budgetary) ecological funds based on these charges is undoubtedly the most important innovation presented in the new Environment Law, aimed at overcoming the "residual" status of environmental protection. The introduction of these charges -- as well as of a value-added tax and natural resource use taxation -- are the main features of the Russian Federation's new tax system, introduced in the beginning of 1992.

The New Russian Tax System

The new Russian tax system includes federal taxes (the main source of federal budget revenues), and regional and local taxes. Most important among the federal taxes are the value added tax (VAT), the excise tax, the tax on corporate profits and the personal income tax. Regional taxes include taxes on corporate property, enterprise payments for water consumption, and a forestry levy. Local taxes include more than 20 different types of payments, including a land tax, potentially mandatory environmental clean-up contributions, and a tax on dog owners.

In addition, there are several types of contributions for extra-budgetary funds, such as social security, pensions and employment funds -- as well as the ecological and natural resources funds.

The existing system of government revenues in Russia is obviously in transition. Gaps in tax legislation, regulation and enforcement and a lack of modern taxation experience, multiplied by the difficulties of the transition to a market economy -- and in particular runaway inflation -- make almost all current data about the taxation system rather unreliable, contradictory and subject to frequent revisions. Corresponding limitations for the following analysis must not be overlooked: its results must be considered only as preliminary and subject to further research.

The total consolidated budget revenues (aggregating revenues for federal, regional and local governments) for 1992 were estimated at almost four trillion rubles (4,000,000,000,000). The revenues of

social security, pensions and employment funds are estimated at 1.4 trillion rubles, and those of other extra-budgetary funds, about 600 billion rubles (Ivestia, 1992). (These estimates are all based on mid-1992 rubles.) These taxes and contributions are estimated as just over 40% of GDP.

In order to consider their environmental impacts, the main taxes and contributions can be classified in three main groups (see Table 1):

-- Taxes and contributions introduced for non-environmental reasons;

-- Taxes and contributions introduced partially for environmental reasons (including natural resources protection and reproduction); and

-- Taxes and contributions introduced chiefly for environmental protection purposes. (Most of these taxes were either introduced or significantly modified in 1992, and it is not yet possible to make a definitive evaluation of their environmental effects.)

Regarding the structure of this new tax system, the non-environmental taxes (group 1) play the main role in raising revenues. Those taxes partially or specifically introduced for environmental purposes (groups 2 and 3) play much smaller roles; most of these taxes, however, were practically unknown in the former tax system (excluding a merely symbolic forestry levy and very modest contributions for mineral resources exploration). The new tax system is oriented primarily to achieving macroeconomic stabilisation, resulting in a high tax burdens, particularly on corporate income.

Unfortunately, due to the high share of indirect taxation in the new system (up to 70 per cent of all receipts of the government and extra-budgetary funds) and the extremely high degree of monopolies in the economy, there are no signs of general price structure improvements after price liberalization. In market economies, uniform VAT taxation helps to preserve free market price proportions and avoid distortion in consumer choice. The "overuse" of this fiscal instrument in economies in transition may help conserve artificial price proportions inherited from the planned economy. Fuel, energy and raw materials were undervalued under central planning, and finished goods overvalued, in comparison with world market price proportions. The low prices for energy and raw materials and the lack of markets for land leads to an artificially low level of value added in extractive industries and in agriculture. The distorted price ratio between raw materials and finished goods is supported by a high VAT share in the tax structure. The negative impact on environment is obvious -- undervaluation of natural resources leads to their wastage and to greater environmental damage.

Environmental Provisions of the Main Tax Instruments

Receipts from the value added tax (VAT) were to provide over 60 per cent of federal revenues and 25 per cent of regional revenues. However, this type of tax had never before been used in Russia, and initial VAT receipts were low -- in the first half of 1992, only 57 per cent of projected levels -- due to economic actors' lack of experience with the tax and a decrease in overall sales (Finovaya Gazeta, 1992). Russia's VAT originally a unified taxation rate -- 28 per cent of value added -- with exemptions for only a limited list of goods and services. In 1993, this was revised to a two tier system: 20 per cent tax rate on all goods and services except food and goods for children, which are taxed a 10 per cent rate.

Table 1: Russian tax structure: estimated 1992 revenues

Tax groups	billions (10^9) of rubles
1. Taxes and contributions introduced for non-environmental purposes	
VAT	1870
Excises	150
Corporate tax on profits	972
Provisions for price regulation fund	160
Tax on property	5
Other taxes (including personal income tax)	600
Subtotal	3757
2. Taxes and contributions introduced partially for environmental reasons	
Payments for natural resources use rights	101
Contributions for mineral resources exploration and prospecting	68
Land tax	33
Forestry levy	14
Payments for industry water consumption	10
Subtotal	226
3. Environmental taxes (pollution charges)*	
Air pollution	2
Water pollution	4
Waste disposal	1
Subtotal	7
TOTAL	3990

Source: Izvestia, 1992.

*Including increase of base rates in the second half 1992.

All receipts from excise taxes go to the federal government and provide about 10 per cent of federal budget revenues. Excise taxes, which vary from 10 to 80 per cent of sales prices, are charged on tobacco, delicacy foods, luxury clothing, jewelry, automobiles bought by private owners, and especially alcohol: 90 per cent of excise tax revenues come from taxes on alcohol.

