

SOFIA INITIATIVE ON ECONOMIC INSTRUMENTS

Improving Environment and Economy

*The Potential of Economic Incentives for Environmental
Improvements and Sustainable Development
in Countries with Economies in Transition*

By
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Szentendre, Hungary
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THE REGIONAL ENVIRONMENTAL CENTER
for Central and Eastern Europe

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The Regional Environmental Center for Central and Eastern Europe (REC) is a non-partisan, non-advocacy, not-for-profit organisation with a mission to assist in solving environmental problems in Central and Eastern Europe (CEE). The Center fulfils this mission by encouraging cooperation among non-governmental organisations, governments, businesses and other environmental stakeholders, by supporting the free exchange of information and by promoting public participation in environmental decision-making.

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Foreword

In recent years new environmental policy instruments have been successfully implemented which address environmental concerns while simultaneously promoting economic development. It is now recognized that these “economic instruments” are central to integrating economic and environmental decision-making, an essential requirement for governments aiming at sustainable development. OECD countries’ experience shows that economic instruments, if designed and implemented properly, often in combination with other environmental policy instruments, can contribute to achieving economic benefits by helping to:

- provide flexibility to polluters in choosing the most cost-efficient and environmentally effective measures, thereby reducing compliance costs;
- change the relative prices of environmentally sensitive goods, leading to an allocation of resources towards more environmentally sustainable production and consumption;
- create “win-win” incentives for environmental investments which generate profits and environmental benefits at the same time;
- promote technological innovation needed for more environmentally sustainable production and consumption; and
- raise revenues which governments can use for catalyzing environmental investments of national priority, or for decreasing income taxes, profit taxes or social security contributions.

This report, “Improving Environment and Economy,” provides a thorough discussion of how the above-mentioned benefits can be attained and provides practical examples of experience with economic instruments in OECD countries and economies in transition. The report focuses on the specific circumstances of economies in transition and demonstrates the importance of integrating modern environmental management policies into emerging economic policies now rather than in the future. This report is a timely contribution: Economies in transition have a unique opportunity to learn from the experience of OECD countries and to avoid high costs of environmental policies, implementation deficits and environmental distortions to economic policies. The report should also be a useful contribution for discussion in those countries of Central and Eastern Europe which are in the process of acceding to the European Union and which will have to adopt and implement European Union environmental legislation. The report highlights many possibilities for achieving European Union environmental standards in a cost-effective way and discusses how the environmental accession process may lead to additional economic benefits.

I am pleased that the framework for analysing economic instruments, originally developed in OECD, is finding use beyond the traditional OECD membership. I would commend the REC, an organisation rooted in Central and Eastern Europe, for producing this valuable report in cooperation with experts from the region. I hope that the

FOREWORD

lessons synthesised in this volume will stimulate further progress in the implementation of cost-effective environmental policies in Central and Eastern European countries and beyond.

Joke Waller-Hunter

Director, Environment Directorate,
Organization for Economic Cooperation
and Development, OECD

Introductory Note

The goal of this report is to inform the reader of the potential benefits of economic instruments for environmental policy and to provide the latest information regarding the role of economic instruments in addressing urgent environmental problems while simultaneously contributing to sustainable economic development and growth in countries of Central and Eastern Europe (CEE) and the Newly Independent States (NIS). Experience with economic instruments in Western Europe and North America is reviewed and compared to the experience in CEE and NIS, and recommendations for the continued and expanded use of economic instruments in CEE and NIS are elaborated. The report is written primarily for high level economic and political decision-makers but should also be valuable for environmental policy-makers as well as a wider audience. This report is published in English language (original) and Russian, Croatian, Estonian and Romanian languages and is widely distributed among the economic and political decision-makers in the CEE and NIS regions, especially in those countries for which a national language version was produced.

This report has been produced under the mandate of the “Sofia Initiative on Economic Instruments” (SIEI) stemming from the 1995 Environment for Europe Ministerial Conference in Sofia, Bulgaria. European environment ministers welcomed the work completed under the SIEI and renewed the mandate at the 1998 Environment for Europe Ministerial Conference in Aarhus, Denmark. The SIEI is implemented as part of the work program

of the Environmental Action Program Task Force with Secretariat at the Organisation for Economic Cooperation and Development (OECD) and the Regional Environmental Center for Central and Eastern Europe (REC). For more information on the SIEI see: <http://www.rec.org/REC/Programs/SofiaInitiatives>.

The report was written by Jürg Klarer (principal author), Project Manager at the REC and environmental economics and financing consultant; Patrick Francis, environmental economics and financing consultant and former Program Manager of the Environmental Financing Program of the EAP Task Force at OECD; and Jim McNicholas, economic instruments expert at the REC.

The national coordination for producing the translated versions was carried out by: Alexander Golub, Professor at the Higher School of Economics Moscow (Russian version); Mirjana Papafava, Senior Advisor at the State Directorate for the Protection of Nature and the Environment of Croatia (Croatian version); Ljubov Gornaja, environmental economics consultant (Estonian version) and Mihaela Popovici, Director, Center for Environmentally Sustainable Economic Policy (CESEP), Bucharest, and expert for the Harvard Institute for International Development (Romanian version). These experts also contributed to the report with specific inputs as indicated in the text, by commenting on a draft version and by proof-reading translations. The translations were completed by Alina Averchenkova (Russian version), Irena Brnada (Croatian version), Siiri Kerge, Mari Lahtmets and Ene Laur (Estonian version) and Carmen Constantin (Romanian version).

The design, layout and final publication of all reports was coordinated by Sylvia Magyar, REC publications officer, with the help of Reuben Stern. The English language version was edited by Daniel McAdams and copy edited by Tom Popper.

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**Secretariat of the Sofia Initiative on
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Executive Summary

The Need for Action

The countries of Central and Eastern Europe (CEE) and the Newly Independent States (NIS) of the former Soviet Union continue to face substantial environmental challenges. Priority problems typically identified include: centres of severe industrial pollution; pollution intensive and inefficient heat generation and distribution systems; increasing pollution from road transport; poor surface and groundwater quality; underdeveloped municipal environmental infrastructure; and the inefficient use of natural resources. Immediate action is required to allow for environmentally sustainable economic growth and to prevent long-term negative effects on human health and damage perhaps irreversible to natural habitats. Opting for short term, unsustainable economic development, rather than working toward solutions for environmental problems now, may prove to be much more costly in the years ahead.

During the economic transition period, a degree of pollution reduction has been achieved in many countries in the CEE and NIS regions. Most noteworthy is the autonomous reduction in some key pollutants which accompanied the massive reduction in industrial output in the early years of transition. Such pollution reduction may be temporary unless regained growth is separated from a corresponding growth in pollution. Economic restructuring in advanced economies in transition (EITs) in CEE and NIS has resulted in cleaner and more efficient production, and the gradual introduction of market-based reforms such as reducing subsidies and price controls,

imposition of hard budget constraints, privatisation and trade liberalisation has brought further environmental benefits. Pollution patterns in the region and in western countries, however, clearly indicate that economic reform alone is not enough to resolve environmental problems.

More effective environmental policies, accompanied by improved implementation and enforcement practices, are also needed and are gradually being introduced in the CEE and NIS regions. In the more advanced EITs, some attention is also being given to developing policy initiatives that simultaneously address environmental concerns and provide long term signals for economic development patterns. In CEE countries, European Union accession has acted to catalyse many of these initiatives. The costs of meeting the environmental requirements of EU accession, an estimated EUR 120 billion only in the air, water and waste sectors, provide a benchmark for policymakers in these countries and give an indication of the environmental challenge faced by these countries. Annual environmental investments of up to 2-4 percent of GDP over 10-20 years will be necessary. A similar benchmark does not exist in the NIS, but costs may be even higher, as environmental progress in the early transition period has been slower in these countries than in CEE countries.

Western environmental policy has rather effectively addressed key concerns in most areas that constitute present priority environmental problems in CEE and the NIS. Higher levels of investment, the development and introduction of modern technologies and increased efficiency of industrial

and heating processes have contributed to the lower pollution intensity of most western economies. Command and control environmental policy instruments traditionally applied in the West, however, have led to implementation deficits and high costs for achieving environmental improvements. These same policies have proven largely unsuccessful in preventing or controlling new environmental problems (e.g., non-point source pollution from road transport). Based on these negative experiences, a gradual reorientation has taken place which is reflected in recent trends in Western environmental policy. Increasingly, current environmental policies attempt to recognise market forces; internalise social costs from pollution and resource use; shift toward full cost pricing in municipal services, such as water supply/treatment, waste management, energy supply etc.; and search for cost-efficient and flexible instruments, which simultaneously support economic development. Economic instruments have proven very useful to achieve such policy goals.

A common conclusion that can be reached based on regional and Western experience is that environmental and economic variables are mutually-dependant (not mutually-exclusive), in the sense that the environment is a key input to many economic activities, and economic decisions are also important for the quality of the physical environment. It is therefore not generally a question of “either the environment or the economy,” but of “*both* the environment and the economy.” While past environmental policy and management in Western countries, as well as CEE and NIS countries, has tended to be divorced from economic policy, today there is growing experience and evidence that a rather new set of policy instruments — economic instruments — can combine environmental and economic objectives.

The Need for Economic Instruments

Economic Instruments (EIs) have gained particular attention in recent years as effective instruments which serve to integrate environmental concerns into economic development strategies. EIs offer numerous benefits:

- *EIs are key to environmentally sustainable development:* By integrating environmental concerns directly into the economic incentive structure that producers and consumers face each day, EIs implicitly promote a shift in the allocation of resources towards those activities which are both environmentally sound and economically attractive.
- *EIs help internalise environmental costs:* Economic instruments can reflect the real costs of pollution and attempt to incorporate them into the prices of goods and services. In the absence of the corrective role played by EIs, the under-pricing of pollution and natural resources allow distortions and inefficiencies to remain in the economy.
- *EIs often are more cost efficient than traditional policy instruments:* Due to the flexibility granted to polluters in achieving pollution targets, EIs encourage pollution reduction where abatement activities can be implemented in the most cost efficient way.
- *EIs support the Polluter and User Pays Principles:* Economic instruments solicit direct payments from those who introduce pollution into the environment and those who use natural resources taken from the environment. In other cases, i.e. packaging, EIs require a deposit from potential polluters.
- *EIs raise revenues for environmental investments or general government expenditure:* In most EITs, revenues from pollution charges are used to co-finance priority environmental investments, often via

environmental funds. The current trend in Western countries is toward “eco-tax reform,” where revenues from eco-taxes flow to the central government budget. The ultimate goal of eco-tax reform is to shift taxes from “goods” such as employment or income to “bads” such as pollution or resource consumption.

- *EIs are compatible with current priorities and trends in regulatory and fiscal reform:* EIs can contribute to achieving overall policy objectives such as: making government intervention more effective; reducing cost; promoting technological innovation; encouraging private investment; and reducing distortions in fiscal systems.
- *EIs may have positive effects on innovation and competitiveness:* By raising the price of pollution and natural resources, EIs encourage the development and trade of more efficient technologies. Enterprises that operate more cleanly and efficiently reap the reward of lower costs and increased competitiveness.
- *EIs help businesses and consumers in taking longer term choices:* By revealing the high, cumulative costs of pollution and resource consumption to producers and consumers, EIs help enterprises and individuals develop strategic plans to reduce environmentally damaging behaviour and save money in the long run.
- *EIs are useful to mitigate “diffuse pollution”:* Pollution coming from various, small sources such as vehicle emissions, chemical run-off from farms and packaging wastes etc. can be better and more cost-efficiently controlled by EIs than traditional policy instruments.

Experience in Economies in Transition

Most of the countries in CEE have introduced pollution charges on air emissions, water effluents and waste disposal. These

charges have generally been introduced in conjunction with a permit system: a base charge rate is applied for permitted emissions and a penalty rate encourages compliance with the permitted standard. Product charges, which have been introduced extensively in Hungary and Latvia, are increasingly being introduced in other countries in the region. It is difficult to assess the incentive effect of these charge systems, but available evidence does suggest that they do provide positive environmental and economic effects. Experience in Poland shows that environmental charges — even if set at high rates — have contributed to accelerated economic restructuring, which has also led to improved economic performance.

Although most charges were introduced with an incentive effect for pollution reduction in mind, a review of these pollution and product charge systems suggests that the primary function has been to raise revenues for supporting environmental investments. With the exception of Albania, Croatia, Romania and Slovenia, the revenue from environmental charges is earmarked for environmental funds in CEE countries. For reasons associated with inherited debt burdens and the under-development of financial markets, environmental funds have been effective in catalysing priority environmental investments that may otherwise not have been completed. The administration of public revenues by environmental funds remains a debated issue in some countries, but if efficiently and transparently managed, funds will most likely play an important role in financing environmental investments in the future. In CEE countries preparing for European Union Accession, environmental funds are already being considered to play special roles in financing necessary environmental improvements.

The introduction of full-cost user pricing in sectors such as energy, water and waste management has also been initiated in most CEE countries and, though to a lesser degree, in the NIS. Current user charges still

remain well below full cost pricing, and further increases in charge rates in line with increases in purchase power of citizens are inevitable for both environmental and economic reasons. Although the reduction of price controls is generally a politically and socially sensitive issue where incomes are low, long term benefits of improved services, environmental quality and more efficient resource use should outweigh initial price increases.

Economic subsidies in the industry, transport, energy and agriculture sectors — including support such as tax allowances and exemptions, non-payments or delayed payments, debt forgiveness, direct support (grants, preferential loans, loan guarantees) and tariff barriers and exemptions — may continue. There has been little analysis on the possible negative environmental effects of such subsidies in the region, though experience in the west indicates that such subsidies contributed to unsustainable economic growth patterns. It appears that some direct subsidies were reduced in the transition period due to budget deficits, but it is also possible that previous subsidy schemes were turned into more hidden forms of subsidisation. The potential negative environmental side effects of large new subsidy schemes that will probably emerge in the context of EU Accession, for example in the transport area (expanding the road network) or the agriculture area (harmonisation with EU Common Agricultural Policy) should be assessed.

Experience in Western Europe and North America

The use of economic instruments has been increasing rapidly in Western countries since the late 1980s, and it is expected that environmental taxes, tradable permits and deposit refund systems will play a larger role in future environmental policies. This trend of applying more economic

instruments is strongly supported both by the OECD and the European Commission.

An important reason for the increased use of economic instruments in all Western countries is related to the positive experiences gained with economic instruments that have been in place for some time already. Both environmental effectiveness and economic efficiency of some older instruments has been proven in empirical evaluation studies (examples discussed in the text include the Swedish sulphur tax, the Norwegian CO₂ tax, the Danish waste charge and the Dutch wastewater charges). Key for achieving positive results was careful and proper design of the instruments, formulation of clear objectives and gradual implementation.

Recent analysis found that certain economic subsidies in the industry, energy, transport and agriculture sectors can have undesired negative environmental effects (often referred to as “perverse incentives”) and have contributed to the development of environmentally unsustainable economic structures. Environmentally harmful subsidies can affect or offset improvements arduously achieved by environmental policy. In some cases, support schemes no longer serve their well-intended original purpose, and it would be wise to reform or remove the support schemes both for environmental and economic reasons. However, experience shows that once a support scheme is in place it is extremely difficult to remove or reform it, due to the vested interest of those benefiting directly from the scheme. The non-internalisation of external environmental costs can be also considered an “implicit subsidy.” CEE and NIS countries should prevent the development of similarly distorting economic schemes while gradually developing a market economy.

Ecological tax reform currently receives priority attention in Western Europe, and, currently, ten European Union member states have implemented or are about to implement an ecological tax reform. The political attractiveness of eco-tax reform has

consisted of the possibility to achieve a “double-double dividend” by delivering simultaneous improvements in: a) the environment; b) innovation and competitiveness; c) employment; and d) the tax system. Eco-tax reform usually involves three complementary approaches: a removal or modification of existing distorting subsidies and tax provisions; a restructuring of existing taxes; and the introduction of new eco-taxes. The introduction or alteration of environmental taxes is often carried out under constraints of revenue neutrality (i.e. constant overall tax revenue), for example by shifts from income or labour taxes towards environmental and resource use taxes. Already in 1995, environmental taxes accounted for 7 percent of total tax revenues in the European Union average (corresponding to 3 percent of GDP). The potential for eco-tax reform in the CEE region has not yet been thoroughly assessed and related analysis should be initiated. A regional fore-runner may be Slovenia, which has recently introduced un-earmarked taxes on CO₂ and wastewater effluent.

Very positive experience has been gained with tradable emission permits primarily in the United States and Canada. The potential for more cost-efficient and market-based environmental policies using tradable permits has also been recognised in the CEE and NIS regions to some extent and a few experimental pilot emission trading schemes have been implemented (Poland and Kazakhstan). Additional research and time is needed before possibly introducing this promising instrument in CEE and NIS countries.

The flexible mechanisms introduced under the Kyoto Protocol aimed at decreasing global greenhouse gas emissions are a special case and represent the first *international* economic instrument. The Kyoto flexible mechanisms include two project-based trading mechanisms (Joint Implementation and Clean Development Mechanism) and international emissions

allowance trading. At present there are still many open questions about the technicalities under which these mechanisms would actually work. However, it is estimated that the global market created by these mechanisms could be as large as USD 10-20 billion in the period 2008-2012, with a major part of funds flowing to EITs. Apart from financial transfers, EITs could profit also from technology transfer and secondary environmental benefits. However, in order to realise these promising gains, EITs will have to take a number of institutional and policy steps to be ready for greenhouse gas trading in the year 2008. The implementation of domestic greenhouse gas mitigation measures will allow EITs to benefit most from international trading.

Conclusions and Recommendations

- *Make greater use of economic instruments to more fully capture the benefits they offer.* The dynamic events occurring in the transition period create a tremendous scope (and need) for new and more effective and efficient policy instruments. Notwithstanding the numerous, and sometimes daunting, challenges posed by the reform process now underway, opportunities for improving existing economic instruments — and introducing new ones — abound.
- *Ensure that the objective(s) of economic instruments are clearly and explicitly specified.* As tools of environmental policy, the environmental objectives of each instrument, and how those objectives will be achieved, should be clearly spelled out by its enabling legislation.
- *Economic instruments currently in effect should be systematically evaluated.* Existing economic instruments should generally be evaluated according to the criteria suggested by OECD: environ-

mental effectiveness; economic efficiency; administration and compliance costs; dynamic effects (innovation); and soft effects (capacity building, awareness raising). Similarly the earmarking of revenue generated by economic instruments and its use should be continuously reviewed. Regular evaluation would provide useful feedback for modifying and adapting the instruments to their changing context and would help decrease barriers to introducing new instruments by showing their positive environmental *and* economic effects.

- *Involve key stakeholders early in the design and implementation of economic instruments.* The constructive involvement of key interest groups will ultimately lead to more effectively designed and implemented economic instruments. These other stakeholders will include (at a minimum) members of other ministries, parliament, industrial groups and environmental citizens' organisations, the latter of which may be very helpful in building public support for economic instruments.
- *Environmentally harmful subsidies should be reduced or eliminated.* In Western countries, certain subsidy schemes led to environmentally unsustainable economic development patterns and have affected or offset arduously achieved improvements by environmental policy. Existing and proposed new support schemes in EITs should be assessed for their environmental impacts and reforms should be initiated if necessary.
- *Establish "green budget commissions" to spearhead more environmentally sustainable economic and fiscal reform.* Experience in a number of OECD countries has shown such commissions to be effective in integrating environmental concerns into economic development and making fiscal policies both more environment-friendly and economically

sound. The potential for ecological tax reform should be analysed in advanced EITs. Experience gained in this area in Western European countries should be taken into account.

Chapter 1: The Need for Action

Central and Eastern European (CEE)¹ countries and the Newly Independent States (NIS) face a formidable environmental challenge. This chapter provides a brief overview of environmental problems and policy responses in the CEE and NIS regions in the context of current economic and social development. This is followed by an overview of environmental problems and policy responses in Western countries. Chapter One sets the stage for the discussion following in chapters Two and Three on how environmental improvements can be attained in a way that provides simultaneous economic gains or reduces environmental costs to a minimum.

1.1. The Environmental Challenge in the Transition Period

The collapse of communism in CEE, and the disintegration of the Soviet Union that followed, revealed the real picture of environmental challenges faced in the region. Box 1 provides an overview of typical environmental problems CEE and NIS countries face during the transition period.²

Early economic transition (1990 until mid-1990s) has been characterised by major declines in economic output due mainly to a collapse of industrial production. All countries in both regions experienced severe episodes of inflation. Unemployment has risen dramatically in most countries, first as a result of decline in economic activity and later also due to restructuring of enterprises. These processes also led to decreases in real wages and even impoverishment

in some areas. Since the mid 1990s, economic growth has resumed in most countries, but by 1997 only Poland and Slovenia had reached levels of real GDP exceeding those of 1990 (see Annex 1 for selected economic indicators). Economic reform is occurring in all CEE countries (CEEC) and the NIS, though with varying speeds and depths. Today, a number of CEEC, including Poland, the Czech Republic, Hungary, Slovenia, Slovakia, Croatia, Estonia, Latvia and Lithuania are considered advanced in economic transition, while reform in other countries, especially some of the NIS, has been slow. In the most advanced CEEC, the gradual reform of several perverse incentives inherited from central planning has resulted in environmental benefits — note that the reforms listed below have not been undertaken with the same vigour in the NIS (adapted from OECD, 1999 forthcoming):

- The *elimination or reduction of price controls and subsidies*, especially for fuels, lead to an initial increase in the costs of production calling for the adjustment of production processes, resource savings and industrial restructuring toward more efficient production and less resource-intensive sectors.
- The *imposition of hard budget constraints*, coupled with changes in the incentive structure of enterprises (including taxation), encouraged managers to improve the efficiency of their operations, reduce waste and improve the overall management of resources.
- Overall, *privatisation and favourable conditions for foreign investments* improved

BOX 1

The environmental challenge in the transition period; a summary of past and current environmental problems in CEE and NIS:

- High levels of air, water and waste pollution emanating from large industrial centres, in some areas resulting in regional “hot spots” causing serious damage to human health and the natural environment.
- High levels of ambient air pollution in larger settlements due to industrial emissions, inefficient heating systems based largely on high sulphur-content coal, fuel oil or lignite and exhaust from old automobiles.
- Inefficient and wasteful use of natural resources such as timber, minerals, fuels, land and water, resulting in various environmental problems.
- Pollution of most surface waters by industrial and agricultural discharges or municipal wastewater effluent (heavy metals, toxic chemicals, nitrates). Poor groundwater quality in many areas (the quality of groundwater in many regions is unknown due to the lack of monitoring).
- Contaminated soil in some areas due to poor waste management practices, deposition of air pollution and the use of agricultural chemicals; serious soil erosion in some areas due to intensive agricultural practices and related water policies.
- Past environmental pollution from abandoned military or industrial sites (toxic wastes, degraded soils, etc.). Environmental liabilities have affected privatisation, significantly lowering the value of some privatised property.
- Neglect of nuclear safety (as evidenced at Chernobyl). Serious concerns about nuclear safety prevailed throughout the 1990s in the region. These included unresolved or improper disposal of nuclear and other hazardous wastes from energy production and military.
- Waste management has been neglected in the past and remains very underdeveloped today in many areas. Numerous uncontrolled, illegal waste dump sites exist. Capacities and facilities to properly dispose and process waste are largely lacking. Relatively little waste is re-used and/or recycled. (Unfortunately, some previously functioning systems for re-use, e.g. use of glass bottles, have disappeared.)
- Municipal environmental infrastructure (e.g. water supply, wastewater collection and treatment, district heating, waste management) is often underdeveloped, in disrepair or simply not existing. Large segments of the population were not connected to sewage systems and in many cases did not have continuous access to safe drinking water.
- Economic development pressures on valuable ecosystems and biological diversity. One positive legacy of centralised planning was that the CEEC/NIS inherited large areas of pristine nature or near-natural habitats, largely due to communist policies of concentrating industry and settlements in urban centres, the undeveloped infrastructure in rural areas and restricted development in natural and forest areas.

corporate governance, efficiency, profitability, and access to finance for the renewal of outdated, inefficient and polluting capital stock.

- *Trade and market liberalisation* increased the exposure of enterprises to market requirements, management and environ-

mental practices and access to cleaner production technologies.

In line with the serious declines in economic output and industrial production in the early 1990s, the first several years of transition generally brought about significant reductions in pollution. Pollution

reduction was also achieved as a side effect of gradual economic restructuring in advanced transition countries. In the most advanced transition economies, further pollution reduction was apparently achieved by the imposition of new, more realistic environmental legislation, gradual steps toward fuller implementation and stricter enforcement of environmental policies along with environmental investments.

Environmental benefits acquired through effective environmental policy are certainly more sustainable than emission reductions achieved merely due to a decrease in production. In many of the advanced transition economies there are clear signs that pollution intensities of some key pollutants have slowly decreased during the past 3-4 years. This indicates that recently resumed economic growth has not been accompanied by similar growth in emissions. Still, even in the most advanced transition economies, key environmental pollution and consumption indicators remain much higher than those in Western countries, as can be seen from Table 1. For example, SO₂ pollution intensity (kg SO₂ emitted per USD 1,000 of GDP produced) was three to 20 times higher in EITs than the OECD area average in 1995. Similar, although sometimes less spectacular, differences can be found for other pollutants or for the use of natural resources. Acquiring similar standards of efficiency will require substantial and sustained efforts (and associated expenditures) in environmental protection and natural resource management over a long period of time.

This conclusion is supported by recent analysis suggesting that an amount of approximately EUR 120 billion will be needed to achieve compliance with the basic Directives of the European Union in the areas of air protection, water protection and waste management in the ten EU accession countries of CEE alone.³ This amount implies that, on average, some 2-4 percent of GDP will have to be spent on environmental investments in the ten acces-

sion countries every year over the next 10-20 years. Taking environmental standards in the EU as a benchmark, these estimates give an indication of the scale of the environmental challenge in the region.

Development in the NIS in the first years of transition has been quite different from that in most CEEC (see Box 2) and relatively little evidence of sustained environmental progress has surfaced. It should be said, however, that assessment of environmental conditions in the NIS is hindered by the poor and incomplete state of environmental monitoring systems and the lack of reliable information on the state of the environment. There has generally been less success in the NIS with the formulation and implementation of realistic environmental policy and related investments have lagged behind in comparison to CEEC. Following the 1998 financial crisis in Russia, the NIS region is characterised by high investment risks. Environmental investments, many of which tend to be long-term and low-return investments, are not very attractive to investors. Nevertheless, the transition period provides the NIS (and CEEC) with a real and unprecedented opportunity to replace old technology with new, more environment-friendly technology, at low cost. Some investments can even generate profits or savings while yielding significant environmental benefits: so-called “win-win” investments. Even these investments, however, are unlikely to be realised (as experience in the region has shown) without stable economic conditions, adequate incentives for the business sector and accessible finance.

The initial policy response to the environmental challenge in CEEC and the NIS has typically consisted of the gradual development of more realistic environmental strategies and action plans, new environmental legislation better adapted to the new economic and political realities, gradual strengthening of institutional capacities and the nurturing of environmental financing markets to promote increased invest-

TABLE 1

Some environmental indicators in selected EITs and Western countries

(data refer to 1995, or latest available)

	<i>BUL</i>	<i>CZE</i>	<i>EST</i>	<i>HUN</i>	<i>POL</i>	<i>BLR</i>	<i>RUS</i>	<i>DK</i>	<i>GER</i>
Sulphur oxides emissions									
(kg/capita)	176	125	91	72	68	32	43	30	37
(kg/USD 1,000 GDP)	41.0	14.4	25.2	12.2	14.4	7.2	6.2	1.6	2.2
Nitrogen oxides emissions									
(kg/capita)	27.2	36.3	27.6	18.3	28.7	20.0	20.6	53.2	27.1
(kg/USD 1,000 GDP)	6.4	4.2	7.6	3.1	6.1	4.5	3.0	2.9	1.6
Carbon dioxide emissions									
(tons/capita)	6.3	11.7	14.0	5.6	8.6	6.6	10.4	11.6	10.8
(tons/USD 1,000 GDP)	1.5	1.35	3.9	0.94	1.70	1.50	1.5	0.62	0.62
Energy supply									
(Toe/capita)	2.4	3.8	3.6	2.4	2.4	2.4	4.1	3.8	4.2
(Toe/USD 1,000 GDP)	0.57	0.44	0.99	0.41	0.47	0.55	0.58	0.21	0.24
Public wastewater treatment									
(% of pop. served)	36	56	72	32	42	n.a.	n.a.	99	86
Municipal waste generated									
(kg/capita)	n.a.	400	406	420	260	242	340	520	360

Sources: OECD, Data on Russia provided by A. Golub. **Abbreviations:** BUL = Bulgaria; CZE = Czech Republic; EST = Estonia; HUN = Hungary; POL = Poland; BLR = Belarus; RUS = Russian Federation; DK = Denmark; GER = Germany; POR = Portugal; CH = Switzerland; UK = United Kingdom; USA = United States of America; OECD = OECD countries average; Toe = tons of oil equivalent; n.a. = data not available.

ments in priority environmental projects. Of course, progress has differed in the above areas from country to country.⁴

Efforts to reform environmental policy in CEEC/NIS had to overcome a number of defects found in policies developed under central planning, including: over-ambitious goals based on unrealistically strict standards; centrally determined and regulated allocation of resources; emphasis on mere technological solutions while omitting related economic and financial feasibility; severely restricted public access to information; lack of negotiation with key stakeholders; lack of setting quantifiable objectives; and lack of evaluation of progress in

policy implementation. As a result, environmental policies often consisted of long “wish-lists” for environmental improvements, failed to establish realistic investment priorities and were poorly implemented. Much attention has therefore been paid to overcoming these problems in the process of formulating new and more realistic strategies, and in most countries at least initial improvements can be reported.

In most countries of the two regions, new environmental legislation has been prepared and enacted, usually consisting of a framework environmental act and sector specific legislation (e.g. on air quality protection, water and waste management). New envi-

POR	CH	UK	USA	OECD
27	5	47	63	41
2.7	0.2	2.9	2.5	2.5
25.5	19.2	38.0	74.3	38.9
2.5	0.9	2.3	3.0	2.4
5.1	5.9	9.6	19.9	10.8
0.49	0.28	0.58	0.80	0.65
1.9	3.5	3.8	7.9	4.5
0.18	0.17	0.23	0.32	0.27
21	91	87	71	n.a.
350	380	350	730	490

Environmental legislation has often been drafted using similar Western legislation as a benchmark (especially EU environmental legislation). This approach certainly makes sense for EU accession countries in CEE, but has maintained the tendency to set ambitiously strict standards and requirements while related enforcement tools adapted to local circumstances were only vaguely defined. The *Polluter Pays Principle* (PPP), which states that the polluter⁵ must bear full financial responsibilities for pollution reduction, has been introduced and emphasised in virtually all new environmental legislation and is now a cornerstone of environmental policy in nearly all CEEC and NIS.

Governments can make use of three broad groups of policy instruments to implement new and modern environmental policies:

- *Command and control instruments*: This group includes instruments such as ambient quality standards, source-specific emission standards, technology standards, product standards, etc.
- *Economic instruments*: This group includes instruments such as emission charges/taxes, user charges, product charges/taxes, deposit-refund systems, emissions trading, tax allowances and subsidies (see section 2.1 for more details).
- *Persuasive and other instruments*: This group includes public and stakeholder participation, information strategies, voluntary agreements, environmental education, etc.

In new environmental policies and legislation, CEEC and NIS have made use of policy mixes involving several types of policy instruments from the above groups to tackle various problems. An emphasis on command and control instruments, however, has been maintained similar to traditional environmental policy development in western countries. As shown in the following section, the traditional approach — relying heavily on command and control — has, in some areas, resulted in excessive costs and “implementation deficits.”

1.2. Trends in Western Countries

Environmental policy development since the 1970s in OECD countries was characterised by more credible implementation and enforcement than analogous policies in the Soviet sphere of influence. Generally, OECD countries’ past environmental policies have led to higher production efficiencies, (fewer inputs being required to produce the same levels of output), which helped to decrease pollution intensities and contributed to more

BOX 2

Macroeconomic constraints influencing environmental improvements in NIS

The NIS have had to cope with the disintegration of economic and political links as well as the difficulties of establishing completely new monetary and fiscal systems. Many NIS face large barriers in their efforts to develop markets outside the former Soviet Union, and they lack the commercial traditions, human resources, foreign investment and capital that have eased the transition for some of the CEEC. Many NIS have continued to protect their enterprises from real market forces through subsidies, including loans from government banks, as well as by tolerating large tax and payment arrears. Industrial restructuring has proceeded slowly, and limited progress in privatisation has not yielded the expected benefits. Ownership was often transferred to former employees or managers without imposing real changes in economic incentives, management practices, traditional ties to government or dependence on budget support. Many companies in the NIS operate largely by non-monetary means such as barter. Bankruptcies and the entry of new firms are rare, hampering the growth of a real competitive environment.

Instead of initiating thorough restructuring measures and programs that would lead to improved financial performance, industrial enterprises are often more interested in maintaining employment, avoiding taxes and maintaining good relationships with business partners and government officials than in producing profits that would be heavily taxed. Exports are frequently pursued primarily to obtain the cash necessary to pay wages in an otherwise cash-less economy. The ability of the public sector to collect and efficiently reallocate tax revenues throughout the economy is severely limited in NIS economies because, *inter alia*, taxes are often paid in-kind. Thus, the supply of goods and services, rather than efficiency considerations, determines public spending. Such unfavourable macroeconomic conditions have also constrained environmental improvements: Proper implementation of environmental strategies is almost impossible; enforcement of environmental law is severely constrained; the private sector's contribution to environmental investment remains low; the public sector is unable to collect and spend significant amounts of money to catalyse private sector environmental investments; etc. As a result, great opportunities to achieve low-cost or even profitable environmental improvements continue to be missed.

Source: based on OECD (1999, forthcoming)

efficient use of natural resources (as indicated in Table 1). Past approaches to environmental policy in OECD countries resulted in clear environmental improvements in a number of areas, but also left a number of important challenges⁶, as illustrated below:

- Reduction in urban air pollution, especially sulphur dioxide, total particulate matter, and lead. Among largely unresolved problems, photochemical smog and fine particulates can be mentioned.
- Microbial pollution of water supplies has been brought under control in many (though not all) locations, but chemical pollution remains a serious threat.
- The release of certain persistent chemicals (DDT, PCBs and mercury compounds) into the environment has been reduced, but not eliminated. Pollution from certain other toxic chemicals remains a problem, and there is much uncertainty about the environmental and health effects of the vast numbers of chemicals in common use and new chemicals developed by industry.
- Major achievements were made in municipal environmental infrastructure related to water supply/treatment and municipal waste management, as well as cleaner heat generation for the household and industry sectors. It is an ongoing challenge to maintain existing facilities and continuously

upgrade them with new, more efficient technology. It also remains a challenge to improve waste prevention and increase waste re-use or recycling to move away from landfills and incineration.

- Congestion, noise and pollution problems associated with vehicle transport are getting worse — not better. Some pollution reduction from road transport has been achieved through technology improvements (e.g. catalytic converters) and new product (fuel) standards, but gains have been offset and overcome by increased transport volumes. This negative trend can already be seen in CEEC and NIS as well.
- Debates on stratospheric ozone, acid rain, climate change and biodiversity provide examples of the increasing internationalisation of environmental problems. Although some progress is being achieved in these areas (notably on ozone), climate change, loss of biodiversity and the long-range transport of atmospheric aerosols continues to intensify. Population growth and unsustainable production/consumption patterns are usually cited as key reasons for this intensification.

Implementation of environmental policies has also led to the development of a new industrial sector, commonly referred to as “eco-industry.” This includes the development and marketing of equipment for pollution control and prevention, as well as environmental research and development, environmental monitoring and environmental consultancy services. In the EU, for example, it is estimated that eco-industries supplied some USD 41.7 billion gross value added in 1994, which corresponded to about 0.5 percent of GDP (EEA, 1998). Real growth of the eco-industry sector is expected to outpace that of the rest of the economy during the next five to ten years, mainly due to the continuing development of environmental policy in the EU, which will

eventually have to be implemented in the accession countries of CEE. Similarly, environmental businesses in EU accession countries are expected to grow rapidly.

Environmental policies in OECD countries are currently undergoing some important changes (OECD 1996): there is a clear trend to shift away from short-term policies (aimed largely at the clean-up of environmental problems), toward more structured/long-term policies, aimed at the prevention of environmental problems. Where problems could once be conceived largely in terms of controlling industrial emissions alone, more complex and integrated solutions are now necessary (integrated pollution control, ecosystem management, life-cycle analysis, policy integration etc.). Non-point sources (e.g. agricultural run-off, vehicle pollution and loss of biodiversity) are also increasingly recognised as priorities. In addition, environmental policy in the 1970s and early 1980s was mainly driven by command and control instruments that often entailed extremely high implementation costs. These costs, and the persistence/emergence of certain environmental problems (as noted above), prompted policy-makers in the late 1980s and early 1990s to search for other, more cost-effective policy options. Interest in more market-based, *economic* instruments for environmental policy was stimulated by a number of factors (adapted from EEA 1996):

- a new orientation towards market deregulation in public policy;
- increasing recognition of the limitations of government in general, and of traditional command and control systems of environmental regulation in particular (“implementation deficits”);
- increasing concern that regulations might not adequately cope with emerging environmental problems, despite imposing substantial economic costs (for instance, pollution from non-point sources);

BOX 3

Some EU views on economic instruments

- The 5th Environmental Action Programme "Towards Sustainability" in 1992 stated⁷: "In order to get the prices right and to create market-based incentives for environmentally friendly economic behaviour, the use of economic and fiscal instruments will have to constitute an increasingly important part of the overall approach. The fundamental aim of these instruments will be to internalise all external environmental costs incurred during the whole life-cycle of products from source through production, distribution, use and final disposal, so that environmentally-friendly products will not be at a competitive disadvantage in the marketplace vis-à-vis products which cause pollution and waste."
- The European Commission's 1994 Communication, Economic Growth and the Environment — Some Implications for Economic Policy Making stated⁸: "In our economy, economic decisions are to a large extent taken on the basis of price signals. As consumers adjust their purchase decisions to price changes and companies determine product design, technological development and the organisation of their production processes to a large degree as a function of market prices, it is essential that these prices correctly reflect the full costs and benefits to individuals and to society. Environmental taxes will prove to be one of the more effective policy responses in a significant number of cases."
- The European Commission's 1997 Communication on Environmental Taxes and Charges in the Single Market stated⁹ in its conclusions: "The use of environmental taxes and charges is rapidly increasing in Member States, in line with the 5th Environmental Action Programme and its recent review. The Commission supports this evolution, as it opens up the scope for a more cost-effective environmental policy ... This Communication shows that there is considerable scope for action by the Member States to implement such instruments, which have shown to be particularly attractive in improving the efficiency of environmental policy."