The corporate tax on profits was expected to provide nearly 20 per cent of consolidated budget revenues. Nearly 60 per cent of the revenues from this tax go to regional budgets. Actual revenues from the corporate tax were, in the first half of 1992, much higher than projected and in fact significantly

exceeded receipts from VAT. The main reason for these high returns was the inflationary growth in profits (profits in the first half of 1992 were 10 times higher than in the first half of 1991, although production decreased 13.5 per cent (Finovaya Gazeta, 1992), but regional authorities, for whom this tax is the most important source of revenue, also ensured its proper collection. In addition, there is much more experience in collecting taxes from enterprises profits.

The profit tax was set in 1992 at, in most cases, a uniform rate of 30 per cent (raised to 32 per cent in 1993). Exemptions were allowed for a very limited set of conditions, but included a partial (30 per cent) exclusion of profits spent on environmental protection. According to preliminary evaluations, this exemption yielded modest results in 1992, equivalent to about 1.5 per cent of all profits subject to the tax. Under Russia's economic conditions, enterprises try to spend as much of their revenues as possible to keep wages matching the pace of inflation. The incentive provided by this tax exemption appears to be too small to have a noticeable effect on environmental investments.

Provisions for the price regulation fund are paid by oil and gas producing enterprises for each increase in oil and gas prices that exceeds the regulated level. These revenues are accumulated in a fund to compensate municipal services for these fuel price increases. Their environmental effects are currently small, but in the future these measures are to be transformed (together with other existing provisions paid by fuel producing industries) into a special energy tax (see section 6, below).

The tax on corporate property was set in 1992 at 0.5 per cent of the average yearly value of corporate (enterprise) property, excluding depreciation. Under the existing legislation, environmental protection facilities are excluded from the corporate property tax. The role of this exclusion is now symbolic (the approximate nationwide projected gain in net profits is only 50 million roubles in 1992 [6, p. 633]), due to the relatively low property tax rate and the low valuation of capital assets. Inflation presents a major problem for valuing capital assets; in the second half of 1992, for example, reavaluations of enterprise assets yielded 30-fold increases over previous evaluations (*Commersant, 1992*). If these valuations can keep up with inflation, the role of the property tax and the corresponding incentives for purchasing environmental facilities will be more important. In 1993, the maximum tax rate was raised to 1.0% of property value.

Taxes Introduced In Part for Environmental Reasons

Russia's new tax and environment legislation introduced a new role for natural resources payments, which were merely symbolic under central planning. The immediate goals of these new measures were to overcome the traditional undervaluation of natural resources (which often cost nothing) and also provide stable revenues for regional budgets and for extra-budgetary natural resources funds. These goals are very close to environmental protection objectives, as wasteful use of natural resources is one aspect of environmental degradation. Economic incentives can be useful in promoting efficient natural resource use and protection. The new taxation system adopted in 1992 provides some important although limited efforts in this direction.

A land tax is levied, at different rates, on agricultural lands, forest lands, rural lands in private use, urban lands, industrial zones, and land used for transport and military purposes. According to the Russian Federation's Law On Land Payments [10, Article 2], the purposes of land payments include "stimulation of rational land use and land protection, creation of equity business conditions for lands with different quality, formation of special financial funds for infrastructure additions in cities and villages."

The base regional tax rates for arable land vary from 10 to 184 roubles per hectare, and regional authorities can set further differences on the basis of the quality and use of the land. Tax rates for pastures and other types of agricultural land are derived from tax rates for arable lands. Payments for urban lands and lands used for industrial purposes are also based on centrally established base tax rates that differ

between regions and in accordance with town and city size. The system recommends that regional authorities use special coefficients that take into account infrastructure conditions in different types of urban areas. They should also consider environmental conditions in setting tax rates. A wide range of tax exemptions are allowed. These do not include, however, possible environmental protection measures, such as incentives to reduce pesticide use. The 1992 rates for the land tax are shown in Table 2.

Table 2: Land Taxation in 1992

Types of Land	Area (mln ha)	Medium Tax Rate ruble/ha	Total, millions of rubles
Agricultural lands	134.2	50	6,709
Rural lands and lands in personal use	11.9	50	596
Urban lands	1.3	18,000	24,309
Lands in industry, transport and military use	7.0	150	1,056
Forestry lands			331
TOTAL			33,000

Source: Izvestia, 1992.

The land tax is levied on 60 per cent of Russia's agricultural lands (which cover a total 222.1 million hectares). The average tax rate (50 rubles/hectare) is obviously an artificial figure, unconnected with the market value of the land, which is still unknown because there is no legal land market in Russia.[3]

Experience has demonstrated that the land tax is largely ineffective, as nearly all land is owned by the state and there is no land market. In addition, the role of the land tax as the source of budget revenues is decreasing very rapidly due to the high rate of inflation (land tax rates per hectare are set). Overall, the land tax appears to create little incentive for wiser land use.

Payments for natural resource use rights were introduced under the new Environment Law. Their main purpose is to collect rent-type revenues, mostly for regional budgets though in some cases for the federal budget. According to 1992 forecasts, 59 billion rubles, 60 per cent of total receipts from these payments, will be levied on fuel-producing industries. Established tax rates are 64.5 rubles per ton of coal, 135 rubles per ton of crude oil, and 24 rubles per 1000 cubic meters of natural gas (*Izvestia, 1992*) These rates are can be varied by regional authorities in accordance with the quality, and the extraction and transportation conditions for the fuel and raw materials taxed.