- a desire to further implement the polluter pays principle and to internalise such environmental costs as pollution into the prices of goods and services; and the need to integrate environmental policy goals into other policy areas such as agriculture, transport, industry, tourism and employment;
- a need to find more cost-effective and flexible tools for achieving environmental progress.

A prime example of an environmental protection strategy which relies heavily on command and control instruments is the current set of environmental legislation and regulations of the EU. Adopting, implementing and enforcing this set of EU regulations is now the dominant policy driver in CEE EU accession countries. Experts, officials and

businesses in EU countries have voiced serious concerns about the cost-intensity of implementing current EU regulations. Similar concerns can now be heard in CEE countries, where the financial burdens will be even greater. Fortunately, a discussion has begun about using more cost-effective approaches, such as economic instruments, for meeting EU environmental standards. EU environmental policy is evolving, and appears to be supporting and promoting a gradual shift to more cost-efficient environmental policies as illustrated by Box 3. It is possible that EU accession negotiations will catalyse a shift toward using more market-based incentives in future EU environmental policies, a step that could bring both significant environmental and economic benefits.

1.3. Better Environment AND Better Economy — at the Same Time!

A general conclusion from the first years of the transition period in CEEC and NIS is that economic reform alone is not enough to resolve the environmental problems caused by the various market, policy and institutional failures (or omissions) originating from past policies. Effective environmental policies, institutions and investments are required to harness the positive forces of market reform in order to match the environmental performance of more developed economies. This, in turn, requires economic stability and the prospect of sustained economic development to encourage governments, industrial enterprises and consumers to take the steps necessary to make more efficient use of energy and natural resources, mitigate pollution and enhance the positive environmental effects generated by economic reform. (OECD 1999, forthcoming) Although development patterns have been different in the wealthy Western countries, clear links between economic development and possibilities for environmental improvement have been proven there as well.

One conclusion from this is that environmental and economic variables are mutually-dependent (not mutually-exclusive), in the sense that the environment is a key input to many economic activities and economic decisions are also important for the quality of the physical environment. It is therefore not generally a question of “either the environment or the economy”, but of “*both* the environment and the economy.” (OECD 1996) While past environmental policy and management in Western countries, as well as CEEC and NIS, has tended to be divorced from economic policy, today there is growing experience and evidence that a new set of policy instruments, i.e. economic instruments, can combine environmental and economic objectives. The potential for these instruments to produce positive effects both

in economic development and environmental improvements is discussed in more detail in the following chapter.

Chapter 2: The Need for Economic Instruments

2.1. What Are Economic Instruments? — Definitions

One definition of the term “economic instruments” is: “*Any instrument that aims to induce a change in behaviour of economic agents by internalising environmental or depletion cost through a change in the incentive structure that these agents face (rather than mandating a standard or a technology) qualifies as an economic instrument.*” (Panayotou, 1998) Currently, diverse definitions of various types of economic instruments for environmental policy are in use. The most widely used classification of economic instruments for pollution control and natural resources management is the one developed by OECD. The following list provides for the OECD typology¹⁰:

- **Emission charges/fees/taxes:** Direct payments based on measurements or estimates of the quantity and quality of a pollutant. [Emission charges in CEEC and NIS typically are covering a wide range of pollutants, often in combination with non-compliance fees (see below). Such instruments are also referred to as “pollution charges” throughout this report.]
- **User charges/fees/taxes:** Payments for the cost of collective services are primarily used as a financing device by local authorities, e.g. for the collection and treatment of solid waste and sewage water. In the case of natural resources management, user fees are payment for the use of a natural resource (e.g., minerals, park, sport fishing or hunting facility).
- **Product charges:** Charges applied to products that create pollution when they are manufactured, consumed or disposed of (e.g., fertilisers, pesticides, packaging, batteries, etc.). Product charges are intended to modify the relative prices of the products and/or to finance collection and treatment systems.
- **Non-compliance fees:** Payments imposed on polluters who do not comply with environmental or natural resources management requirements and regulations. They can be proportional to selected variables, such as damage due to non-compliance or profits linked with non-compliance. Non-compliance fees are also referred to as “fines” or “penalties” throughout this report.
- **Deposit-refund systems:** Payment made when purchasing a product (e.g. glass bottles). The payment (deposit) is fully or partially reimbursed when the product is returned to the dealer or a specialised treatment facility.
- **Marketable (tradable, transferable) permits, rights or quotas, also referred to as “emissions trading”:** Instrument based on the policy principle that any increase in emission or in use of natural resources must be offset by a decrease of an equivalent, and sometimes greater, quantity of emissions. For example, when a statutory ceiling on pol-

lution levels is fixed for a given area, a polluting firm can set up a new facility or expand its activities only if it does not increase the total pollution load. The firm must therefore buy “rights” or permits to pollute from other firms located in the same control area which are then required to abate their emissions by an amount equal to the additional pollution emitted by the new activity.

- **Performance bonds:** To guarantee compliance with environmental or natural resources requirements, polluters or users must pay a deposit in form of a “bond.” The bond is refunded when compliance is achieved.
- **Liability payments:** Payments made under civil law to compensate for the damage caused by a polluting activity. Such payments can be made to “victims” (from chronic or accidental pollution) or the government. They can operate in the context of specific liability rules and compensation schemes, or compensation funds financed by contributions of potential polluters (e.g. funds for oil spills).
- **Subsidies:** All forms of financial assistance to polluters or users of natural resources, e.g. grants, soft loans, tax breaks, accelerated depreciation, etc.

A number of additional distinctions on environmental charges and taxes should be considered. Environmental charges and taxes are generating revenues and a fundamental distinction is whether revenues are reserved specifically for environmental spending or contribute to general state or municipal budgets. In this publication the term “*charge*” is applied if all or major parts of the revenue from the instrument is earmarked for environmental expenditure. For example, the term “charge” is used if revenues are collected by environmental funds, water funds or public enterprises providing municipal services such as wastewater treatment and solid waste management. If the

revenue is not earmarked for environmental expenditure, the term “*tax*” is used. This simple approach is largely compatible with the current OECD definitions of the terms “charges/fees” and “taxes.”¹¹ Regarding the intention and design of environmental charges and taxes, a further distinction is often made according to the policy goal and function of the instrument:

- **Incentive charges or taxes:** Instruments with a primary goal of changing environmentally damaging behaviour. While such an instrument will necessarily generate revenues, an incentive charge/tax is designed to provide a price signal needed to achieve environmental objectives, for example through graduated charge rates reflecting the investment required for pollution reduction costs. Often, incentive instruments are charges where the revenues are used to further encourage behavioural change via subsidies for related investments.
- **Cost-covering charges:** Charges which are intended to cover the cost of public or environmental services provided to individual consumers or the public. Such charges are generally observed in the water supply, wastewater treatment and waste management sectors.
- **Fiscal environmental taxes:** Taxes with the primary goal of raising revenues (i.e., yielding substantial revenues over and above those required for related environmental regulation; behavioural change might still occur but is not primarily intended).

Given the complexities of environmental problems and the impact of environmental policies on social and economic activities, specific environmental problems are usually addressed by employing a “*policy mix*” consisting of various command and control instruments, economic instruments and persuasive instruments (as discussed in section 1.1). It is important to stress, there-

fore, that economic instruments usually are not the ideal and only solution *per definition*. In turn, the effectiveness and efficiency of economic instruments always depends also on the specific accompanying overall policy mix.

Based on the practical experience in applying economic instruments in recent years, numerous good results have evolved suggesting a gradual shift of environmental policy towards an increased use of economic instruments. Such virtues of economic instruments are discussed in the following section.

2.2. Nine Virtues of Economic Instruments

Economic instruments (EIs) are key to environmentally sustainable development

The term “sustainable development” rose to ubiquitous prominence following the 1987 publication of the United Nations sponsored Brundtland Commission “Our Common Future,” which defined sustainable development as development which “meets the needs of present without compromising the ability of future generations to meet their own needs.” Various differing interpretations of the term have been made since, and the term has been used (or misused) for all sorts of activities. Without entering into the discussion and vast literature¹² dealing with various understandings and possible meanings of the term “sustainable development,” one can fairly say that the idea of sustainable development places the three basic economic problems of optimal allocation, optimal distribution and optimal scale into a new discussion, following the principles of sustainability, sufficiency, equity and efficiency. This new discussion takes place in the triangle of economic, social and environmental development, be it on the local, national, regional or international level.

In this context, the three fundamental economic problems could be summarised as follows (modified after Daly [1996]): An *optimal allocation*, the division of the resources among their alternative commodity uses, is one that is efficient in giving people what they want and are able to pay for. The instrument in attaining efficiency in a market economy is relative prices. An *optimal distribution*, the division of the resources in their final product embodiments among people, is one that is within the bounds of equity and sufficiency. The policy instrument is transfer payments and limits to inequality. An *optimal scale* has not traditionally been recognised by economic theory and policy, and there is no policy instrument available today. The key questions are: at which point does growth cost more than it is worth — be it on the global, regional, national or local level — or, at which level does the economic system overload the ecosystem to the point of reducing future life? It should be noted that this notion of optimal scale is totally anthropocentric in that the human niche is constrained only by the necessity to preserve other forms of life for their instrumental value to humans. If the intrinsic value of other living things is recognised (and it should be), that results in lower optimal scale for humans.

Considering the above, it is clear that economic instruments are right at the heart of the sustainable development idea: They can alter relative prices and address efficiency properties; they involve distribution and equity questions; and some of them, such as tradable permits, even involve decisions on scale. It is no surprise that the notion of economic instruments as a key element of strategies aiming at sustainable development has been elaborated in many important documents. One example is Agenda 21, a global plan of action that was adopted at the United Nations Conference on Environment and Development in Rio de Janeiro, June 1992 (“Earth Summit”) — an unprecedented

event that brought together more heads of government than any meeting before.¹³ Principle 16 of the Rio Declaration states: “National authorities should endeavour to promote the internalisation of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution with due regard to public interest and without distorting international trade and investment.”

EIs help internalise environmental costs

Economic activity produces goods and services that have a price (private costs). As a side effect of economic activity, costs of pollution and other costs of using the environment may occur. In real life, such costs (social costs) are not or only partially included in prices paid by producers or consumers. Such costs are called external costs. An economic instrument tries to bring these external costs into prices (referred to as the “internalisation of externalities”) so that both social and private costs are brought closer together. The closer the alignment between total social costs and private costs of production and consumption, the more environmental concerns become part of regular economic decision-making. As tools for internalisation, economic instruments correct the omission of social costs in private decision-making, restore relative prices reflecting true scarcities and convey more correct market signals. In the absence of internalisation, the under-pricing of some commodities and over-pricing of others convey the wrong signals and result in inefficient and wasteful use of resources.

A severe form of market failure due to unaccounted externalities can be shown by the example of burning fossil fuels, for instance in coal fired power plants. Burning coal results in emissions of: a) local pollutants such as CO, NO_x and suspended particulate matter, which may affect human

health; b) regional pollutants such as SO₂, which may affect agriculture and buildings due to acid rain; and c) global pollutants such as CO₂, which contributes to global warming. Costs incurred by such damages are not included in the prices paid by power producers or consumers. Instead, they are finally paid by society as a whole or by individuals who do not directly benefit from the power station. Such prices provide for incorrect market signals, encourage power production beyond the level of economic efficiency and discourage the development and transfer of more energy-efficient or energy-saving production technologies, pollution control methods, and abatement processes and equipment. Moreover, no incentive is provided to switch to alternative, less polluting fuels. If coal production is subsidised, in addition to the unaccounted external costs, the economy is even further driven from sustainable energy policies.

Another example is the unaccounted external costs of using a car. Prices of cars and gasoline do not include costs of the use of land for building roads, costs generated by air and noise pollution, costs caused by accidents, costs arising due to time lost in traffic jams, etc. Since such externalities are not included in prices, they create large distortions in the market by encouraging activities that can be very costly to society even if the individual car user benefits. It is a difficult task to estimate the economic value of externalities, and certain externalities cannot be valued at all, e.g. the loss of a life in a car accident. However, recent estimates of the external costs of road transport in the EU are high, totalling an average of 4.2 percent of EU GDP each year (EEA 1996). Similar data for CEEC and NIS do not exist today. Despite lower car ownership and fewer total kilometers driven per year (these indicators are rising massively in many transition economies though), it is likely that the external costs of road transport in these countries are high and rising. In addition, the average car is much older and more polluting than in the West.

EIs often are more cost efficient than other instruments

In the case of a command and control solution for pollution control it is usually expected that all polluters reduce their pollution by the same extent (i.e. according to the same standard imposed), irrespective of their costs of doing so. An economic instrument, however, allows each polluter to decide whether it is cheaper to bear the cost of pollution imposed by the instrument or to pay for reducing pollution. Therefore (modified after OECD 1997), economic instruments have a potential to minimize the overall cost of achieving a given pollution control target, as polluters with lower marginal abatement costs will abate emissions more than polluters facing higher costs (“*static efficiency*”). Furthermore, since polluters face a price on each unit of the remaining emissions, there is a permanent incentive to reduce pollution and to develop more efficient control techniques: This is known as “*dynamic efficiency*.”

An example of dynamic efficiency can be shown by product taxes (e.g. on fertilisers, pesticides, batteries, fuels) where the taxes increase the relative price of these products, thus providing a permanent incentive to use and manufacture less polluting ones (e.g. fuels with low vs. high sulphur content). Economic instruments are self-regulating, in the sense that they leave economic agents free to adapt to market signals in the most efficient way that they can.

In transition economies, environmental policy solutions that restrict economic growth or massively affect the competitiveness of the country’s exports as a whole are not desired. Therefore, the optimal instrument must achieve its purpose at the lowest cost possible and simultaneously help improve the efficiency of resource use, increase productivity and economise on scarce resources (e.g., capital, skills and management). It is also desirable that the instrument promotes change towards the

development and adoption of more efficient, less wasteful production technologies. In this sense, transition countries priorities clearly favour the cost-efficiency and flexibility of economic instruments over the rigidity and cost-intensity of command-and-control instruments.

EIs support the Polluter and User Pays principles

The *Polluter Pays Principle* (PPP) states that polluters must bear full financial responsibilities for pollution reduction. The PPP is one of the cornerstones of both the EU and OECD environmental policy and has recently been adopted in most environmental policies and framework laws of CEEC and NIS. It is generally accepted that the scope of financial responsibility imposed by the PPP is defined through complying with environmental legislation. Note that compliance with “command and control” instruments also represents the application of PPP if polluters do not receive subsidies. In fact, the PPP was originally introduced for curbing the use of environmental subsidies. Subsidies may conflict with the PPP and can distort competition. Possible exceptions for the granting of subsidies without violating PPP are defined both in OECD and EU documents.¹⁴ The common element in these exceptions is that subsidies must be temporary and targeted to specific environmental problems.

The PPP concept has evolved and several refinements and definitions appeared in OECD and EU environmental policy documents. The PPP, as illustrated by Box 4, started out as an *economic* principle and is gradually evolving into a *legal* one. It has also partially, but not yet completely, become identified with the full internalisation of all external effects of pollution. Economic instruments are recognised as one, but not the only, way of achieving this integration (OECD 1996).

An extension of the PPP is the broader *User Pays Principle* (UPP). Although the UPP enjoys yet less recognition in policy and legal documents, it is already being applied *de facto* in many countries via such instruments as user charges (water, waste) and charges or taxes on natural resources. The UPP will probably expand by the emphasis being given to deregulation and privatisation in water supply, energy supply and waste management sectors in many countries and resulting pressure for full-cost pricing (see section 3.1.3.).

Given the uncertainty about the human and environmental effects of many existing and new chemicals and other products, any increase in eco-efficiency that economic instruments encourage also helps to implement the *Precautionary Principle*. The Precautionary Principle broadly demands that, if an activity or substance carries a significant risk of environmental damage it should either not proceed or be used, or should be adopted at only the minimum essential level and with maximum practical safeguards.

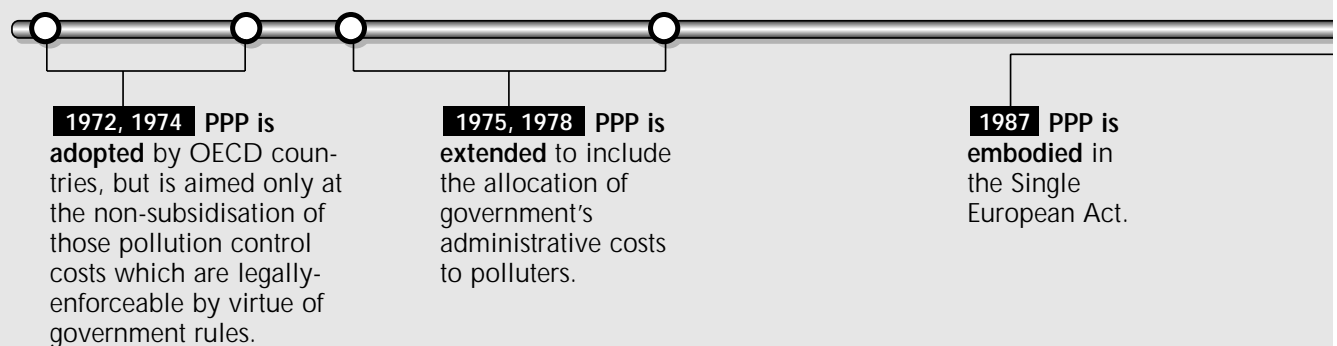
EIs help raise funds for environmental investments or general government expenditure

In contrast to command and control regulations, which do not generate revenues and often represent an additional financial burden to government regulators, environmental charges and taxes generate additional public revenues at little extra cost. In the case of *cost-recovery charges*, such as user charges for wastewater treatment, energy, road or parking access, water use and solid waste management, revenues collected help utilities provide quality, environmentally sensitive services and allow for full cost recovery if charges are set high enough. In the case of *subsidies*, the removal or reform of state subsidies in sectors such as agriculture, transport and energy production based on fossil fuels, can save substantial amounts of government revenues.

Revenues from environmental taxes and charges can be used for financing government programs to support and co-finance priority environmental investments or for other government expenditure not linked to environmental expenditure. In the

BOX 4

Evolution of the Polluter Pays Principle



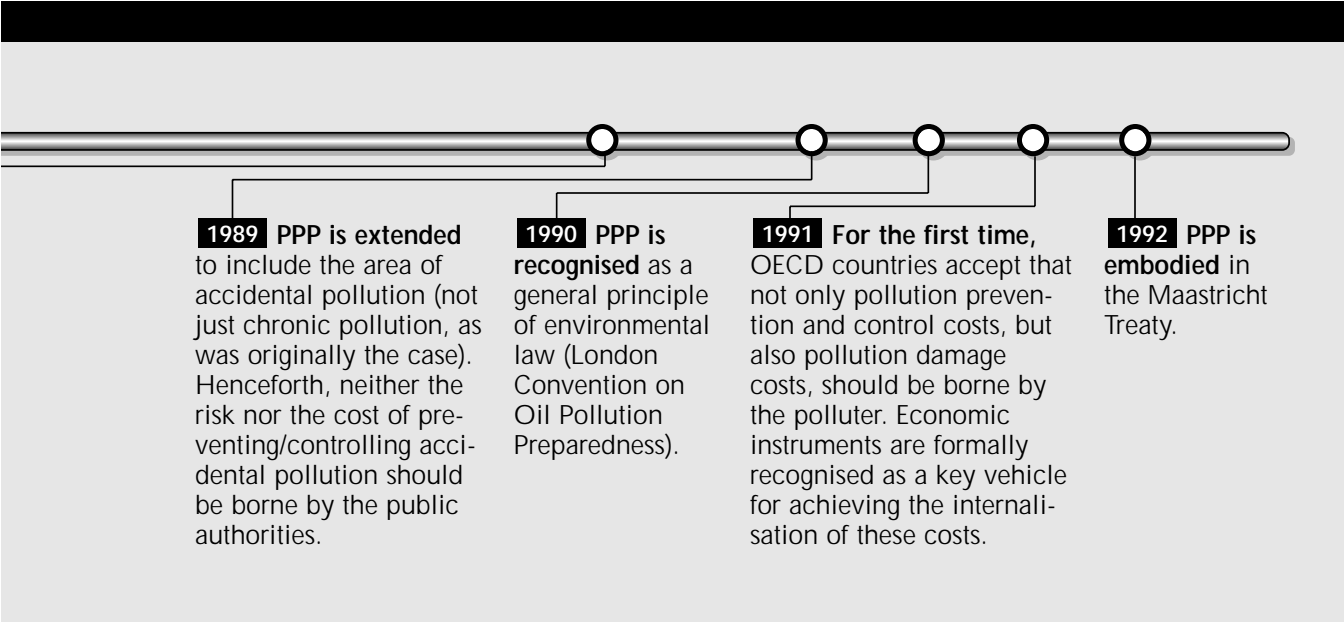
Source: OECD (1996)

framework of eco-tax reform, revenues from environmental taxes can also be used to increase the government budget if cutting budget deficits is a desired policy objective. Eco-tax reform can also be constructed in a way that government revenues remain stable (often referred to as “revenue neutrality”) while a shift in taxation from economic “goods” such as labour and capital, onto “bads” such as pollution or resource use is implemented. This can be achieved by reducing existing distorting taxes, such as income taxes and social security payments, which diminish the incentive for work, or sales taxes, which distort consumption decisions.

According to EEA (1996), taxes on labour, capital and savings are often more costly in terms of economic welfare than environmental taxes, so that a shift of tax burden from these activities to environmental taxes increases economic efficiency and welfare. This is because labour and capital taxes reduce incentives to work, save or invest. US data, for example, shows that each dollar raised in taxes costs about 20-30 cents in lost economic output (EEA 1996). Environmental taxes, if designed properly,

are the only taxes that do not have this distorting effect, and they actually increase rather than decrease economic welfare. The paradox from the environmental policy perspective, however, is that the greater the environmental effectiveness of an environmental tax, the less the revenue generated (i.e., the higher an eco-tax rate, the more incentive is given to the polluter to invest in abatement, the more the actual tax base is eroded). As a result, regulators collecting eco-taxes may have incentives to maintain pollution levels to fill their budgetary coffers, or tax rates have to be continuously increased over time.

While eco-tax reform has received wide political support only recently, and almost exclusively in West European countries (see section 3.2.3.), recent priorities in transition economies have been different. In CEEC, EU accession provides the dominant policy framework. One major task for policy makers is implementing the “acquis communautaire” which means adopting, implementing and enforcing EU legislation and policies in all areas. In most of the recent CEE applicant country evaluations in the context of EU’s Agenda 2000, there was strong reference



1989 PPP is extended to include the area of accidental pollution (not just chronic pollution, as was originally the case). Henceforth, neither the risk nor the cost of preventing/controlling accidental pollution should be borne by the public authorities.

1990 PPP is recognised as a general principle of environmental law (London Convention on Oil Pollution Preparedness).

1991 For the first time, OECD countries accept that not only pollution prevention and control costs, but also pollution damage costs, should be borne by the polluter. Economic instruments are formally recognised as a key vehicle for achieving the internalisation of these costs.

1992 PPP is embodied in the Maastricht Treaty.

made to environmental issues. As mentioned earlier, the finances required to transpose and properly implement and enforce key EU legislation only in the areas of air, water and waste management has been estimated as high as EUR 120 billion for the 10 applicant countries (EDC/EPE, 1997). On a per capita basis, expenditures on environmental protection may need to raise manifold. The lion's share of financing should come from domestic resources.

In this context, it is no surprise that economic instruments are receiving increased consideration among CEE environmental policy makers. At present, the interest in economic instruments is mainly focused on raising revenues to enable payment of the environmental bill of EU accession, and in a next step, spending these revenues through governmental support programs which are tailored around EU accession priorities. A huge number of various types of new economic instruments are proposed for this purpose throughout the CEE region (see section 3.1.). In contrast to the perception of economic instruments being used to address EU approximation financial concerns, the perception of using economic instruments in a flexible manner that would *reduce implementation costs through direct incentive impacts* is not yet widely understood and acknowledged.

In NIS, a clear political benchmark such as the cost of EU accession in CEEC is absent. Priorities in NIS may be more focused on necessary environmental investments to reduce pollution that cause serious damage to health (e.g., excessive industrial pollution in highly populated areas), environmental investments that allow for simultaneous economic and structural gains ("win-win investments," e.g., certain energy efficiency investments), environmental investments that help address past pollution/liabilities, environmental investments that improve the supply of water and energy or treatment of solid waste and wastewater. NIS governments are trying to catal-

yse such investments by making state support available, with support largely made up of revenue from pollution charges. There are, however, large inefficiencies in such systems, additionally exacerbated by adverse conditions created by economic and financial systems. Considering that the overall situation was very similar in CEEC in early years of transition, there should be a large potential for experience transfer between the two regions.

EIs are compatible with current priority trends in regulatory and fiscal reforms

According to OECD (1997) recent priorities in OECD countries' regulatory reform include objectives such as: improving competition in markets; improving the effectiveness of government intervention (including enforcement); meeting consumer needs more closely; reducing costs; and promoting technological innovation. Given the efficient properties of economic instruments as described above it is obvious that such instruments are fully compatible with such regulatory reform objectives. This also holds true for CEEC and the NIS where the above mentioned reform objectives are high on the agenda as well.

Even if overall regulatory reform is progressing in transition economies, in most CEEC and NIS legal systems remain weak and further improvements are of great importance. Typical weaknesses include¹⁵: inability to pay (in parts of the population); weak legal action for enforcement; long backlog of cases in the courts limiting the threat of court action; different cultural perception towards litigation than those prevailing in the West — courts are used as a last resort and, as this is common knowledge, regulations that depend on court action are not well complied with. An additional problem specific to environmental policy is that the authorities' capacities (human, technological and financial) for

monitoring of emissions, which forms a fundamental precondition for enforcement, remains weak in most countries.

Given weak legal systems, command and control approaches that are based on legal action for enforcement are less effective than economic instruments. It should be noted, however, that enforcement weaknesses are also an issue for economic instruments, for example in case of non-payment. It is therefore indispensable that these are adequately designed (for example, an environmental tax/charge should have a broad tax base and a simple tax basis/structure) and implemented (for example, using tax authorities to collect product charge revenues in Hungary has proven much more effective than using environmental authorities).

Another important area is fiscal reform. Recent trends in fiscal reform in the OECD area can be summarised as follows (modified after OECD, 1997): since the late 1980s personal income tax rates and corporate income tax rates have been reduced in virtually every OECD country. A second major change has been the growth of general consumption taxes. Third, social security contributions have also risen, reflecting the pressures of increased unemployment and ageing populations on expenditures in these areas. The report then concludes: "Not only do such reform processes provide opportunities to introduce new environmental taxes, but these taxes can also contribute to the required fiscal and economic adjustments. In particular, several countries are reducing taxes on labour to reduce unemployment: in a context of public finance deficit, environmental taxes can provide revenue to offset, at least in part, the revenue loss caused by reduced labour taxes. In some cases, governments are seeking a reduction of the overall tax burden. Eco-taxes should be considered in the context of governments' other fiscal priorities, such as deficit reduction, job creation and health care spending."

There is no doubt that fiscal reform during the 1990s has helped to introduce eco-tax reform at least in some OECD countries, such as Denmark, Sweden, Norway and the Netherlands. Positive experience in these countries has very recently prompted similar steps in many other European countries (see section 3.2.3.). In case of CEEC and the NIS, it is certainly true that fiscal systems have been under fundamental change in the first years of economic transition. A gradual adaptation of new fiscal regimes to real-life circumstances will most likely continue in many transition economies. In EU accession countries, an additional challenge will be to bring fiscal policy objectives in line with EU accession requirements. It is clear that these continued reform processes will bring about many possibilities for introducing new economic instruments, which help achieve not only environmental policy goals but also overall fiscal policy objectives. Closer cooperation between environmental authorities and ministries of finance should be achieved to reap full benefits for both sides. "Green tax commissions," such as those established in Norway, Sweden, Denmark, Belgium and the Netherlands, can effectively facilitate such cooperation.

Present reality is likely to limit the scope for eco-tax reform in the near future in the CEE and NIS regions, even if the issue is discussed in some of the most advanced CEEC (Czech Republic, Poland). Reasons for such an assessment include:

- The overall tax burden is already high but so is tax evasion. Therefore, predicting the impact of reducing labour tax rates is very difficult.
- There are few existing environmental charges in the region that raise enough revenue to be seriously considered for a revenue switch.
- Current earmarking practices of pollution charges are also in conflict with a revenue switch.

- Finally, current state environmental financing systems (with environmental funds playing key roles) would have to be completely redefined.

Nevertheless, CEEC can gradually prepare for possible future eco-tax reform — preparatory steps could include detailed analysis in the short term, and, depending on the results of such analysis, some new instruments, particularly in the field of energy taxes, could be designed in the long run.

EIs may have positive effects on innovation and competitiveness

Because the introduction of economic instruments leads to higher prices for pollution or higher priced resources, such as fossil fuels, water, or waste, this can encourage new processes, technologies and products to meeting public needs. One example is CO₂ taxes or environmentally motivated energy taxes in Scandinavian countries that stimulate the development of cleaner energy technologies. Note that this effect is increased through spending all or part of the revenue on energy efficiency projects and projects that aim at the development of commercially viable renewable energy sources etc. Another example is the US tax on CFCs, which helped to encourage the development of substitute chemicals that were then exported.

By raising the price of pollution and resources, economic instruments help to move an economy toward the more “*eco-efficient*”¹⁶ use of resources. Weizsäcker and Lovins (1997) show that already today there is a huge potential for massive increases in resource productivity through technological solutions in energy, material and transport sectors that can contribute to qualitative *and* quantitative economic growth. Some of these solutions may even be achieved in commercially viable ways without a need for government intervention. The authors provide examples of eco-efficient projects that would result in resource productivity increased by a

factor of four. With this kind of efficiency, the world could enjoy twice the wealth that is currently available, while simultaneously halving the stress placed on the natural environment. Such large scale structural changes in production and consumption can be encouraged and catalysed by economic instruments, especially if their price signals are gradual and predictable over the long planning periods required by industry.

Given the export potential of environmentally friendly innovations, economic instruments — if properly designed — can also help improve *competitiveness*. There is an international dimension to this issue: countries and companies that tax or regulate first may achieve “first mover” advantages, as argued by the 1993 Delors’ White Paper¹⁷: “The European Community would improve the overall strength of the economy through optimal use of its resources and the prevention of costly clean-up operations, while a first-mover advantage can be exploited; the latter element is not to be underestimated as the new technology is not only a necessity in the industrial world but also in the Newly Industrial Countries and Development Countries.” It should also be noted that the Netherlands and Scandinavian countries belong to the most competitive economies in the world despite their significant environmental taxation. It has to be stressed, however, that the proper design of an economic instrument is crucial; instruments that are not properly designed can also have negative influence on competitiveness.

EIs help businesses and consumers in making longer term choices

An economic instrument that is designed to have an incentive impact will force a polluter to make a choice of whether to avoid the costs imposed by the instrument by investing in measures that are less polluting or to pay the costs. (A precondition for this, of course, is that the instrument is properly

enforced which can be a challenge in transition economies.) Due to this incentive function, a properly designed economic instrument influences the polluters' longer term choices and behaviour.

The price, however, is not the only factor that determines economic behaviour. Other factors include: the availability of money to invest in less polluting measures; the availability of information on alternative, less polluting technologies or products; and the availability of such technologies and products in the domestic market. Since information, access to alternative technology and other factors are usually crucial to making a well designed economic instrument function in practice, policy-makers often need to design policy packages that address all of the main aspects of a market that is addressed by a specific economic instrument. An economic instrument that is accompanied by well-prepared supporting measures can be a very powerful tool to change the polluters' behaviour, while allowing for flexibility in future choices.

Panayotou (1998) has summarised the flexibility properties of economic instruments as follows: "Apart from their market correction qualities and their efficiency or cost minimisation objectives, economic instruments are ideally suited for reconciling environmental concerns with development needs and integrating environmental and economic policies by virtue of their a) flexibility in accommodating heterogeneity, and b) adjustability to changing circumstances. The key to the promise of economic instruments is their ability to harness the power of the market and the self-interest of the individual, and to turn these presumed adversaries of sustainable development into powerful allies. This is done not by mandated or prescribed actions, but by changing the economic incentives facing producers and consumers; by taking full advantage of their self-interest and superior information at their disposal without requiring the disclosure of such information and without creating large

and costly bureaucracies. Economic instruments in effect transfer from bureaucrats to the market the responsibility of identifying and exploiting new and additional low-cost sources of pollution control."

EIs are useful to mitigate "diffuse pollution"

Environmental problems originating from diffuse pollution sources, such as transport emissions, waste from specific products and agro-chemicals, are difficult and costly to address through command and control instruments. Economic instruments, including product charges, deposit refunds and tradable permits, can reach and control dispersed and small-scale sources more easily and cost-effectively. In the case of small-scale sources and diffuse pollution sources, supporting measures such as information campaigns can be important too.

Chapter 3: Economic Instruments in Real Life

3.1. Experience in Transition Economies

In section 3.1., practical experience in using economic instruments already introduced in EITs is discussed based on available information.¹⁸ Table 2 presents an overview of selected economic instruments introduced specifically for environmental policy or to influence natural resource use in CEEC. The list is quite long, and experience with pollution charges is more extensive in the region than anywhere else in the world. Note that Table 2 does not include environmentally relevant charges and taxes which were introduced in non-environmental policies (for instance, fiscal taxes on energy such as excise and value added taxes).

A variety of new economic instruments is also being discussed for possible implementation in the CEE region, as is shown in Table 3. Many of these new instruments are proposed based on the perceived need to widen the revenue base in order to secure additional resources necessary to finance investments required for implementing EU environmental legislation in the course of EU accession. In some (though few) cases, new, more incentive-based economic instruments are being designed with the aim of reducing the overall costs of pollution abatement — and therefore reducing the amount of environmental financing required. Most popular are product charges, which are currently being designed in virtually all CEEC. Proposals include charges on a wide range of products, including: packaging materials,

batteries, tires, paper, dyes, solvents, fluorescent lamps, washing agents, paints and varnish, fertilisers and pesticides, refrigerators, computer equipment and TV monitors.

Similar information for the NIS region is not yet available but is under preparation. Notwithstanding the extensive number of economic instruments introduced in the CEE region and a high degree of success with some instruments, several sub-optimal features have emerged in analysis. These specific elements will be discussed for the main types of instruments (pollution charges and taxes, product charges, user charges, subsidies) in the following sections. On a general level, more attention has been given to the revenue raising aspect of most of the instruments while the effect of incentive dimensions has remained largely unevaluated. These issues will be discussed in more detail in the following section.

3.1.1. The Incentive and Revenue Raising Dimensions of Economic Instruments in the Transition Countries

The ultimate objective of any economic instrument in environmental policy is (or should be) to contribute to improvement in environmental conditions. As noted earlier, economic instruments attempt to achieve positive environmental effects by employing economic incentives to change behaviour so as to reduce pollution or the consumption of resources. Most of the economic instruments applied in CEEC today

TABLE 2

Overview on selected economic instruments introduced in environmental policy in Central and Eastern Europe (as of mid 1998)

	<i>B&H</i>	<i>BUL</i>	<i>CRO</i>	<i>CZE</i>
AIR EMISSIONS				
air emission charge				X
air emission non-compliance fee		X	X	X
CO ₂ tax				
WATER POLLUTION				
water effluent charge			X	X
water pollution non-compliance fee		X	X	X
sewage charges	(X)	X	X	X
WASTE				
municipal waste user charges	(X)	X	X	X
waste disposal charges				X
waste non-compliance fees		X	X	X
deposit refund on beverage containers	X	X	X	X
levies related to management of nuclear waste				
WASTE RELATED PRODUCT CHARGES				
packaging material				
batteries / accumulators				
refrigerators and refrigerants				
lubricants				
tires				
substances/products damaging ozone layer (CFCs)				X
TRANSPORT				
tax differentiation un-/leaded gasoline	X	X	X	
product charge on transport fuels				
increased import duty for used cars or without catalyse	X	X		
road tolls/pricing			X	X
noise/air pollution tax on air travel				X
NATURE PROTECTION AND BIODIVERSITY				
nature protection non-compliance fees		X	X	
NATURAL RESOURCES AND MINING				
natural resource or mining tax/charge ¹			X	X

	<i>EST</i>	<i>HUN</i>	<i>LAT</i>	<i>LIT</i>	<i>POL</i>	<i>ROM</i>	<i>SR</i>	<i>SLO</i>	<i>YUG</i>
	X		X	X	X		X		(X)
	X	X	X	X	X	X	X		X
								X	(X)
	X		X	X	X	X	X	X	X
	X	X	X	X	X	X	X		X
	X	X	X	X	X	X	X	X	X
	X	X	?	X	?	X	X	X	X
	X		X		X		X		
	X	X	X	X	X		X		X
	X	X		X	X	X	X		X
							X	X	
	X	X	X		X				
		X	X		X	X	X	X	
		X			X	X	X		
		X		X	X	X	?		
		X					X	X	
	X	X		X	X		X		X
	X	X	X	X	X				

TABLE 2 (continued)

	<i>B&H</i>	<i>BUL</i>	<i>CRO</i>	<i>CZE</i>
water extraction charges			X	X
OTHER				
income tax/VAT allowances for environ. technology				X
duty/tax allowance on import of environ. technology		X	X	
ENVIRONMENTAL FUNDS²				
at national level		X		X
at regional level				
at municipal level		X		
debt-for-environment swap fund		X		

Source: Klarer, McNicholas (1999). **Abbreviations:** "X" = instrument in force; "(X)" = in force in parts of the country; "?" = unclear whether such an instrument is in force at present (information was not provided); B&H = Bosnia and Herzegovina; BUL = Bulgaria; CRO = Croatia; CZE = Czech Republic; EST = Estonia; HUN = Hungary; LAT = Latvia; LIT = Lithuania; POL = Poland; ROM = Romania; SR = Slovak Republic; SLO = Slovenia; YUG = Federal Republic of Yugoslavia.

have as their principal, official objective "to provide incentive to reduce emissions," "to provide incentive for compliance with environmental standards," "to stimulate pollution prevention," etc. In other words, the primary, official objective of such instruments is to induce a desired environmental effect (see Klarer and McNicholas, 1999).