It is worthwhile to note that payment rates as a rule are established by quantity of fuel produced (that is, extracted or sold), instead of by quantity of mineral resources utilized in production. This method of taxation is relatively simple and can be audited easily, but it does not provide incentives to decrease the

[3] The so-called "normative land price", sometimes used for valuing land for granting mortgages and other purposes, is calculated by multiplying the tax rate, but not less than 100 rubles/hectare by 50. Black market evaluations exceed official rates many times.

wasteage of mineral resources (and corresponding environmental pollution) in the process of extracting fuels.

The levies for mineral resources research and prospecting provide the finances for subsiding continuing exploration. These type of payments existed in the "planned" economy for many years, but there was practically no connection between subsidies for exploration and prospecting activity and corresponding receipts from extracting industries: as a rule, the subsidies exceeded the receipts. The budget system for 1992 sets a strict balance between receipts and subsidies. Unlike other types of payments for natural resource use, contributions for research and prospecting activities are levied as a percentage of the current price of corresponding mineral products (10 per cent for crude oil and natural gas, 5 per cent for coal. This type of levy allows revenues to grow in accordance with the inflation rate, preventing a depreciation of subsidization funds. Nearly 80 per cent of the contributions for natural resources exploration and prospecting come from the oil and gas industries, which correspondingly receive the lion's share of subsidies for oil and gas exploration. The adopted method of levying extraction industries for exploration subsidies demonstrates the high government priority for these activities. This system is compatible with the current low level of commercialisation in Russia's oil and gas industry, but it will have to be changed when this sphere of industrial activity is privatised.

In addition to the land tax, forestry enterprises must pay a forestry levy. In 1992, this charge was based on an average tax rate of 59 rubles per cubic meter wood, but the specific rate depends on the quality of the wood and the economic and environmental conditions of areas where it is cut. This levy provides very modest revenues (see table 1) that are used for replanting. The low tax level, due in part to high inflation, has few environmental incentives; further, there are no provisions to encourage more environmentally friendly logging. Moreover, gaps in existing tax regulations allow the use of forestry levy receipts for local budgets, (*Zelenyi Mir, 1992*) although the forestry industry payments should, according to existing legislation, provide separate payments to local governments. This diversion of funds further reduces their use for forest protection and replanting.

Since 1982, industrial enterprises have had to make payments for water use. In 1992, the average rate for these charges increased from 2 to 25 kopeks per cubic meter; the payments provided an estimated 10 billion roubles in revenues, to be used for financing regional and municipal water distribution and waste water treatment facilities. Agricultural enterprises -- the principal water users in Russia -- are still exempt from paying for their water consumption. Excess water use and loss are great in Russia's agricultural sector, creating difficult environmental problems in many regions of the country. Water payments could be the key instrument to encourage rational water use, but the present system has only a small impact. its revenue-raising role is rather modest too.

Russia's new tax legislation provides municipal authorities the opportunity to introduce local taxes. These can include taxes with positive environmental effects, including taxes on environmentally damaging activities in protected areas and contribution requirements for environmental cleanup; as yet, however, information concerning the actual use of these taxes is not available.

There are some indications that taxes levied for local clean-up requirements have had adverse effects. For example, there are reports that a tax on dog owners, implemented in some cities to pay for "dog-generated" wastes, has on occasion become financially unbearable for low-income dog owners. As a result, packs of homeless dogs may be now observed in many cities, with corresponding environmental and spiritual losses.

Environmental Taxes and Pollution Charges

In 1991 and 1992, charges on air pollution, water pollution and waste disposal were adopted.[4] The main features of the new system for pollution charges are as follows:

a) There are two types of pollution charges: 1) charges below the permitted level of pollution, based as a rule on the TPP rates and in a few cases on MPP rates (see section 2); and 2) fines for pollution above the permitted level.

b) Both types of pollution payments come out of polluter's after-tax profits (that is, after all other taxes, including the tax on profits, the property tax, etc.).

c) The total sum of pollution charges paid by each polluter depends on:

   -- The volume of pollution discharges within and above the permitted level;

   -- The payments rates (in rubles per ton or per cubic meter) for the pollutants, as established by the Russian Federation's Ministry of Environmental Protection and Natural Resources. These base rates are equal for all Russian territory;

   -- A system of correction coefficients to take into account the environmental and socio-economic situations of different regions and the corresponding damage potential of pollution. The ministry establishes these coefficients (usually in terms of maximum/minimum figures), while regional (or, in cases, local) authorities retain the right to apply them;

   -- Special privileges and exemptions that can be granted to a polluter by regional (or local) authorities "with regard to the environmental situation, economic conditions and polluter's expenditures for environmental protection" (Council of Ministers, 1991).[5]

d) All sums levied as pollution charges are distributed between the federal budget (10%) and extra-budgetary ecological funds (90%). Of this latter portion, federal ecological funds receive 10%; regional ecological funds, 30%; and local ecological funds, 60%.

e) Pollution charge payments do not release polluters from the obligation "to carry out environmental protection measures and to compensate pollution damage caused by infringement of the ecological legislation" (Law on Environmental Protection, 1992).

Two main purposes of the adopted pollution charge system are:

-- to provide economic incentives for polluters for pollution abatement; and

-- to collect financial resources for regional environmental protection systems (including municipal sewage facilities, waste disposal and treatment facilities, and regional environmental monitoring systems).