For a number of reasons, however, the incentive effect of these instruments in achieving environmental benefits is very difficult to assess, both in CEE and elsewhere. To start with, it is difficult, if not impossible, to separate out the distinct incentive effects of economic instruments from the effects of other environmental policy instruments (e.g. command and control approaches), as well as from other influences which may not be environmentally motivated (e.g. price reforms, international competition, etc.). Additionally, economic instruments in CEEC have not been widely, systematically evaluated, thus the basis for judging their incentive effect is weak.

Nevertheless, there is some empirical and anecdotal evidence suggesting that the incen-

tive effect of certain economic instruments applied in CEE has been successful in encouraging more environment-friendly behaviour and practices. Some examples: a survey of enterprises in Lithuania found that many were undertaking low-cost measures to reduce their air pollution levels, encouraged in part by interest in reducing pollution charge payments (Semeniene, Bluffstone, 1997); air pollution charges which are among the highest in the world have created incentives for pollution reduction measures in Poland (Anderson and Fiedor, 1997); in Hungary, the introduction of a charge on packaging materials prompted some companies to start waste prevention and recycling measures (Klarer and Lehoczki, 1999); in Estonia, a recently introduced excise tax on drink containers motivated a rapid growth of reuse of such packaging (Kraav, 1999). As existing economic instruments in the region continue to be refined by environmental authorities, as new instruments are introduced and as the enforcement of environmental standards is strengthened, the scope for incentive effects to be realised will expand.

									PART 2 OF 2
	<i>EST</i>	<i>HUN</i>	<i>LAT</i>	<i>LIT</i>	<i>POL</i>	<i>ROM</i>	<i>SR</i>	<i>SLO</i>	<i>YUG</i>
	X	X	X	X	X	X	X	X	X
	X	X			X	X	X		X
	X	X	?	?	?	X	?		X
	X	X	X	X	X		X	X	X
	X				X				
				X	X				
					X				

Notes: 1) Only those natural resource or mining taxes/charges are reported which were introduced partly for environmental reasons or if part of the revenue is earmarked for environmental expenditure. 2) Environmental funds are not analysed in detail in this report (see OECD/Phare Sourcebook on Environmental Funds, 1999 for more details).

The other major objective of economic instruments as applied in economies in transition is that of revenue raising. While some of the economic instruments in use in the region do not explicitly acknowledge revenue raising as a principal objective, a review of those instruments reveals that revenue raising is in fact the dominant, *de facto* function of the majority of them. This can be explained by a number of factors. Many of the instruments currently in effect were first adopted during the period of central planning and were not intended to provide any real incentive effect (i.e. their only practical function was revenue raising, even if the amounts were minimal). During the present period of economic transition, the financial hardship being experienced in many sectors — public, private, household — often constrains policy-makers from setting environmental charge, tax and fine levels high enough to provide compelling incentives for pollution reduction measures. Moreover, some public authorities, especially in CEEC preparing for EU accession, are feeling increased pressure to finance environmen-

tal investments and are looking to earmarked economic instruments as an important source of that finance. Cost estimates of investments needed for CEEC to meet EU environmental standards are very high; one commonly cited figure is EUR 120 billion (EDC, EPE, 1997). While there is no comparable driver of demand for environmental finance in the NIS, the *needs* for investment in environmental infrastructure are enormous and likely to be of a similar magnitude, and possibly greater. Thus, the revenue raising potential of economic instruments will remain of critical importance in the region for the foreseeable future.

As Table 4 illustrates, a number of economic instruments in the region have been successful in generating considerable sums of revenue.

The revenue generated by these and other economic instruments are used in a variety of manners. Some revenue flows to the general budgets of state and local governments, where they may be used to finance public environmental services or other, non-environmental public expendi-

TABLE 3

Selected new economic instruments currently being discussed for possible future introduction in CEEC (as of mid 1998)

	<i>Tradable permits</i>	<i>CO₂ / energy charge</i>	<i>Product Charges</i>	<i>Eco-tax reform</i>
Bulgaria			X	
Czech Republic	X		X	X
Estonia		X	X	
Hungary			X/O	
Latvia	X		X/O	
Lithuania	X		X	
Poland	X	X	X	
Slovakia			X	
Slovenia		O	X	X

Source: Klarer, McNicholas (1999). Note: X = proposed; O = instrument already in force.

tures. Most of the revenue generated by the instruments listed in Tables 4 and 6, however, are strictly earmarked for environmental purposes and channelled to environmental funds, which administer and disburse the money in support of projects and activities identified as priorities according to state/local environmental policies.

The *earmarking of public revenues* and the use of environmental funds offers a number of opportunities, but also raises some concerns. Earmarking remains a much debated issue: it can lead to inefficient allocation of resources if the money could generate greater net social benefits by being spent elsewhere than the earmarked sector. However, earmarking has been justified as a means of gaining broad acceptance among stakeholders for charges/taxes/fines (Opschoor et al, 1994). It has also been argued that, when revenues are collected from a broad range of polluters and then allocated to specific polluters prepared to implement pollution reduction measures considered high priority, such earmarking may retain some level

of efficiency and constitute a practical application of the Polluters Pay Principle.

The use of *environmental funds* as mechanisms for managing earmarked revenues and delivering subsidised finance for environmental investments has helped governments in many CEEC and NIS to overcome or mitigate a number of conditions during economic transition that constrain full application of the PPP and impede the emergence or effective use of financing mechanisms characteristic of more mature market economies. These conditions include weak or ineffective enforcement of environmental policy, severe financial constraints on enterprises and households, uncertainties in fiscal systems, poorly developed commercial capital markets and inadequate information concerning costs of environmental damage. While the funds should be considered a “second-best” and transitional alternative to more direct application of the PPP, in many CEEC/NIS they have proven useful by:

- accelerating the pace of environmental improvement;

TABLE 4

Revenue from pollution and product charges in CEEC introduced in environmental policy

(in million USD, nominal value, and as percentage of GDP, 1994 and 1997)

	POLLUTION AND PRODUCT CHARGES IN FORCE	REVENUES IN 1994		REVENUES IN 1997	
		USD millions	revenue in % of GDP	USD millions	revenue in % of GDP
Bulgaria	NCFs (air, water, waste)	1.5	0.02	0.3	<0.01
Croatia	EC (water)	23.4	0.16	42.2	0.22
Czech Republic	ECs and NCFs (air, water, waste), PC (freon)	91.4	0.23	80.5	0.15
Estonia	ECs and NCFs (air, water, waste), excise tax on packaging	1.6	0.07	4.8	0.10
Hungary	NCFs (air, water, waste), PCs (fuel, packaging, tires, refrigerators, batteries)	32.7	0.08	61.9	0.14
Lithuania	ECs (air, water) and NCFs (air, water, waste)	5.2	0.12	19.2	0.20
Poland	ECs and NCFs (air, water, waste)	448.9	0.48	475.8	0.35
Romania	EC (water), NCFs (air, water)	n.a.	<0.05 (est.)	n.a.	<0.05 (est.)
Slovakia	ECs and NCFs (air, water, waste)	21.0	0.15	23.5	0.12

Source: Klarer and Lehoczki (1999); data on Poland from Francis, Klarer, Petkova (1999). **Abbreviations:** "n.a." = data not available; "EC" = emission charge; "NCF" = non-compliance fee. **Notes:** Data in this table only include revenues from air/water/waste pollution charges and product charges explicitly introduced for environmental policy. Note that in many countries there are additional charges and taxes with environmental relevance in force, such as mining charges or taxes, energy taxes, transport related taxes (such as registration charges, vehicle taxes, etc.). See table 5 for more details on the instruments listed above.

- catalysing the development of a domestic market for environmental finance;
- leveraging additional financing for environmental investments;
- enabling a more flexible use of financial resources by avoiding certain bureaucratic constraints posed by normal budgetary procedures;
- strengthening domestic capacities for project preparation and policy implementation.

Given that most economic instruments in

CEEC/NIS play more of a revenue raising function than incentive function, and given that much of these revenues flow to environmental funds, a full assessment of the instruments' environmental effectiveness can only be achieved by considering the role and effectiveness of the funds. Table 5 provides a summary of key characteristics of selected environmental funds in CEEC/NIS. The important role being played by the funds is illustrated by recent research, which found that environmental funds accounted for 30-40 percent of total national pollution abatement and control investment expenditures in

TABLE 5

Key characteristics of selected environmental funds in CEE/NIS(Revenues and expenditures in mIn USD¹)

	<i>BULGARIA: National Environmental Protection Fund</i>	<i>ESTONIA: Central Environmental Fund</i>
Operational in current form since	1993	1990
Total income/expenditure²	Income/expenditure	Income/expenditure
1993	3.60 / 2.18	n.a. / n.a.
1994	4.42 / 3.42	0.93 / 1.08
1995	5.94 / 6.25	1.78 / 1.83
1996	6.14 / 8.48	6.78 / 5.41
1997	9.49 / 4.38	7.69 / 8.78
Major revenue sources in 1997 (with % of total revenues)	<ul style="list-style-type: none"> • Liquid fuel charge (78.4%) • Privatisation (13.8%) • Administrative fees (3.7%) • Environmental fines (2.5%) • Loan repayments with interest (1.6%) 	<ul style="list-style-type: none"> • Environmental charges and fines (46.2%) • Privatisation (27.4%) • Mineral extraction charges (17.8%) • Packaging excise (3.4%) • Loan repayments with interest (2.3%) • Other (2.9%)
Major fields of expenditure in 1997 (with % of total annual environmental expenditures)	<ul style="list-style-type: none"> • Air (9.3%) • Water (43.7%) • Waste (16.8%) • Monitoring (20.5%) • Soil protection (8.3%) • Others (1.4%) 	<ul style="list-style-type: none"> • Air (1.9%) • Water (33.3%) • Waste (10.1%) • Building program (19.3%) • Supervision (11.9%) • Other (23.5%)
Primary disbursement mechanisms in 1997 (with % of total disbursements for environmental projects)	<ul style="list-style-type: none"> • Grants (76.8%) • Interest free loans (7.7%) • Equity investments (15.6%) 	<ul style="list-style-type: none"> • Grants (89.6%) • Interest free loans (7.6%) • Soft loans (2.8%)

Source: Francis (1999). **Notes:** "n.a." indicates that the information was either not available or not provided by the fund. Totals may not add up to 100% due to rounding. 1) Nominal values based on average annual exchange rates. 2) Income data excludes start of year balances; expenditure data excludes overhead & administration costs and other non-environ-

<i>POLAND: National Fund for Environmental Protection and Water Management</i>	<i>KAZAKHSTAN: Republican Environmental Fund</i>	<i>RUSSIA: Federal Environmental Fund</i>
1989	1993	1992
Income/expenditure 266.70 / 204.94	Income/expenditure 3.09 / 2.77	Income/expenditure 3.66 / 2.70
338.06 / 278.89	4.03 / 2.87	9.50 / 7.54
481.58 / 428.44	1.79 / 1.68	10.41 / 8.92
432.60 / 510.12	3.45 / 3.12	14.23 / 13.15
418.61 / 389.67	9.73 / 3.46	18.48 / 17.31
<ul style="list-style-type: none"> • Environmental charges (53.6%) • Environmental fines (1.3%) • International loans and grants (3.6%) • Loan repayments with interest (35.7%) • Profits from financial operations (5.8%) 	<ul style="list-style-type: none"> • Air pollution charges (46.1%) • Wastewater charges (21.6%) • Waste charges (13.1%) • Air pollution fines (14.6%) • Wastewater fines (2.0%) • Waste fines (2.7%) 	<ul style="list-style-type: none"> • Pollution charges and fines transferred from the regional env. funds (65.7%) • Loan repayments with interest (5.3%) • Transfers from Far East and Northwest marine funds (25.7%)
<ul style="list-style-type: none"> • Air (33.2%) • Water (39.0%) • Mining related (9.0%) • Soil protection (8.9%) • Nature protection (3.4%) • Emergencies (1.8%) • Education (1.6%) • Monitoring (0.8%) • Other (2.5%) 	<ul style="list-style-type: none"> • Construction/repair of env. facilities (24.6%) • Research (8.0%) • Nature protection (23.9%) • Program/project development (4.2%) • Education (2.4%) • Protected areas (6.5%) • Environmental authorities (12.3%) • Other (17.6%) 	<ul style="list-style-type: none"> • Air (5.3%) • Water (13.6%) • Waste (20.4%) • Soil/land (2.1%) • Nature (34.2%) • Education (3.9%) • Monitoring (15.3%) • Research (1.4%) • Other (3.0%)
<ul style="list-style-type: none"> • Soft loans (61.2%) • Grants (30.9%) • Interest subsidies (2.5%) • Equity investments (5.1%) 	<ul style="list-style-type: none"> • Grants (100%) 	<ul style="list-style-type: none"> • Grants (52.6%) • Equity investments (37.3%) • Interest free loans (8.2%) • Soft loans (1.9%)

mental expenditure of the funds; expenditures may exceed revenues for a given year because of income carried over from previous years.

TABLE 6

Pollution charges in Central and Eastern Europe (as of mid-1998)

PART 1 OF 2

<i>Country</i>	<i>Sector</i>	<i>Type of pollution charge</i>	<i>Number of chargeable pollutants</i>	<i>Revenue in 1997 (mln. USD)</i>	<i>Share of revenue to environmental fund</i>
Bulgaria	AIR	Fine only	16	0.12	100%
	WATER	Fine only	27	0.20	100%
	WASTE	Fine only	13 (soil)	0.02	100%
Croatia¹	AIR	Fine only	n.a.	n.a.	No
	WATER	Charge/Fine	n.a.	42.2	Water Fund
	WASTE	Fine only	n.a.	n.a.	No
Czech Republic²	AIR	Charge/Fine	Approx. 90	50.9	100%
	WATER	Charge/Fine	5 indicators	15.9	100%
	WASTE	Charge/Fine	All waste	11.48	Partially
Estonia	AIR	Charge/Fine	6 (standard)	0.83	100%
	WATER	Charge/Fine	7	1.41	100%
	WASTE	Charge/Fine	All waste	2.01	100%
Hungary	AIR	Fine only	Approx. 200	3.3 (est.)	70%
	WATER	Fine only	32	1.8	70%
	WASTE	Fine only	Hazardous	0.4	70%
Latvia	AIR	Charge/Fine	Approx. 160	n.a.	100%
	WATER	Charge/Fine	36	n.a.	100%
	WASTE	Charge/Fine	5 Classes	n.a.	100%
Lithuania³	AIR	Charge/Fine	Approx. 100	7.1	70%
	WATER	Charge/Fine	51	7.6	70%
	WASTE	Fine only	5 Classes	0.3 (est)	100%
Poland⁴	AIR	Charge/Fine	62	175.9	100%
	WATER	Charge/Fine	6	106.3	100%
	WASTE	Charge/Fine	19	72.0	100%
Romania^{1,5}	AIR	Fine only	22	0.98 (est.)	No
	WATER	Charge/Fine	Approx. 20	1.08	Water Fund
	WASTE	none	--	-	-
Slovakia⁶	AIR	Charge/Fine	Approx. 120	11.7	100%
	WATER	Charge/Fine	5 indicators	6.06	100%
	WASTE	Charge/Fine	All wastes	5.2	Partial

TABLE 6 (continued)

		PART 2 OF 2			
Country	Sector	Type of pollution charge	Number of chargeable pollutants	Revenue in 1997 (mln. USD)	Share of revenue to environmental fund
Slovenia ⁷	AIR	CO ₂ Tax	1 (CO ₂)	0.05	No
	WATER	Tax	7	2.91	No
	WASTE	none	-	-	-
Yugoslavia	AIR	Fine only	n.a.	n.a.	No
	WATER	Charge/Fine	n.a.	n.a.	No
	WASTE	Fine only	n.a.	n.a.	n.a.

Source: Based on Klarer, McNicholas (1999). **Notes:** n.a. = data are not available. 1) Currently there is no environmental fund established in Croatia and Romania. 2) Czech waste charge revenue data refer to revenues to National Environmental Fund only. 3) Revenue data for Lithuania refer to 1996. 4) Revenue data for Poland refer to 1996. Air emission revenue refers to SO₂ and NO_x charges only. 5) Data for Romania refer to 1996. Water sector revenues data refer to fines collected by Water Fund only. 6) Slovak waste charge revenue data refer to revenues to National Environmental Fund only. 7) The Slovenian CO₂ tax was introduced during 1997. Revenue in following years will be higher.

Poland during 1993-1996. In Hungary, Lithuania and Slovenia this indicator was about 20 percent in 1996 and about five percent in Russia (OECD/EAP Task Force, 1999). For a more thorough discussion of the opportunities and limitations associated with environmental funds in CEEC/NIS, readers are encouraged to see two OECD publications: "Sourcebook on Environmental Funds in Economies in Transition" (forthcoming, 1999) and the "St. Petersburg Guidelines on Environmental Funds in the Transition to a Market Economy" (1995).

Though it is difficult to predict the precise role that economic instruments (including funds) will play in the region in the future, it appears very likely that they will continue to be important elements of environmental policy. CEEC preparing for EU accession are under pressure to meet EU environmental standards. Economic instruments, through both their incentive and revenue raising functions, offer attractive options to policy-makers to help meet those standards. Environmental funds in some CEEC are

already being considered to play special roles for financing accession priority investments. In the NIS, while there is no driving force comparable to EU accession, there nevertheless exists tremendous potential for using economic instruments to both improve the environment and make economies more efficient. The challenge will be for environmental authorities to persuasively demonstrate this potential to other government officials (e.g. in the Ministries of Finance) and politicians, who are largely pre-occupied with economic and social issues perceived as more important at this stage of the transition.

3.1.2. Pollution and Product Charges

In almost all CEEC, comprehensive *pollution charges* on air emissions, water effluents and waste disposal have been introduced in recent years. Pollution charges have usually been introduced in conjunction with a permit system: a base charge rate is applied to all pollution within the permitted

level and a penalty rate is added for pollution above that level. The fines are intended to provide incentive to reduce pollution to permitted levels and therefore play a compliance function. The charges are intended to raise revenues and encourage cost-effective abatement below the permitted level. Such a system is in place in Poland, Czech Republic, Estonia, Latvia, Lithuania and Slovakia (see Table 6). As discussed in the previous section, the revenues from these charges are largely earmarked for expenditure through national and local environmental funds. Because of the direct link between pollution charges and the environmental financing system in these countries, pollution charges play a fundamental role in environmental policy and implementing the PPP.