---

[4] Charges on noise, electromagnetic fields, and a few other kinds of pollution are planned for later introduction.

[5] A later government decree provides a clearer formulation: "with regard to polluters' expenditures for environmental protection." In addition, the right to correct base pollution charge rates and coefficients, according to this document, belongs to the Ministry of Environmental Protection "in concordance" with the Ministry of Economy and the Ministry of Finance.

The two goals are to a certain extent contradictory and really need separate charge systems. The current system is a result of a compromise between these goals, without clear priorities given to either.

The charge system includes almost 300 base rates for air pollutants and almost 150 base rates for water pollutants. The rates vary widely (for example, the air pollution charge for hexane is 0.7 rubles per ton, while that for tellurium dioxin is 6.6 million rubles per ton), and are in some cases set precisely, to the kopek (1/100 of a ruble). These rates were determined using each pollutant's MPC level, which is believed to reflect human health risks. The MPC rates vary widely, and this variation is reflected in the rates for pollution charges. The assumption behind this approach is that it is possibile to make a central evaluation of environmental or human health risks for all pollutants, in all situations, with a preciseness limited only by the available number of digits after the decimal point. Such preciseness appears particularly superfluous considering the very limited possibilities for monitoring actual pollution discharges, given the available measurement equipment in Russia.

The total sum of pollution charge receipts within the adopted rules of their assessment is centrally established ex ante at the level, regarded to be "admissible" for polluters and at the same time sufficient to provide financial resources for ecological funds. All corresponding evaluations are necessarily very vague.

Guidelines to allocate the costs of environmental investments between government budgets and ecological funds (on the federal, regional, municipal levels) and polluters have not yet been developed.

In addition, the Ministry of Environmental Protection and other central authorities responsible for determining pollution charges are not provided (and cannot be provided) with information concerning marginal pollution abatement costs, economic damage from pollution and other information necessary for at least a rough determination of incentive levels for pollution charges.

Excess complexity, preciseness and overcentralisation of pollution charges determination are partially neutralized by the rather wide rights, given to local authorities, to correct central rates and implementation rules. Although this situation leaves much room for uncertainty and irrational decision-making, the preliminary results of the pollution charge system may be regarded as chiefly positive.

First, this system has resulted in increased interest on the part of polluters and local authorities in inventories and monitoring of pollution sources. Second, the new pollution charge system, although obviously contradictory, helps to "internalize" some pollution damage external costs. Third, the regulatory and enforcement role of regional and local environmental protection authorities has substantially increased due to financial sources now at their disposal. These authorities also now widely use their right to decrease, in proper cases, pollution charge payments: as a result, while initial receipts were below revenue projections by one billion rubles, there was a corresponding increase in direct enterprise investments for environmental protection (*Commersant, 1992*). In some regions, the increased enterprise investments in environmental protection exceeded the fall of centralized funds for this purpose (*Zelenyi Mir, 1992*).

Some local authorities achieved important improvements of local water and air quality monitoring systems, previously unavailable due to their lack of financial resources. For example, environment protection authorities in Tver (a town in central Russia) used the local ecological fund to pay for reliable, independent monitoring services, performed by local chemical laboratories. The existing pollution charges system, necessarily very imperfect, thus creates the conditions to improve environmental monitoring and the system's future performance.

At the same time, many gaps in the pollution charge system are now obvious. Its design was overly overcentralised, it is not very compatible with current monitoring and enforcement abilities, and, in addition, in many cases polluters simply refuse to pay pollution charges, either pleading their poor financial position or contesting the results of pollutant measurements provided by local authorities. In addition, the high

inflation rate depreciates the receipts from pollution charges. In the second half of 1992, the initial rates were increased fivefold to cope with inflation, but this measure provided only a partial solution.

The RF government decree of August 1992, introduced innovations in the system of environmental pollution charges. The revised system uses three types of charges instead of two: 1) charges for pollution below the MPP level; 2) charges for pollution above the MPP level but below the TPP level; 3) and charges for pollution in excess of the TPP level.

The first two types of pollution charges are now provided by a system of base rates and correction coefficients similar to the original mechanisms, although base rates were increased. The type 2 base rates are substantially higher than the type 1 rates; the type 3 rates are now five times the type 2 rates. If the polluter does not have the necessary permit, the penalty is applied to the overall pollution discharge. Enterprises can include their type 1 payments in their production costs, but the type 2 and 3 payments must be paid from net after-tax profits. Maximum levels of payments are established by industry branch. In addition, there is now a provision to allow government authorities to shut down, either permanently or temporarily, polluters whose after-tax profits are equal to or less than their total type 2 and 3 pollution payments.

Russia's system of pollution charges is intended to regulate the distribution of pollution control costs between producers and consumers of goods, produced by polluting industries, under unique conditions of the transition period. However, supply and demand price elasticities under current market conditions are very low, so partial inclusion of pollution charge payments in production costs should lead to a corresponding increase in production prices. Energy, petrochemical and other polluting industry markets have strong monopoly structures, so the burden of pollution charges can easily be transferred to consumers. The maximum rates of profit extraction by industry are intended to take into account the specific market and other economic conditions of different industries. The future efficiency of this system for implementing the "polluter pays principle" depends on difficult-to-predict factors, including, most importantly, the "enforcement ability" of the environmental legislation and regulation system and the efficiency of general taxation policy.

Current policy debate and assessment

The government's 1993 Working Programme, entitled "Development of Reforms and Stabilization of the Russian Economy", includes several proposals concerning taxation and environment. The most important of these are the following:

-- introduction of an excise tax on natural gas and a 30 per cent increase in excise taxes on crude oil;

-- introduction, in 1994, of a unified tax for natural resource use, increasing state revenues from mining;

-- inclusion of the federal ecological fund in the federal budget in 1994, although the sum would remain earmarked for environmental expenditures.

In addition, the government proposed several amendments to tax legislation effecting the environment:

-- exempting ecological funds from paying VAT;

-- removing the profit tax on any goods and services financed by ecological funds;

-- abolishing VAT and profit tax for wildlife reserves, national parks, and botanical gardens.

The Russian Federation's financial situation remains unclear, as does the outlook for the future. The government's main focus is on economic problems and macroeconomic stabilisation. At the same time, relatively little attention has been paid to the role of "environmental stabilization" in Russia's transition. At present, natural resources -- one of the most important components of Russia's national wealth -- are seriously undervalued. And as long as markets for natural resources do not exist, price proportions will not reflect their scarcity (*Fedorenko et al, 1992*).

One of the most sharply discussed problems -- the adoption of private property rights for land -- is very closely connected with the development of the tax system and its environmental effects. Whatever policy choices are made, the progress creating an institutional base for land and other natural resources markets will not be rapid; the corresponding consequences for price and tax systems must be taken into account.

Without proper markets for natural resources, the economy gives too much importance to the manufacturing sector. This macro-economic distortion creates many negative effects -- environmentally destructive, wasteful natural resource use being one of them. The "best" solution would be the full and rapid development of private property and markets for natural resources (taking into account market failures, of course). But this path will likely be long and difficult to implement; a more active tax policy may be the "second best" choice. The role of direct taxation on natural resources should be substantially increased, with a corresponding decrease in the role of indirect taxes and taxes on manufacturing industry profits. The macroeconomic effect of this redistribution of the tax system should be fiscally neutral, although some difficult fiscal, price and equity problems may arise at regional and sectoral levels. Continuing research will be very important to prepare for such a move.

Environmental issues are an acute problem in privatisation. One of the main environmental problems in the transition is the lack of a clear distribution of responsibility for financing environmental protection measures between government authorities (at both federal and regional levels) and polluters. This problem existed before the beginning of the privatization process, but has become very acute now with the growing speed of privatisation. Many of the proposals to regulate these environmental issues could slow privatisation. Instead, there may be opportunities to apply economic instruments, including taxes, to resolve this dilemna. International assistance on this topic may be of great value.

The attention paid to environmental taxation and other economic instruments for environmental protection is steadily growing in Russia. The new structure of the Ministry of Environmental Protection and Natural Resources includes several economic departments, specialized in different types of economic instruments (including a pollution charges department, a natural resources payments department, and an environmental services market development department). Structures for economic instruments have been created in some regional environmental protection committees. There has also been increased scientific research and the development of some independent environmental auditing expertise.

The deficiencies of Russia's system of environmental taxation are in many cases caused by the lack of modern taxation methodologies and practical experience. International cooperation will undoubtedly help to decrease the difficulties of Russia's transition to an environmentally sound market economy. Overall, however, the fate of Russia's new economic mechanisms for environmental protection strictly depends on the overall success of economic reform. The greatest danger for the country's environment is not environmental "market failure", but general failure of the transition to a market economy.

REFERENCES[6]

Communication from the State Tax Authorities, *Finansovaya Gazeta*, No. 36, 1992.
Delovoi Mir, N 153, 1993.

Council of Ministers of the RSFSR, Decree No. 13, "On the confirmation for 1991 of bnormative payments for the emission of polluting substances in the environment and conditions for their use," January 9, 1991.

Council of Ministers of the RSFSR, Decree No. 632, August 28, 1992.

Fedorenko, N.P., K.G. Gofman, et al, *Svoboda y solidarnost*, M., "Nauka", 1992.

Gofman, K.G., A.A. Golub, A.A. Gusev, et al, "Principles for considering the ecological factor in privatisation of economic entities", *Zelenyi Mir*, 1993, No. 12.

Legal Act of the RSFSR, "Ob Okhrane okruzhayushchei prpodnoi sredi" (On protection of the natural environment), Vedomosti Sezda narodnykh deputatov RSFSR u Verkhovnogo Soveta RSFSR, 1992.

Legal Act of the Russian Federation, "Osnovy nalogovoi sistemy y Rossiiskoi Federatsii" (Foundations of the Tax System in the Russian Federation), [ibid.], 1992.

Legal Act of the Russian Federation, "on tax payments" [M], 1992.

Ministry of Ecology and Rational Use of Natural Resources of the Russian Federation, National Report on the State of the Environment in the Russian Federation 1991, in *Zelenyi Mir* (nos. 19-27), Moscow, 1992.

Presidential Decreee of the Russian Federation, "On regulation of leasing arrangements and privatization of leased and municipal property," *Commersant*, No. 38(154), 1992.

Semi-annual and annual projections for Russian Federation major socioeconomic development indexes in 1992. M., *Izvestia*, 1992.

Zelenyi Mir, Nos. 37-40, 1992.

[6] All sources are in Russian, except 2.