One difficulty in the design of pollution charges and non-compliance fines in the region can be seen in the setting of charge rates. Primarily for social and political reasons, charge rates were usually established at a low level, providing only modest incentives for polluters to invest in pollution reduction instead of paying the charge (see Table 7). High inflation levels further eroded the real incentive effect and revenue raising potential of charges in a number of countries in the early part of the decade. Non-compliance fines — which are theoretically designed to deter polluters from violating regulations — have also been set too low compared to the costs of the activities they would be designed to encourage. Some charge and fine rates were established, for example water charges in Slovakia, with rates that decrease exponentially as pollution increases — thus serving neither the incentive or revenue raising purposes. The emphasis on maintaining revenue streams from the charge systems also appears to have inhibited the implementation of stricter charge rates which may have been more environmentally effective. In some cases, charge rates were explicitly linked to revenue raising goals rather than environmental effectiveness or

economic efficiency criteria.

Solutions to some of these obstacles have been developed over the past decade and some success has been achieved with the charge systems in some countries. The following modifications have assisted the implementation and effectiveness of pollution charges:

- reduction of the number of pollutants covered and overall simplification of the charge rate system;
- monitoring of emissions has been improved;
- collection of pollution payments has been included in existing tax structure resulting in higher collection efficiency;
- late payments are charged interest and are collected by tax inspectorates;
- charge rates have been phased-in via announced percentage increases;
- charge rates have been linked to inflation;
- charge rates have been increased to promote abatement measures;
- penalty rates have been introduced with substantial multipliers to provide incentive for pollution reduction.

Some policy-makers and business decision-makers may have concerns that higher pollution charge rates hinder economic development and growth. The case of the Polish air pollution charges, however, clearly indicates that this need not be the case: Polish SO₂ and NO_x charge rates (see Table 7) have been fairly high during the entire transition period even comparing to levels of similar charges in some West European countries. Given that energy consumption in Poland is heavily based on coal and oil (more than 80 percent) and payment collection efficiency was high, these charges obviously had a broader impact on the countries' industry and its reform. Poland's growth in GDP and industrial production during 1990-1997, however, has by far exceeded that

achieved by any other CEE or NIS country, which indicates that high pollution charge rates do not necessarily hinder economic development. On the contrary, the Polish case may rather suggest that investment in cleaner production and modern technologies may actually have contributed to accelerated economic restructuring.

Several countries have recently introduced *product charges*, which are linked to specific environmental problems. For example, both the Czech Republic and Slovakia introduced product charges on ozone depleting substances, whereas Poland and Estonia apply excise taxes on packaging. Although the expansion of environmental charges for other products is now under consideration in many countries in the region, broad-based product charges are currently applied only in Hungary and Latvia. Though still linked with specific environmental goals, these charges largely play a revenue raising role for environmental funds.

The Hungarian product charge system is applied to gasoline, packaging, tires, refrigerators, batteries and lubricants. The goal of the system is to raise revenue to help solve product related waste management problems and provide an incentive to reduce consumption of environmentally more damaging products. In 1997, product charges accounted for 78 percent of the Hungarian Central Environmental Protection Fund's USD 93 million total revenues. In some cases, the earmarked environmental product charges are combined with other non-earmarked taxes. For example, the combination of product charges and taxes on fuels in Hungary yields the highest gasoline prices in the region.

A number of difficulties were identified in the Hungarian experience with product charges. The primary problem highlighted has been the establishment of charge rates: The charges rates have been set too low to substantially decrease production and consumption of charged products. Due to low charge rates and low revenues from some

TABLE 7

Charge rates for selected pollutants in selected European countries (USD/ton of pollutant)

Country	Type	SO ₂	NO _x
Czech Republic (1997)	EC	29	24
	NCF	44	36
Estonia (1997)	EC	2	5
	NCF	116	265
Poland (1997)	EC	94	94
	NCF	940	940
Denmark (1998)	ET	1,460	0
France (1998)	ET	30	25
Sweden (1998)	ET	3,750	5,005

Sources: Klarer/McNicholas (1999) and Ekins/Speck (1999). Notes: EC = emission charge (payable on emissions within permitted levels of pollution); NCF = non-compliance fee (payable on emissions above permitted levels of pollution); ET = emission tax. Note that purchase power is lower in CEEC than in the western countries listed above (by a factor of 2-4).

products (e.g. aluminium cans, refrigerators) environmental authorities found that product charges alone did not generate enough revenue to finance required waste management investments. Authorities also discovered that collection of charges was easiest in the case of fuels and refrigerators, where a few larger firms pay the charges, and more difficult in case of packaging materials, where many more, smaller enterprises pay the charge. In 1997, Hungarian tax inspectorates assumed the authority to collect charges, which further improved the efficiency of the charge system. Cooperation between environmental and tax authorities and the many stakeholders necessary to implement a comprehensive reuse and recycling campaign requires further attention. Finally, the harmonisation of product charges with European Union reg-

ulations will have to be considered in charge system design (for example, EU rules on the Single Market state that foreign firms and products may not be discriminated by national taxation¹⁹).

3.1.3. User Charges

User charges in the energy, water, waste, mineral extraction and nature protection sectors are essential, if politically unpopular, economic instruments to secure environmental objectives. These charges are essential in order to recover costs for a continuous provision of socially adequate and environmentally sensitive services and to provide the correct price incentive to conserve valuable resources. They are unpopular because they represent increased prices to producers and consumers.

*Full-cost pricing*²⁰ of resources and services requires that all costs, present and future, internal (private) and external (social), that are incurred by society during production and consumption are incorporated and fully covered by the price of the good or service. All resources used up in the production or consumption of a commodity must be reflected in its price in order to avoid over-production and/or over-consumption, resource depletion and environmental degradation. Full-cost pricing provides the correct signal regarding relative scarcities and a strong incentive to economise and use resources efficiently. Note that in the absence of full cost-pricing, it is still society which pays for the provision of services and resources through subsidies. Facing the lower, subsidised prices for services and resources, however, individual users have little incentive to conserve resources and use them economically. From a fiscal perspective, therefore, full-cost pricing reduces the burden on the state budget from subsidies to producers and consumers and from deficits of public utilities that cannot fully recover their costs. From a financial perspective, full-cost pricing

reduces the need for additional capital to expand supply systems. Furthermore, full-cost pricing conserves natural resources and reduces environmental damage, thereby reducing the need for financial resources to undertake defensive or mitigatory expenditure. For example, meeting growing energy demands by improving energy efficiency and promoting conservation through full-cost pricing of energy, rather than by increasing supply, eliminates the need for new power plants and hence the need for funds to finance abatement technology to reduce emissions such as SO₂ and CO₂. It is true that full-cost pricing implies higher costs for producers and higher prices for consumers in the short-run, but the long-term benefits in terms of more sustainable economic growth often should outweigh these costs, although some cushioning of the impact on low-income groups might be necessary.

Despite these advantages, cost recovery pricing in EITs is always a politically and socially sensitive issue. During transition, per capita income is generally low and citizens' ability or willingness to pay for services that were at low cost or free in the past is reduced. Such a scenario is most likely representative of CEE in the first years of transition, when income increases were often outstretched by inflation and overall price increases due to price liberalisation etc. Purchase power probably has increased significantly since 1994 in some of the most advanced EITs, however. At present, price controls and often-significant subsidies in most public services and utilities continue to exist in most CEEC. Subsidisation of new investments using latest technology — for example a new wastewater treatment plant — is probably inevitable at present since costs for new technology are high: Often such technology needs to be imported from the West. This investment cost could only be made possible by accumulating revenues from user charges after a long time period. Current user charges for most public ser-

TABLE 8

Water tariffs for households in selected CEEC (end-1997) and EU countries (1995)

Country	Water supply (USD per m ³)	Sewage treatment (USD per m ³)	Annual average bill for water services (for a consumption of 200 m ³ water per year)
Bulgaria (min-max)	0.06 - 0.28	0.01 - 0.11	n.a
Croatia (min-max)	0.36 - 0.99	n.a.	n.a
Estonia (min-max)	0.12 - 0.41	0.14 - 0.70	n.a
Hungary (min-max)	0.24 - 0.70	0.14 - 0.56	n.a
Romania (average)	0.19	0.08	n.a
Slovakia (average)	0.18	0.09	n.a
Slovenia (average)	0.38	0.13	n.a
Denmark	0.52	1.55	Copenhagen USD 223; Aarhus USD 132
Finland	n.a	n.a	Helsinki USD 190; Turku USD 278
France	n.a	n.a	Paris USD 162; Lyon USD 301
Germany	1.78	2.45	Average tariff - there are large regional differences
Netherlands	n.a	n.a	Amsterdam USD 169; The Hague USD 267
Portugal	n.a	n.a	Lisbon USD 64; Porto USD 108
Spain	n.a	n.a	Barcelona USD 134; Seville USD 58
Sweden	n.a.	n.a	USD 526 (country average)
UK (data for 1998)	1.22	0.98	Country average: when metered USD 369; when not metered USD 404 — there are large regional differences

Sources: Data on CEEC — Klarer, McNicholas (1999); data on EU — Speck (1999b). **Note:** n.a. = data not available. Data for EU countries were converted into USD from ECU using an exchange rate of 1.1. Croatian water supply data include sewage charges and water effluent charges.

vices, however, remain significantly below similar charges in Western Europe in real terms as is shown in the example of water prices (Table 8). If purchase power parities would be applied (factor 2-5 between CEEC and highly developed Western countries),

differences are smaller. It is clear that levels of user charges will continuously have to increase in coming years and increases will have to keep pace with increases in purchase power at least. In the longer term, full-cost pricing should be the objective.

Pricing of basic energy commodities such as electricity, coal, gas and gasoline will continue to play volatile and significant roles in both macroeconomic and environmental terms. The present status of these markets in the region can be described by below-cost pricing, partial subsidies to producers, inefficiencies in production, distribution and consumption and reliance on fuel sources with heavy environmental impact. The revenues generated by low prices have usually not been sufficient to maintain or improve technologies. Due to the inefficiencies, the region is characterised by high energy intensities per unit of GDP.

In EU accession CEEC, the EU regulations provide a framework for priority setting in other public services which impact the environment. Waste water and waste management are identified in most country evaluations of the European Unions Agenda 2000 as areas that need particular attention. Investment needs for complying with the relevant EU directives represent the bulk of total environment related costs of EU accession. Moreover, these are services largely provided by companies in the public sector. The households' willingness to pay for such services is generally described as low, but ability to pay has almost certainly increased in most countries in the CEE region over the past few years.

In addition to user charges in the public services sectors (energy, transport, water and waste), economic instruments can also play a role in conserving national natural resources while generating significant revenues for environmental funds and/or national budgets. Economic instruments can serve this function in several ways: *resource extraction charges/taxes*, *conversion charges* and *recreational user charges*.

Resource extraction charges, such as water extraction charges, mineral extraction charges and tree cutting charges, illicit direct payments for natural resources consumed or used in economic activities. Such charges provide policymakers with an

instrument to promote sustainable management of valuable national resources. In some countries in the region, extraction taxes generate revenues for the central budget and little additional environmental benefit is achieved. In other countries, such as Estonia, Latvia, and Lithuania, the tax is levied in conjunction with extraction permits in which protection requirements are considered. In Latvia, the charge system works in conjunction with a non-compliance fine rate and the revenues are earmarked for environmental expenditures.

Land conversion charges have also been implemented in several countries in the region: charges in the Czech Republic and Slovakia are levied to discourage the conversion of agricultural and forest land for other uses. In this way the charge recognises the co-benefits created by undeveloped agricultural and forest lands. Finally, user charges, such as national park entrance fees, hunting and fishing fees and tourism taxes have recently received attention for their ability to protect biodiversity and natural areas. Poland is currently one of the few countries in the region to charge an entry fee to national parks, but entry fees are increasingly being initiated to allow natural areas to pay for themselves. Hunting and fishing fees play a dual role: to encourage compliance with standards protecting species and to generate income for their protection. A Nature Tax is currently under consideration in Bulgaria. The draft envisions an annual tax on enterprises located in protected areas, and revenues would be administered by the national and municipal environmental funds.

3.1.4. Subsidies

A *subsidy*, in broad terms, can be understood to mean all forms of financial assistance which reduce the costs of consumption or production of goods and services. In this sense, subsidies include not only direct payments to producers and price controls for consumers, but also:

- tax credits, deductions and exemptions;
- preferential loans, loan guarantees;
- payment delays, non-payments and debt forgiveness;
- tariff barriers and exemptions;
- provision of public services or infrastructure below costs.

In many cases, the price signals created by subsidies have a negative impact in environmental terms. Subsidies in CEE and the NIS²¹ in nearly all sectors have decreased since 1990 as a direct result of state budget deficits. Nevertheless, subsidies in three key areas continue to play large roles in both environmental and economic terms: energy, transport and agriculture. Subsidies in these sectors exist in Western Europe and most OECD countries as well. For CEEC who are negotiating entry into the EU, reform of subsidy policies and harmonisation with EU guidelines has already begun. In certain sectors, i.e. energy, harmonisation and improvements resulting from necessary investments will likely bring benefits for the environment. In other sectors, such as road transport and agriculture, the environmental effect of harmonisation of subsidy policies with EU policies should be further analysed.

Price liberalisation and removal of subsidies in the energy sector has begun in CEE, generally led by the economies advanced in transition. Although public information regarding subsidies in the coal, electricity and district heating sectors is limited, it can be reasonably assumed that some forms of subsidisation occurs. Hidden subsidies may also exist in the form of non-payments of energy bills of enterprises (including state-owned industry) and households.

Subsidies in the transport sector throughout the CEE/NIS before 1990 favoured public transport and rail development. While generally a more environmentally friendly mode of transport, state subsidies and low user prices inhibited the maintenance and

modernisation of railways. Since 1990, CEE countries face increased road transport pressures much of which is tied to increased private car ownership and opening of road-oriented trade with Western Europe. As transport and trade are recognised as important variables for social welfare and economic development, removing or reducing road subsidies does not appear to be a current priority in CEE. Given the high infrastructure costs involved in road expansion, the economic and environmental impact of subsidies in this sector deserves further attention.

Agricultural subsidies play a large role in both budgetary terms and environmental impact in the EU, CEE and NIS. In many cases, incentives are provided to increase agricultural production which causes direct negative impact on the environment. An example of this in CEE can be found in Croatia, where the sale of fertilisers is subsidised. Total transfers in CEE, however, are substantially less than those in the EU, where the Common Agricultural Policy (CAP) provides for price supports above world market prices and additional export subsidies to eliminate surpluses generated by overproduction. Common policy trends in CEE include the harmonisation of agricultural policies with CAP (which may result in increased subsidisation), continued privatisation of farms and de-coupling price support from production levels. Where data is available, implementation of similar reforms appears to be slower in the NIS.

3.1.5. Tradable Permits

Inspired by positive experience with tradable permits in Western countries, especially the USA (see section 3.2.4), possibilities for introducing emissions trading schemes in CEE and NIS countries have been studied in several countries of the region, and a few countries have even implemented such schemes.

A few experiments with emission trading have been implemented in NIS. An interest-

ing case took place in Almaty, Kazakhstan²²: where a pilot trade on air emissions was implemented by the Almaty City Environmental Committee assisted by the Harvard Institute for International Development (HIID). This pilot trade demonstrated that basic environmental regulation in NIS creates enough opportunities for implementation of emission trading. In Poland, an experiment with VOC emission trading was implemented in 1991 in the Chorzow area with the participation of a steel industry and the Chorzow power plant. Due to lack of adequate regulations, no transaction/trade took place. However, the experiment provided useful experience, and the possibility of using emission trading remains under official consideration, and further research is being carried out. For example, the EU recently funded a project to research the institutional and legal preconditions for air emissions trading in Poland. In the Czech Republic, the ministry of environment is considering the introduction of air emission trading in conjunction with existing pollution charge-permit structures in the medium term (1999-2005). In Lithuania, a marketable permit system in the water sector is under preparation.

As will be discussed in more detail in section 3.3, the Kyoto Protocol foresees the establishment of international emission trading on greenhouse gases, the most likely of which to be implemented is carbon dioxide (CO₂). This trading scheme is principally open to all CEE and NIS countries that have signed Annex B of the Kyoto Protocol, including Russia, Ukraine and most CEE countries.

3.2. Western Countries' Experience

One reason for the continued interest in applying more economic instruments for environmental policy all over the world is the overall positive experience that has

been gained over the past years in implementing such instruments in western countries. Section 3.2. offers a short overview on such experience.

3.2.1. Environmental Charges and Taxes

Over the last decade a large number of environmental charges and taxes were introduced in Western countries (see Table 9 for an overview of various such charges and taxes). Most likely, the use of new environmental taxes and charges will continue to increase over the next years in OECD countries.²³

In all countries listed in Table 9, user charges on water consumption, sewage treatment and municipal waste collection and treatment are in force. Various product charges or taxes have been introduced. There are also several air emission charges/taxes and some countries operate water effluent charges, hazardous waste charges and/or landfill charges/taxes. The basis of emission charges/taxes in Western countries usually consists of one pollutant, unlike in CEEC and NIS where pollution charges usually can be applied to numerous pollutants (see Table 6). Some other differences in the application of emission charges/taxes and product charges/taxes between Western countries and EITs can be observed:

- Often the environmental goal of an emission or product charge/tax in Western countries is more clearly specified than in EITs. For example, in Western countries the enabling legislation of emission charges often sets a goal of a certain percentage emission reduction of a certain pollutant in a certain time period.
- The earmarking of charge/tax revenues to special "funds" appears in Western countries, but there are no comprehensive environmental funds as in EITs, which collect revenues from a number of emission and product charges. In Western

countries, earmarking is often directly related to the pollutant/resource regulated by the charge. In case of un-earmarked revenues, there is a trend to offset other taxes in the framework of ecological tax reforms (see section 3.2.3.).

- In Western countries, environmental charges and taxes are probably more complementary to the existing command and control instruments than in EITs, where environmental charges are an integral part of the public environmental financing system.
- In Western countries, the overall responsibility for implementing and administering emission and product taxes and charges, with few exceptions, lies with ministries of finance (or ministries of taxation). This is in contrast to CEE and NIS countries, where these instruments are largely implemented under the responsibility of ministries of environment (ministries of environment are usually also responsible for the administration of comprehensive environmental funds).

Table 10 presents data on the fiscal relevance and importance of environment and energy taxes in Western countries: in the EU, on average, revenues from environmental and energy taxes accounted for roughly 3 percent of GDP and 7 percent of total tax revenues in 1995. Similar data for CEE and NIS countries are currently not available except for CEE countries, which recently joined the OECD. Interestingly, environmental and energy taxes in Hungary have a similar relative importance as in the EU, while in Poland revenues from energy and environmental taxes seem to be significantly lower. In Western Europe, the fiscal role of environmental taxes will most likely increase given the increased interest in ecological tax reform (see section 3.2.3.).

From an environmental policy perspective, a key factor in the performance of an environmental charge or tax is its environ-

mental effectiveness. Existing charges and taxes in Western countries are increasingly being evaluated for their environmental effectiveness (and also for their economic and administrative efficiency functions). Four examples of evaluated charges and taxes²⁴ are presented below, each indicating the powerful environmental effects such instruments can produce.