TAXATION AND THE ENVIRONMENT IN HUNGARY

By

I. Pomazi and György Zsikla
Ministry of Environment and Regional Policy
Budapest

The Economic Background and Environmental Framework

Central planning and state ownership of production created a contradiction for environmental policy in Hungary: the state owned nearly all property and production facilities, but was also responsible for protecting the environment, and government environmental authorities had to persuade government-owned companies to meet environmental requirements. This system worked poorly. Investments for environmental protection were low, and never reached, even in the most successful years, 1 per cent of GDP, while environmental damages were, by one estimate, equivalent to 3 to 5 per cent of GDP.

In 1990, Hungary's new, democratically elected government proclaimed in its National Renewal Program the long-term goal of developing a "social market" economy, in which nearly all property would be privately owned. At the time, however, the state owned 90 to 95 per cent of all property, and its share in mid-1992 was still about 85 per cent.

In the current transition period, Hungary faces several tasks for environmental policy in order to move toward a more environmentally benign economy. Hungary's main environmental priorities are listed in Box 1, below. The task of repairing the environmental legacies of central planning will require considerable financial resources, but the problems of past contamination have to be faced now in the process of privatising state property and in particular industrial enterprises. In addition, with Hungary's intention to strengthen its ties with the European Communities (EC), it must gradually adopt EC environmental standards. These new standards will effect the competitiveness of all sectors of the economy.

These potentially expensive environmental tasks create a dilemna, as Hungary faces significant economic problems in the transition period. Gross Domestic Product fell about 3.5 per cent in 1990, almost 12 per cent in 1991, and 5 per cent more in 1992, while the optimistic estimations for 1993 are for stagnation. In addition, Hungary is hindered by its considerable external debt (which amounts to US$ 2000 per person), causing a considerable outflow of resources from the country which neither privatization nor foreign investment is likely to offset.

Nonetheless, the transition period provides a unique chance for integrating environmental considerations into the process of economic restructuring. Leaving environmental issues to a later date would prove very costly. Greater use of economic instruments could provide Hungary a cost-effective way of taking advantage of this opportunity. This chapter describes the economic instruments currently in use in Hungary for environmental policy, including fines and taxes, and the role of Hungary's Central Environmental Protection Fund, which receives much of the revenues from these instruments. First, however, it considers the environmental provisions of Hungary's new tax system.

Box 1. Hungary's Environmental Protection Action Plan

The Government's Short and Medium-Term Environmental Protection Action Plan, approved in December 1991, set priorities, objectives, and programmes for environmental improvement. The first task is the elaboration of a new environment protection law to allocate long-term legal and financial responsibilities between the national government, local administrations, and the private sector.

The Action Plan includes the following priorities for the coming years:

- Cleanup of accumulated, unattended contamination at former military bases, closed industrial plants, abandoned mines, and other locations.
- Measures to halt the environmental deterioration of regions exposed to severe, cumulative contamination;
- Significant reductions in air pollution from motor vehicle traffic, particularly in cities;
- Improvement of waste water collection and treatment capacities to prevent further groundwater contamination;
- Reduction of risks from contaminated sites, especially hazardous and toxic waste disposal sites; and
- Increased recycling of solid waste.

The Action Plan also calls for greater use of economic instruments in Hungary's environmental policy.

Environmental Implications of Hungary's New Tax System

In 1988, Hungary introduced a landmark reform of the tax system, the first among the now ex-socialist countries, and a precursor of even greater economic changes to follow. Tax reform introduced a personal income tax, a value added tax and a company profit tax. The environmental provisions and implications of these and other taxes are considered in this section. One problem in any analysis, however, is that Hungary's tax system is undergoing continuous change and evolution; many of the provisions described here may have since been modified.

The personal income tax was a central element of tax reform. The new income tax originally allowed individuals to deduct 30 percent of the contributions they for the investments of cooperatively owned communal public works systems, including those for water supply and waste water. This allowance may have promoted infrastructure projects in underdeveloped regions. However, the allowance was suspended in 1992. At present, the income tax appears to have a neutral impact on the environment.

Tax reform also introduced a value added tax (VAT) that replaced a set of consumption taxes. The VAT introduced in 1988 had three levels: 25, 15, and zero percent. Although it held a necessary and central role in the reform process, the introduction of the VAT increased inflation in Hungary, aggravating the economic difficulties of the transition.

The VAT had several provisions regarding environment expenditures. A number of environmental services were exempted from the tax (that is, taxed at zero per cent level). At first, this applied only to hazardous waste management services, but was later expanded to include water supply services, public transport, and other local services, as well as nature conservation services. Nonetheless, many other environmental products and services were not receive exemptions (while, paradoxically, military goods did).

In 1993, the Government modified the VAT, creating a simpler, two-tier system. The top rate remains 25 per cent, but some environmental products and services are taxed at 6 per cent.

In addition to the above measures, Hungary's VAT provides additional environmental provisions, as 20 per cent of VAT paid for most environmental investments can be claimed back. For sewer and wastewater treatment investments, 100 percent of VAT can be reclaimed.

A profit tax came into force in 1989, replacing earlier regulations on the taxation of company earnings, but this, in turn, was replaced in 1992 by a broader company tax. The 1989 profit tax provided a number of allowances for environment protection expenditures. For example, there was an 80 per cent reduction in taxes paid on profits arising from waste water treatment activities, waste transportation, and some local environmental services. In 1990, the Government introduced a new, 20 per cent tax allowance for certain environmental investments, including those to reduce air pollution, to treat waste water, and to neutralize hazardous wastes.