Sulphur tax in Sweden

In 1991 a sulphur tax was introduced in Sweden in order to further decrease sulphur emissions, promote the use of cleaner fuels and the cleaning of flue gases emitted from the use of fuels with a high sulphur content. The tax applies to fuels (coal, oil, peat) that contain 0.1 percent or more of weight of sulphur and amounts to SEK 30 per kg of sulphur in 1996 (USD 3.7/kg S). If sulphur emissions are abated, the tax might be reimbursed, and for light oils there is a tax differentiation scheme which compensates for the cost of producing oils with sulphur content below prescribed limits through tax rebates. The tax has had a considerable impact. The average sulphur content of fuel oil decreased from about 0.65 percent in 1990 (the legal maximum allowable content was 0.8 percent at that time) to 0.4 percent recently. The sulphur content of light oils is lower than 0.1 percent on average, which corresponds with levels for which no tax is due. About a quarter of the taxed subjects have taken measures to clean flue gases and are receiving tax refunds. The reduction of sulphur emissions is 70 percent on average. The average costs of the measures taken after the introduction of the sulphur tax was about SEK 10/kg, which is considerably lower than the tax rate of SEK 30 and indicates a large incentive effect of the tax.

CO₂ tax in Norway

The CO₂ tax in Norway was introduced in 1991, focusing on emissions from stationary sources in the manufacturing industry and services and from stationary and

TABLE 9

Overview of environment-related taxes and charges in selected Western European countries (as of spring 1999)

	AUT	BEL	DEN	FIN	FRA	GER	ITA	NEL
Motor Fuels:								
Carbon/energy tax		X	X	X				X
Sulphur tax			X	X	X ¹		X	
NOx charge					X			
Other Energy Products:								
Carbon/energy tax	X	X	X	X			X	X
Sulphur tax			X		X		X	
NOx charge					X		X	
Air transport:								
Noise charge / others		X	X		X	X	X	X
Water:								
Water user charges	X	X	X	X	X	X	X	X
Sewage treatment charges	X	X	X	X	X	X	X	X
Water effluent charge		X	X		X	X		X
Waste Management:								
Municipal waste user charge	X	X	X	X	X	X	X	X
Hazardous waste charge	X	X		X	X	(X)		X
Others				X ⁴				X ⁵
Agricultural Inputs:								
Pesticides		X	X	X				
Fertilisers			X					X
Other goods/products:								
Batteries		X	X				X	
Plastic carrier bags			X				X	
Disposable containers		X	X	X				
Packaging		X			X	(X)		
Gravel		(X)						
Tires			X					
CFCs and/or halons			X					
Lubricant oil charge			X	X				
Oil pollution charge				X	X			
Others		X ⁶	X ⁷		X ⁸			X ⁹

Source: adapted from Speck (1999) and OECD (1997). **Abbreviations:** X = instrument in force; (X) = in force in part of the country; AUT = Austria; BEL = Belgium; DEN = Denmark; FIN = Finland; FRA = France; GER = Germany; ITA = Italy; NEL = Netherlands; NOR = Norway; POR = Portugal; SPA = Spain; SWE = Sweden; UK = United Kingdom. **Notes:** (1) air pollution tax; (2) tax on domestic air traffic; (3) air passenger duty; (4) nuclear waste tax and landfill tax; (5) tax on uranium; (6) taxes on: disposable razors, disposable cameras, paper and cardboard, surplus manure, heavy accidents, ionising radiation; (7) taxes on: raw materials, chlorinated solvents, disposable tableware, light bulbs; (8) paper tax and tax on mines; (9) surplus manure tax.

	NOR	POR	SPA	SWE	UK
	X			X	
	X			X	
	X			X	
	X		X	X	
			X	X	
	X	X		X ²	X ³
	X	X	X	X	X
	X	X	X	X	X
			X		
	X	X	X	X	X
		X			
	X			X	
	X			X	
		X		X	
	X	X		X	
				X	
	X				
	X				
		X			

“There is no art which one government sooner learns of another than that of draining money from the pockets of the people.”

ADAM SMITH (1723-90)
 Scottish economist, in his book
The Wealth of Nations

mobile household sources. About 40 percent of CO₂ emissions are taxable. Certain sectors have been exempt from this tax, mainly because of concerns about international competitiveness. The nominal tax rate in 1993 was USD 205/ton CO₂. The price of heating oil and petrol increased about 15 percent and 10 percent, respectively, as a result of the tax. The total effect of the tax was a reduction of CO₂ emissions of 3-4 percent for the period 1991-1993. The largest effect was calculated in the paper industry. Oil consumption would have been 21 percent higher without the tax. The impact in the intermediate products sector and the government services was 11 percent and 10 percent respectively. The impact was much lower in other economic sectors. Private car transport by households would have been 2-3 percent higher per year without the tax.

Waste charge in Denmark

Denmark has applied a charge on the disposal (dumping and incineration) of non-hazardous waste since 1986. Waste incinerated is charged DKK 210 per ton (ca. USD 31/ton) except for installations that recover heat or generate electricity, which are charged DKK 160 per ton (USD 23.5/ton). Landfill waste is charged DKK 285 per ton (USD 42/ton). The revenues from the Danish waste charge flow to the general budget and since 1993 they have been used as a part of the green tax

reform. Nevertheless, the intended environmental impact includes reduction of waste generation, increase of reuse and recycling and a larger share of waste being incinerated. In 1985-1993, reuse and recycling of waste increased from 21 percent to 50 percent of the total amount of waste collected, and dumping decreased from 57 percent to 26 percent. The share of waste incinerated remained constant. The financial effect of the waste charge is considerable. The waste charge increases the costs of waste dumping by about 100 percent and increases the costs of incineration by 70 percent on average.

Water pollution charge in the Netherlands

The Dutch water pollution charge system was introduced in 1970 to facilitate the building of wastewater treatment capacity. The charge rates are calculated on the basis of finance required for investment and operation and maintenance cost once the plants are constructed. Treatment capacity increased from 52 percent in 1975 to 95 percent in 1992 in terms of households connected with a public sewage treatment plant. Of all discharges, 74 percent were treated in 1991, against 51 percent in 1980. Emissions from the manufacturing industry decreased by 80 percent in the period 1975-1991. Two studies attempted to disentangle the impact of the charges from the impact of the Dutch water quality policy. One study found a strong relationship between variations in charge rates and the rate of reductions of discharges. Another study found that the majority of interviewed industry representatives (54 percent) claimed that the charge has been the decisive factor in decisions in favour of water pollution abatement measures, whereas only 20 percent pointed at the permit policy to be of main importance. This study also stated that the average charge rate (which varies substantially across water boards) was only slightly lower than average pollution abatement costs.

3.2.2. Subsidies

It makes little sense for societies to begin making the polluter pay through better implementation of the PPP until they first stop paying the polluter through environmentally damaging subsidies. Few governmental policies are as unpopular in theory and as popular in practice as subsidies.

The environmental effects of support to energy, industry, agriculture and transport have attracted increased scientific and political interest in recent years in Western countries. A number of analytical studies have shown that the linkages between support and the environment are complex and often indirect. The non-internalisation of external environmental costs can be also considered an "implicit subsidy." The approach required to address implicit subsidies would be to remove existing supports from environmentally harmful activities and to internalise external environmental costs. Solving this problem is not an easy task. Some examples of environmental impacts of subsidies are presented in Box 5.

Usually the original purpose for introducing subsidies is to support the poor, to stimulate economic development or growth, to protect employment and investment, to safeguard domestic supply and reduce external dependence. In principle, subsidies can be beneficial, especially if they are sharply focused and limited to achieving one desired effect. In practice, subsidies tend to become deeply entrenched in the expectations and interests of those who benefit from them, long after they have served their original purpose. For this reason, there is often great resistance to any attempt to change these subsidies, even when their costs have reached a point where they far outweigh any conceivable benefits. In many cases, subsidies also exact high costs in environmental and social terms which represent a constraint on the transition towards sustainable development.

A recent OECD report (OECD, 1998) offered a number of general policy conclu-

TABLE 10

Revenue from environment and energy taxes as a percentage of total tax revenues and of GDP in the European Union, the USA, Hungary and Poland (data refer to 1995)

	<i>Revenue from environmental taxes as % of total tax revenues</i>	<i>Revenue from energy taxes as % of total tax revenues</i>	<i>Revenue from environmental and energy taxes as % of GDP</i>
Denmark	4.3	4.3	4.4
Netherlands	5.8	3.4	4.1
Italy	1.2	7.7	3.6
Luxembourg	0.4	7.0	3.3
Ireland	4.0	5.2	3.2
Portugal	0.3	8.4	3.1
Sweden	0.7	5.1	3.0
Spain	2.9	5.2	2.9
United Kingdom	1.6	6.3	2.8
Germany	1.5	4.8	2.7
France	1.2	4.5	2.5
Finland	0.3	4.7	2.3
Austria	1.7	3.2	2.1
Belgium	1.1	3.4	2.1
Greece	1.4	4.6	1.9
EU 15	1.7	5.2	2.9
USA		3.7 ¹	1.0
Hungary		7.0 ¹	2.8
Poland		3.8 ¹	1.6

Source: Eurostat (1997) except: data for USA, Hungary and Poland are OECD estimates. **Notes:** Data listed above are not comparable to those presented in table 4. Unlike data in table 4, data in table 10 include revenues from additional taxes often raising large revenues such as taxes on energy products, transport related taxes (import taxes, sales taxes, registration and user fees) and revenue from water/sewage charges. 1) Revenue from environment AND energy taxes as % of total tax revenues.

sions for subsidy reform: First, it is essential that the transparency of support measures is increased in order to clarify the tradeoffs between sectoral and general interests in society. Second, the removal of support measures on the use of “throughput” material and energy should be a high priority in order to

stimulate technological change and decrease governmental spending. Third, to reap the maximum benefit from the support reduction, an effective and well-directed environmental policy will also be required. Last but not least, identification of all the beneficiaries and losers associated with the support policy

will help to understand full costs and benefits of such removal. Roodman (1998) offers six principles of good subsidy policy:

- Subsidies may be warranted if they make markets work more efficiently; for example by overcoming barriers to the commercialisation of new technologies, or by favouring environmentally benign technologies over ones with hidden environmental costs.
- Subsidies may be warranted if they advance societal values and not only economic efficiency.
- Subsidies should be effective.
- Subsidies should be directly and exclusively targeted at intended beneficiaries.
- Subsidies should be a least-cost means of achieving their purpose.
- All costs, including environmental costs, should be counted when weighing the value of subsidy, which entails sometimes difficult judgements about how to compare different kinds of damages and benefits.

At present there is no internationally comparable information available to show Western countries' progress in reforming environmentally harmful subsidies. It would be important and desirable, however, to see and analyse such progress. Some initial achievements in a number of countries can be reported though, for instance, the recent reform of subsidies to the coal production sector in Germany or the gradual reorientation of agricultural subsidies toward more environmentally sound agricultural production in a number of West European countries.

3.2.3. Eco-Tax Reform and Green Budget Reform

Instead of addressing environmental problems on a case-by-case basis by introducing new environmental taxes or charges focused on specific problems or by reform-

ing or removing specific environmentally damaging subsidies, West European countries are increasingly moving toward a more comprehensive approach of "greening" entire taxation systems. This process is referred to as "eco-tax reform," or sometimes, "green budget reform" (to better reflect potential environmental benefits from measures on the spending side, i.e., the reform of subsidies). Eco-tax reform usually involves three complementary approaches: a) a removal or modification of existing distorting subsidies and tax provisions; b) a restructuring of existing taxes; and c) the introduction of new eco-taxes. The introduction or alteration of environmental taxes is often carried out under constraints of revenue neutrality (i.e. constant overall tax revenue), for example by shifts from income or labour taxes towards environmental taxes. Sometimes Western governments have also decided to use revenues from new environmental taxes to finance budget deficits.

The political attractiveness of eco-tax reform has been its ability to achieve a "double-double dividend" (EEA, 1996): "if environmental taxes are well designed and implemented, they could deliver a 'double-double dividend' for policy-makers by achieving improvements in a) the environment; b) innovation and competitiveness; c) employment; and d) the tax system." Initial experience suggests that well implemented eco-tax reforms can fulfil the promises of delivering positive environmental effects at lower costs, promoting innovation and competitiveness and contributing to reducing economic distortions in taxation systems. Available analysis indicates, however, that no significant employment gains should be expected. (It is important to note that none of the respective studies found a decrease in employment.)

Environmental taxes, in order to be significant and attractive from a fiscal perspective, have to generate large revenues that can be sustained over time. In this context, taxes on energy products (instead of a flat rate, energy taxes could be at least partly

BOX 5

Environmental impacts of subsidies: Some examples from Western countries

	<i>Examples of subsidies...</i>	<i>...and their environmental Impacts</i>
Agriculture	<p>Transfers generated as a result of agricultural policy amounts to roughly USD 333 billion annually in OECD countries, or roughly 2% of OECD GDP.</p> <p>Irrigation water supplied by the US government costs more than USD 1 billion per year, only 25% of which is recovered in user fees. In addition, fewer than 6% of farmers receive more than 50% of the total benefits.</p>	<p>Overall Impacts depend on environmental and economic circumstances. Components of these subsidies have severe negative impacts on the environment (e.g. pollution from pesticide and fertilizer use, erosion, desiccation).</p> <p>Desiccation, erosion, exhaustion of a natural resource.</p>
Industry	<p>The net cost to government of industrial support activities averaged USD 66 billion annually over the period 1986-89; this was about 2.5% of total manufacturing value-added in the 22 OECD countries reviewed. Of this total, 28% was for direct investment support. R&D, regional development and export promotion accounted for a further 12%, 22% and 20% respectively. Depletion allowances in excess of total development and extraction costs in some extraction industries (e.g. mining) amount to more than USD 1 billion per year in the US.</p>	<p>Especially when raw materials processing and energy use are subsidised, a negative impact on recycling and (by consequence) a strong negative impact on all kinds of emissions and waste can result. (Roughly 50-75% of all emissions and waste are generated by raw materials and energy processing).</p>
Energy	<p>Annual coal subsidies (PSE) in 7 OECD countries amount to USD 10.3 billion.</p>	<p>Subsidies in the energy sector favour "black" energy uses over "green" ones.</p>
Road transport	<p>Only 79% of road infrastructure investment costs in the US are directly borne by road users. The remainder (approximately USD 15 billion in 1991) comes from the general taxpayer. Significant income transfers in favour of trucking are made in most other countries.</p>	<p>Such subsidies stimulate road traffic, which is more polluting than using railways or waterways.</p>
Fisheries	<p>Subsidies in OECD countries amount to USD 50 billion.</p>	<p>Fish stocks become exhausted. Lower catches in the past would have allowed for significantly higher catches today.</p>

Source: OECD (1997)

based on the content of polluting components such as CO₂) and transport related taxes (import taxes, sales taxes and registration or user taxes) have the greatest potential. Other taxes, such as waste related taxes, (e.g., landfill tax) or specific product taxes, (for example, taxes on lubricants, fertilisers, pesticides, nuclear fuels, non-returnable containers, mercury and cadmium batteries, feedstock chemicals and packaging) have increasingly been identified as potentially creating large revenues and providing a stable tax basis.

As demonstrated in table 10, existing environmental taxes accounted for up to 7 percent of total tax revenues in 1995 in Western Europe. Table 11 shows implemented and proposed tax-shifts as part of eco-tax reforms in West European countries. Note that only tax-shifts are shown in table 11; other elements of eco-tax reform such as subsidy reform or removal are not considered. In order to screen existing taxation systems and national budgets for environmental distortions, elaborate proposals to reform such schemes and identify and elaborate proposals for introducing new environmental taxes, a number of countries have established “green tax commissions.” These commissions have been working successfully and some general conclusions from their work is summarised in Box 6.

Below follows a short discussion of current achievements in two of the most active countries in eco-tax reform, Sweden and Denmark (based on EEA [1996] and OECD [1997]):

Sweden was the first country to implement a tax shift from income taxes to taxes on energy and pollution. In addition to an energy tax that had been in force since 1974, a new CO₂ tax was introduced in 1991, together with the imposition of VAT on energy and new environmental taxes on NO_x and SO₂. The total redistribution of the tax burden was equivalent to 6 percent of GDP while the tax shift between labour and energy accounted for some 4 percent. The

“The hardest thing in the world to understand is income tax.”

ALBERT EINSTEIN (1879-1955)

motivation for the tax reform was primarily the need to lower high marginal tax rates on labour income, but climate change policies also played an important role. In 1992 the energy tax burden was partly shifted from industry to households: The CO₂ tax was reduced to 25 percent of the normal rate and the energy tax component was abolished. The tax burden, however, was not shifted back to labour. Instead carbon-energy taxes on households were increased. Reflecting the recent more widespread practice of carbon-energy taxation in Western Europe, the Swedish parliament has recently increased the CO₂ tax for industry to 50 percent of the original level. Also, several non-energy taxes have been applied, like taxes on fertiliser and pesticides, beverage containers and batteries.

In Denmark, the first step in eco-tax reform in 1993 resulted in marginal income taxes lowered by about 8-10 percent, from 1994 through 1998, and the phasing in of new green taxes worth DKK 12 billion (roughly USD 1.8 billion). Increased gasoline and energy taxes account for most of the increased revenue, and about one third of the new revenues are derived from an increase in the waste charge and a new water supply tax. A CO₂ tax was introduced in 1992 and in 1996 this tax was increased considerably. The 1995 tax shift is based on the principle of revenue neutrality, and the revenue from the increased CO₂ tax is returned to industries, e.g. by means of a lowering of social security contributions and for energy savings purposes. In 1998 a further tax shift was implemented.

BOX 6

Conclusions of “Green Tax Commissions”

The implementation of green tax reforms is an evolving issue. Several countries have set up so-called “green tax commissions” to investigate ways and means either to deepen and strengthen current tax reforms or to implement new ones. These commissions are usually government-appointed and comprise official and independent experts, members of parliaments, representatives from different stakeholder groups, etc. Green tax commissions exist in Belgium, Denmark, Norway, Sweden and the Netherlands. Naturally, the conclusions and recommendations from these commissions apply to the specific conditions and requirements of each country. However, a set of conclusions of general interest can be highlighted:

1. Green taxes are effective and efficient instruments for environmental protection.
2. A tax shift where green taxes are increased, and labour taxes or other distorting taxes are reduced, will improve economic performance through improvements in the environment and some reductions in other economic distortions.
3. These improvements are not likely to come at the cost of significant employment losses, overall. On the contrary, total employment might increase somewhat.
4. Such a tax shift would on its own make only a marginal contribution to solving the unemployment problem in many OECD Member countries.
5. High international mobility of means of production can generate adjustment costs if small, open economies introduce policies that differ significantly from what other countries pursue. More ambitious environmental policies would therefore be stimulated by increased international cooperation.

Source: OECD (1997)

3.2.4. Tradable Permits

One of the most significant examples of practical implementation of emission trading was the United States’ SO₂ trading program.²⁵ The legal basis for this program was established by a new Clean Air Act adopted by the US Congress in the early 1990s. The target was to reduce SO₂ emission by 10 million tons from the 1980 level by the year 2000. Traditional regulatory approaches were considered a very expensive way to achieve this target, burdening US industry with massive costs. Instead, the more flexible approach of emission trading had been selected. The expected 2010 cost level of US industry compliance under the regulatory approach was estimated at USD 5 billion per year. According to the most recent estimation, the expected cost of compliance under emission trading is USD 1-2 billion per year.