In January 1992, the Government replaced the profit tax with a company tax, and substantially changed the tax allowances for environmental expenditures. The 80 per cent reduction for waste water treatment activities and other services was reduced to 40 per cent. The 20 percent tax allowance for environmental investments introduced in 1990 was suspended for all new investments.

The new tax system does, however, provide significant reductions for joint ventures that manufacturing pollution-control and other environmental products. Qualifying joint ventures get 100 per cent tax allowances in the first five years of operation, and 60 per cent for the following five years, if more than 50 per cent of their income arises from the manufacture of environmentally beneficial products, including: solar collectors; waste water treatment equipment such as sedimentators; air pollution abatement equipment, including electrostatic filters; and fluidised-bed furnaces. The preferred products also include agro-chemicals classified as environmentally friendly. There are no advantages, however, in other areas, such as recyclable packaging. Despite its contradictions, this tax allowance plays an important role by trying to stimulate the development of a national environmental protection industry. Tax allowances for joint ventures are, however, being gradually phased out: the last year for possible deductions should be 2003.

In addition, the new company tax provides for accelerated amortization of environmental protection equipment: environment-related equipment activated after January 1st, 1992 can be amortized at 33 per cent per year, instead of the 14.5 per cent rate for most capital equipment. (The accelerated rate also applies to computers and office equipment.)

Consumption taxes appear to provide great flexibility to introduce incentives and disincentives for environmental protection, as they influence consumer choices between products by differences in their tax rates, which are reflected in their retail prices. In Hungary, the most important consumption taxes influencing the environment have so far been taxes on motor vehicle fuels. In 1990, Hungary adopted a scheme under which the level of fuel tax varied on the basis of pollutant content. Lead-free gasoline was taxed at the lowest rate leaded gasolines were taxed at higher levels, depending on their octane ratings. In 1991, these tax rates were adjusted, and they are now set as specific levies in Hungarian Forints (HUF) per liter of fuel (see Table 1). These fuel taxes go to general revenue.

The environmental protection product charge in Table 1, a levy whose revenues go to Hungary's Central Environmental Fund, is described in section 3 below.

Hungary also has a consumption tax on new automobiles. In 1992 this tax was 40,000 HUF per car, but cars equipped with catalytic converters were exempt. In 1993, this tax was changed to approximately 12 per cent of the sales price, again with an exemption for cars with catalytic converters.

Table 1. Taxes on Motor Vehicle Fuels in Hungary
(September 1992)

	92 octane gasoline		98 octane gasoline		95 octane, lead free gasoline		Diesel oil	
	HUF	%	HUF	%	HUF	%	HUF	%
Consumption tax	42.40	64.2	42.40	61.5	36.50	56.0	20.40	47.4
Public roads fund	5.20	7.9	5.20	7.5	5.20	7.8	5.20	11.6
Environment protection product charge	0.50	0.8	0.50	0.7	0.50	0.7	0.50	1.2
Production and distribution price	17.90	27.1	20.90	30.3	23.80	35.5	17.10	39.8
Consumer's price	66.00	100	69.00	100	67.00	100	43.00	100

Note: The average exchange rate for 1992 was 79 HUF = 1 US$

A new, annual motor vehicle tax that was introduced in 1992 also encourages the use of low-emissions automobiles. The base tax is set at 200 forints for each 100 kilograms that a vehicle weighs. (The tax on motorcycles, caravans and tent-holding trailers is uniformly 1000 forints per year.) Only motor vehicles used for public transportation, road cleaning, or waste transport are exempt from the tax. Owners of motor vehicles equipped with catalyzers, however, are charged 50 per cent of the normal rates.

Hungary also has a transit tax on automobiles: after a 60-day tax-free period, passenger vehicles registered abroad are obliged to pay a tax of 50 forints per day. For trucks, the total weight of the vehicle, including its load, as well as the distance travelled in Hungary are used to calculate the amount of tax: 3 forints are charged for each ton and each kilometer. In 1992 and 1993, 600 million forints from these revenues went each year to the Central Environmental Protection Fund. (From 1994, however, all this revenue will go to the Road Fund.)

Since 1991, a land tax has been charged on income from the use of agricultural lands (including arable fields, gardens, fruit gardens, vineyards, and grass and reed lands). The tax rate depends the type of cultivation and the average net income per hectare. In 1992, the Ministry of Agriculture added a 50 per cent tax allowance to promote environmentally friendly agriculture: this allowance goes to farmers using approved, environmentally friendly methods, including provisions to reduce water and winder erosion, to improve waterlogged areas, and to improve acidic soils and sandy soils. (The list of approved measures was drawn up by the Ministry of Agriculture; its regional offices are responsible for ensuring that they are properly followed.)

The new law for local taxes came into force in January 1991. Local governments can set three types of taxes: property taxes (on buildings and land); taxes on industrial activity; and communal taxes. Local governments can use the communal taxes -- which are levied on companies according to the of employees and on individuals by the value of their property -- to fund local infrastructure projects, including environmental protection investments. Introduction of local taxes is not obligatory. By the end of 1992,

approximately 40 per cent of local governments decided to impose local taxes, most choosing the communal tax because of the need to improve local infrastructures.

Taxes, Charges, and Fines for Environmental Purposes

Penalties

Environmental protection penalties are the most important type of economic instrument used in Hungarian environmental policy. At present, there are seven main types of penalties in force, for violations of regulations for: waste water; drainage; air pollution; hazardous waste; noise and vibration; nature protection; and land protection.

Penalties are charged for pollution emissions or other environmental impacts above a specified threshold level. The system of penalties has been in force since the 1970s, though with many subsequent modifications. Most of the revenues from environmental penalties go to Hungary's Central Environment Protection Fund and to other earmarked funds; however, they account for only a fraction of the Central Fund's revenues (see Box 2). The breakdown of penalties going to the Central Fund is shown in Table 2.

Waste water penalties are defined for excess discharges of 19 polluting and 13 toxic materials considering their water damaging effect. Charges increase with the level of damage and other modifying factors -- continuous excessive discharges receive a progressive penalty. The sewage penalty can be

Box 2. Earmarked Funds

The Central Environmental Protection Fund was established in the early 1980s to finance environmental investments, although its legal basis was revised in January 1993. The Fund's revenues come mainly from the environmental charges penalties described in the text, although it can also receive money from state budget allocations and foreign assistance. Its estimated revenues for 1993 should be approximately 3.5 billion Forints: about 1.5 billion HUF from the product charge on gasoline, about 0.6 billion HUF from the motor vehicle transit tax, 0.4 billion from environmental fines, and 1 billion HUF in aid from the European Community's PHARE Programme. At least 75 per cent of the Central Funds money must be spent on investments and other measures for environmental protection; this provision is to ensure that the major portion of the Fund is not used for government activities -- the remaining 25 per cent, however, can be spent on such government work as environmental research and education.

There are several other earmarked funds in Hungary whose resources could be used for environmental investments. The Tourism Fund, financed from tourist revenues, is used to develop the country's tourism infrastructure, which can include ecotourism investments. It is administered by the National Tourism Office, part of the Ministry of Industry and Trade. The Regional Development Fund can be used for infrastructure investments, including municipal waster water treatment systems and solid waste facilities, as well as some tourism investments. The Water Management Fund supports investments for the protection of water resources, water conservation, and waste water treatment. Its revenues come from user charges on water resources (the water extraction fee), and it is administered by the Ministry of Transport, Telecommunications and Water Management. Finally, the Ministry of Agriculture administers a Land Protection Fund, whose purpose is to finance soil quality improvements. Its main sources of revenue are the soil protection penalty and charges levied for agricultural lands removed from production.

imposed on industrial plants that discharge waste water into communal sewer systems. Penalties have been defined for 14 polluting and 17 toxic materials.

The air pollution penalties have been defined for almost 300 pollutants. The amount of penalty depends on the relavent emission limit, the amount released, the potential damage of the pollutant, and the type of area polluted. Imposition of the penalty is progressive: in case of continuous pollution, after the first year of violation the penalty is increased by 20 per cent in the second year, 40 per cent in the third year, 60 per cent in the fourth year and 80 per cent in the fifth and the following years. The penalty is paid into the Central Environment Protection Fund.

The hazardous waste penalty can be imposed on 235 materials or groups of material groups. The rate depends on the toxicity and quantity of the material disposed. For repeated violations the penalty can be increased by a double or triple factor. The basic charge is doubled in residential or nature protection areas. This penalty also goes to the Central Environmental Protection Fund. The penalty on noise and vibration is imposed when limit values are exceeded. The penalty depends on the character of the facility causing noise and vibration and on the nature of the surround area. When limit values are exceeded repeatedly, the fine may be multiplied by a factor of 1.5 to 2. Finally, the nature protection penalty prohibits certain activities in protected natural areas, as well as the destrution of protected plant and animal species.

There is also a land protection penalty, which can be imposed by property registry offices for failures to utilise or reutilise agricultural land, as well as soil contamination and cultivation without proper plant care. This penalty can be imposed up to four times per year. Revenues from this penalty, unlike previous ones, go to the Land Protection Fund.

Table 2. Penalties collected in the Central Environment Protection Fund

	1988		1991	
	HUF (millions)	**US $ (millions)**	**HUF (millions)**	**US $ (millions)**
Hazardous wastes	72.0	1.4	64.0	0.88
Noise and vibration	38.9	0.8	34.0	0.5
Nature protection	0.5	0.01	0.4	0.01
Air pollution	384.1	7.6	851.6	11.4
Wastewater			170.7	2.28
TOTAL	495.50	9.81	1,120.70	15.07

The Central Environment Protection Fund has collected waste water penalties since 1991. These penalties previously went to the Water Management Fund.

*1988 Exchange Rate: 50.4 HUF = 1 US$; 1991 Exchange Rate: 74.7 HUF = 1 US$

The Motor Vehicle Fuels Product Charge

Since May 1992, a 50 filler (0.5 Forint) product charge is levied on each liter of motor vehicle fuels, separate from other, larger taxes in these fuels (see Table 1).

The proceeds go to the Central Environment Protection Fund, and they are earmarked mainly for tackling motor vehicle-related environmental problems, including activities to develop infrastructure or to reduce traffic. Up to 25 per cent of the revenues can, however, be used to finance government environmental work, including research and education activities. Revenue from this charge should exceed all sources of income of the Environment Protection Central Fund.

The Future for Economic Instruments for Environmental Policy

Currently under discussion for Hungary's new environmental protection law is an expansion of economic instruments, in particular effluent charges on waste water, as well as product charges on batteries, car tires, and packaging materials. On January 1st 1994, the product charge on motor vehicle fuels was increased from 50 filler to 80 filler per liter.