In other words, emission trading was the cheapest way for US industry to meet requirements of the SO₂ emission reduction goal. The trading program was not supposed to create environmental benefits additional to the established emission target. However, actual emission dynamics shows that since 1990 annual SO₂ emissions were always lower than the target level.

Specific features of air circulation in the US allow for the exchange of the long term SO₂ emissions from different sources. In other words, one ton of the long term SO₂ emissions from a utility located in New York State was considered to be equal to 1 ton of SO₂ emissions from a utility located in Colorado, Massachusetts, or any other state. More than 2,000 sources in the US were involved in the emission-trading program. In the early stages of program implementation, limited numbers

TABLE 11

Implemented and proposed eco-tax reforms in European countries (tax shifts only, as of spring 1999)

Country	TAX SHIFT		REVENUE SHIFTED
	From	To	in % of total tax revenue
Sweden 1990	Personal income (reduction of labour taxes of around 4.3 percentage units) ¹	Environmental and energy taxes, including CO ₂ tax and SO ₂ tax	1.9% (revenues from environmental and energy taxes EUR 2 billion)
Denmark 1993, 1995 and 1998	Personal income, employers' social security contributions, investment incentives	Various (electricity, water, waste, cars), CO ₂ and SO ₂	2.5% (EUR 340 million in 2000)
Spain 1995	Personal Income	Motor fuels	0.2%
Netherlands 1996	Personal income, corporate profits, employers' social security contributions	Energy and CO ₂ (regulatory tax on energy)	0.8% (EUR 1 billion in 1998)
United Kingdom ² 1996	Employers' social security contributions	Landfill	0.2% ³ (EUR 640 million)
Finland 1997	Personal income, employers' social security contributions	CO ₂ and landfill	0.5%
Italy 1999	Reduction of employment charges	CO ₂	approx. 0.2% (approx. EUR 6 million)
Germany 1999	Social security contributions paid by employers and employees	Energy (mineral oils, natural gas and electricity)	Social security contributions will be reduced from 20.3% to 19.5% (approx. EUR 4.3 billion)
France 1999	Plans to reduce taxes on labour and employment	Generalised pollution tax (known as TGAP) ⁴	n.a.
Austria 1999 (proposed)	Employers' social security contributions	Energy and traffic-related (vehicle taxation)	up to 4.8% (up to EUR 3.6 billion)

Source: Adapted from Ekins and Speck (1999a). **Notes:** An eco-tax reform is also proposed in Switzerland. 1) The whole reform reduced the revenues generated by taxes levied on households and corporations to 21.3% of GDP in 1991 compared with 25.3% in 1989. 2) The Chancellor of the Exchequer announced in the 1999 Budget that the Government proposes to introduce a climate change levy on business use of energy from April 2001. The revenues (estimated to be EUR 2.5 billion) are intended to be recycled in full to business through cuts in employers' NICs (National Insurance Contributions) and energy efficiency schemes. 3) It was a 0.2 percentage reduction in NICs and not a reduction of total tax revenue. 4) The French generalised pollution tax was created in 1999, grouping 17 environmental taxes on waste, water and air pollution together.

of trades were recorded. The transactions occurred mainly on a source-by-source basis. However, the market infrastructure has been developed quickly and SO₂ allowances are now considered a normal commodity at the New York or Chicago Exchange. The market size increased five times between 1994 and 1997. At the same time, the unit price of SO₂ allowances has been reduced over the same period. In the early stages, the price expectation was more than USD 700 per ton of SO₂. The lowest recorded price was approximately USD 60 per ton of SO₂ in 1996. At present, the price is around USD 100. Transaction costs are very low (estimated not more than 1-5 percent), due to the efficiency of the market infrastructure. Administrative cost is very low as well, due to the effective recording and tracking systems. SO₂ trading was well received by the industry. Until now there was no single case of a violation (for example, SO₂ emission without permit). The SO₂ allowances are fully marketable (anyone can hold allowances; anyone can buy allowances; allowances are tradable throughout the 48 continental states; allowances are bankable).

Apart from the SO₂ emission trading scheme, there are also trading schemes for NO_x, lead and ozone depleting substances implemented in the US. Similar trading schemes (NO_x, ozone depleting substances and VOCs — volatile organic compounds) are in place in regions of Canada. Australia and some US states are operating tradable permit schemes for water quality management (Australia: control of saline discharges; Colorado: control of phosphorus discharges; Wisconsin: control of BOD discharges).

3.2.5. Other Economic Instruments

Deposit refund systems have traditionally been operated on glass drink containers, such as beer and wine bottles, in several OECD countries. A key indicator for the environmental effectiveness of such systems is the rate of return achieved for the products

included in the system. In most OECD countries the return rate has been very positive (reading close to 100 percent). It should be noted that many CEEC and NIS are operating similar systems, often with high return rates. In recent years, some new products such as aluminium cans and plastic bottles, have been incorporated into existing deposit refund systems on drink containers in Western countries. In addition, new deposit refund systems were established in a number of countries on products such as food packaging, (car) batteries, lamp bulbs, pesticide containers, home appliances and lubricant oil. Similar development has not been observed in CEE and NIS countries, and there appear to be many possibilities for introducing similar new deposit refund systems in the region.

Other types of economic instruments, such as performance bonds and liability payments, have been used in some Western countries.²⁶ Performance bonds have been used in Australia, Canada and the US, primarily for guaranteeing rehabilitation and clean-up obligations related to mining sites and landfill of (hazardous) waste. Liability payment schemes exist in several OECD countries. For example, Japan's system of compensation for air and water-related health damages is a traditional and wide-ranging instrument in Japan's environmental policy. In the US, a scheme is in place on hazardous waste sites to ensure the cleanup of sites posing a threat to human health and the environment (numerous cases have occurred involving billions of USD). It should be noted, however, that performance bond and liability payment schemes require a strong enforcement tradition, a prerequisite which may be largely absent in CEE and NIS countries.

3.3. International Economic Instruments: Kyoto Mechanisms

A special case of economic instruments are the Kyoto mechanisms which — if fully

implemented — would be the first economic instruments operated on international level. This section introduces the Kyoto flexible mechanisms and discusses the potential gains countries with economies in transition (EITs) could realise from these mechanisms. Box 7 provides for a short glossary on Kyoto-mechanisms related terms.

Background to the Kyoto Mechanisms

The ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC) adopted at the 1992 Earth Summit in Rio de Janeiro is to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system (Art. 2, UNFCCC). In order to stabilise atmospheric concentrations of greenhouse gases, anthropogenic emissions must be reduced below present values. The UNFCCC, however, contains no quantitative, legally-binding obligation for parties to limit their emissions. It merely states the aim that Annex I Parties individually or jointly return their emissions of CO₂ and other greenhouse gases to their 1990 levels (Art. 4.2 (b), UNFCCC).

For this reason, and also based on new scientific evidence, the Conference of the Parties (COP — the supreme body of the UNFCCC), at its first session in 1995, judged that the existing commitments under the Convention were inadequate and decided to initiate negotiations for a protocol or other legal instruments to strengthen the emission limitation commitments of industrialised countries. This was the so-called “Berlin Mandate.” The result of these negotiations was the Kyoto Protocol, adopted by the third Conference of Parties (COP-3) on December 12, 1997. The Kyoto Protocol commits so called Annex I countries to collectively reduce their overall emissions of greenhouse gases by at least 5.2 percent below 1990 levels in the commitment period 2008-12 and contains an Annex B listing the quantitative emission limitation and reduction commitments for each individual party as shown in Table 12.

A key element of the Kyoto Protocol is the provision for three new international mechanisms that allow transfers of emission rights or credits among parties (the so-called “flexibility mechanisms”) in the time frame of 2008-2012. These mechanisms were included in the Protocol based on one of the UNFCCC principles, which called for cost-efficient global policies for greenhouse gas reduction. Since marginal abatement costs are in most cases much higher in industrialised countries than in EITs or developing countries, the three flexibility mechanisms are intended to enable international trading of greenhouse gases. Each of the three mechanisms provides for exchanges of a different type, between different sets of countries and using a different type of unit to denote the emissions or emission reductions being exchanged:

- *Joint implementation* (Art. 6), referred to as “JI”: Any party included in Annex I may transfer to, or acquire from, any other such party emission reduction units resulting from projects aimed at reducing anthropogenic greenhouse gas emissions by sources or enhancing anthropogenic removals by sinks of greenhouse gases in any sector of the economy.
- *Clean development mechanism* (Art. 12), referred to as “CDM”: Parties included in Annex I may use the certified emission reductions accruing from CDM project activities to contribute to compliance with part of their emission reduction commitments under Art. 3.
- *International emission trading* (Art. 17), referred to as “IET”: The parties included in Annex B may participate in emissions trading for the purposes of fulfilling their commitments under Art. 3.

In addition, the joint fulfilment of QELRC commitments (formation of “bubbles” of a group of countries) is permitted by the Kyoto Protocol. For the first commitment period (2008-2012), it is likely that only the

BOX 7

Glossary related to the Kyoto mechanisms

Annex I	Annex I to the UNFCCC contains a list of industrialised country parties that have special commitments to limit their emissions of greenhouse gases under the Convention (i.e. the 24 original OECD countries, the EC and 11 countries undergoing the process of transition to a market economy).
Annex II	Annex II to the UNFCCC lists the original 24 OECD member countries and the European Community. These industrialised countries have additional financial obligations under the Convention.
Annex B	Annex B to the Kyoto Protocol lists those 39 (currently industrialised) countries that have taken on quantified emission limitation and reduction commitments (QELRCs) under the Protocol.
CDM	Clean Development Mechanism: defined under Art. 12 of the Kyoto Protocol; permits (among other things) the acquisition by Annex I Parties of certified emission reduction credits (CERs) accruing from project activities in developing countries to contribute to compliance with part of their QELRC commitments under Art. 3.
COP	Conference of Parties: supreme body of the Convention consisting of all parties to the UNFCCC.
flexibility mechanisms or Kyoto mechanisms	New, international economic instruments under the Kyoto Protocol, that allow transfers/ acquisitions of credits, for climate change mitigation, and of emission allowances among various groupings of Protocol Parties: emission "bubbles" for groups of parties (Art. 4), joint implementation (Art. 6), clean development mechanism (Art. 12), international emission trading (Art. 17).
GHGs	Greenhouse gases: those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation. GHGs regulated under the Kyoto Protocol include: CO ₂ , CH ₄ , N ₂ O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and SF ₆ .
IET	International emission trading: transfer or acquisition of parts of assigned amounts under Art. 17 of the Kyoto Protocol.
JI	Joint Implementation: transfer or acquisition of emission reduction units (ERUs) resulting from climate change mitigation projects under Art. 6 of the Kyoto Protocol.
KP	Kyoto Protocol: adopted in Kyoto on Dec. 12, 1997.
QELRC	Quantified emission limitation and reduction commitment.
sink	Any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere.
UNFCCC	United Nations Framework Convention on Climate Change: adopted in New York on May 9, 1992; entered into force on March 21, 1994.

Source: Klarer, Swisher, Kolehmainen (1999)

European Union (EU) will make use of this possibility.

These flexibility mechanisms are generally only anchored in the Protocol, without fixed rules regarding their implementation. COP-4, which took place in 1998 in Buenos Aires, agreed on a work plan addressing the key technical, methodological and institutional issues surrounding these three mechanisms. It is expected that COP-6 (planned to take place in the end of the year 2000) will decide on the detailed rules for each of the three instruments. At present, some of the most controversial issues surrounding the flexibility mechanisms include:

- introduction of possible “supplementarity” limits (some parties want to fix a certain percentage of emission reductions that has to be achieved via domestic mitigation rather than allowing a country to achieve the QELRC fully through the flexible mechanisms);
- rules and sanctions for delinquent parties that do not comply with the Kyoto Protocol and especially its QELRCs;
- definition of rules for private sector involvement in the flexible mechanisms;
- accuracy of inventory or project related monitoring data, as well as procedures for their certification and verification;
- need for international control mechanisms and institutions;
- supply of “hot air,” i.e., the amount by which a country’s Kyoto target may exceed actual emissions in the commitment period if climate change policies are not implemented (some experts fear that international trading of “hot air” from countries like Russia and Ukraine may substantially contribute to some investor countries achieving their QELRC without any reduction of greenhouse gases);
- eligibility under CDM of certain carbon sink projects (e.g., afforestation);

- timing of implementing the flexible mechanisms (the Kyoto Protocol only foresees that CDM *can* be operational from 2000; the timing for JI and IET is yet largely unclear).

It should be noted that it will be possible to implement the flexible mechanisms only after the Kyoto Protocol has actually entered into force. The conditions for the Protocol to enter into force are that: a) 55 countries ratify the Protocol (out of the 175 countries that signed and ratified the UNFCCC), including b) industrialised countries, which as a group have caused at least 55 percent of the total industrialised countries’ greenhouse gas emissions in 1990 ratify the Protocol. Many climate negotiators believe these conditions will be fulfilled. However, one of the key questions will be whether the US, as the largest emitter of greenhouse gases, will ratify the Protocol (emission projections suggest that the USA would need to reduce current emissions by as much as 40 percent below their projected “business as usual” emission levels in order to reach its Kyoto QELRC).

Greenhouse gas emission trends and reduction potential in CEEC and NIS

CO₂ emissions (CO₂ is the main greenhouse gas) in CEEC and NIS all decreased sharply after 1990, as these countries began the process of economic restructuring and reconstruction. Nevertheless, the relatively high energy intensity of these economies, compared to Western countries, and the high carbon intensity of their energy supply systems, is expected to lead to substantial growth in carbon emissions up to the first commitment period of the Kyoto Protocol. Thus, the key challenge for these countries is to de-couple greenhouse gas emissions from GDP growth in a sustainable way. The key factors influencing future CO₂ emission patterns include GDP growth, level of economic restructuring and the structure and development of the energy demand and supply sectors.

In recent studies, CO₂ emission projections in EITs up to the Kyoto Protocol commitment period 2008-2012 have been carried out. Since quantifying the development of factors such as GDP growth, energy consumption and economic restructuring over a period of 10-15 years necessarily involves substantial uncertainties, such projections should be interpreted with caution. Nevertheless, a recent study by the World Bank and the Swiss and Finnish Governments (Klarer, Swisher, Kolehmainen 1999) reported the following results for four EITs — indicating the potential for greenhouse gas trading also for other CEEC and NIS:

“In ‘business as usual’ scenarios²⁷ with high economic growth, the Kyoto QELRCs will be reached or exceeded in 2008-2012 in the Czech Republic, the Slovak Republic and Russia (these are all Annex I countries qualifying for JI and IET). In Uzbekistan, which qualifies as a CDM country (non-Annex I), there will be steep emission growth if no measures are taken. In ‘business as usual’ scenarios with lower economic growth assumptions, CO₂ emissions in 2010 will be 5-8 percent below the Kyoto QELRCs in Slovakia, Czech Republic and Russian Federation; and in Uzbekistan, CO₂ emissions will be 20 percent above 1990 levels in 2010. These ‘business as usual’ projections suggest that a modest amount of emission allowance trading may be possible, based on the 2008-2012 emissions falling short of the QELRC levels. However, the volume of emission reduction units available for trade can be significantly increased through implementation of domestic reduction measures and participating in the JI or CDM mechanisms: The national-level emission-mitigation scenarios for the Czech Republic, Slovakia and Russia suggest reductions of up to 10-15 percent from the baseline scenario emissions (in Uzbekistan up to 25 percent) in 2010, based on a variety of mitigation measures, such as increased energy prices/taxes and subsidy

TABLE 12

Quantitative Emission Limitation and Reduction Commitments (QELRCs) for each individual party of the Kyoto Protocol

<i>QELRC commitment (% of base year/period emissions)</i>	<i>Party</i>
110	Iceland
108	Australia
101	Norway
100	New Zealand, Russian Federation, Ukraine
95	Croatia
94	Canada, Hungary, Japan, Poland
93	USA
92	EC and each of its member states, Bulgaria, Czech Republic, Estonia, Latvia, Liechtenstein, Lithuania, Monaco, Romania, Slovakia, Slovenia, Switzerland

Source: Kyoto Protocol / UNFCCC Secretariat

removal, the introduction of a CO₂ tax, as well as specific technology measures in the energy and agriculture sectors (e.g., fuel switch, energy efficiency, renewable energy, afforestation etc.).”

Market potential for flexible mechanisms in the first commitment period 2008-2012

Various recent studies²⁸ have attempted to estimate the market potential, that is the possible flows of money, induced by the flexible mechanisms in the first commitment period of 2008-2012. Of course, this is an extremely difficult task and many unknown factors may affect these estimations in the real world situation. Some of these factors include: Some key modalities and actual rules for the flexible mechanisms are not yet decided upon;

the influence of competition between the three mechanisms, especially the influence on market clearing prices of CDM (non-Annex D) on JI and IET; possible assumptions on “supplementarity”; the size of greenhouse gases’ marginal abatement costs in CDM and Annex I host countries and willingness to pay in investor countries; host countries’ investment climate in case of the project based mechanisms JI and CDM; human and institutional capacities in host countries and on the international level to implement greenhouse gas trading; degree of private sector involvement in the project based mechanisms; etc.

Nevertheless, the above mentioned studies have tried to estimate the market potential by modelling various scenarios along the lines of the above mentioned uncertainties. Clearly, results have to be interpreted with great caution. Results suggest that some USD 10-20 billion could flow through the operation of JI, CDM and IET in the first commitment period of 2008-2012. The flow of money would be from highly developed Western countries to CEEC and NIS as well as developing countries (note that according to the Kyoto Protocol these flows of money have to occur alongside to official development aid). Apart from financial gains, CEEC and NIS would simultaneously profit from additional positive environmental side-effects and local economic and social gains caused by the implementation of greenhouse gas reduction projects.

The Kyoto flexible mechanisms would be the first international economic instruments ever implemented. While they could contribute to address the problem of climate change on the global level in a substantial way, for CEEC and NIS they could bring about not only substantial foreign investments, particularly in the energy sector, but could also help in modernising industrial technologies and in more sustainable economic restructuring. Much work, however, remains to be done to realise such potential gains, both on international and national levels.

Chapter 4: Recommendations

Economic instruments cannot, and do not, function in a vacuum, nor are they “self-implementing”; certain pre-conditions must exist for them to be considered viable policy options. The economy in which economic instruments are set must feature (or be making real progress toward) important characteristics of a free-market, such as well defined property rights, private enterprises as the pervasive norm (rather than exception) and price liberalisation. Moreover, a basic level of institutional capacity must exist, e.g. within the relevant environmental policy and enforcement agencies, to support the design and implementation of the instruments. Such pre-conditions are firmly in place in many CEEC/NIS and some of these same countries already have complex systems of economic instruments. Other countries are still working to achieve these conditions. In both CEEC and NIS the transition period provides a window-of-opportunity, if not a need, for innovative policy reform and the development and introduction of new, more market-based policy instruments. Given the potential for economic instruments to help countries achieve declared environmental goals in the most cost-effective manner while also enhancing economic efficiency, all stakeholders concerned with environmental protection and economic development will have a role to play vis-à-vis the following recommendations.

Make greater use of economic instruments to more fully capture the benefits they offer

Although economic instruments must be integrated into a broader “policy package,”

they offer a number of comparative advantages over other policy options (as elaborated in Chapter 2). The role to be played by economic instruments vis-à-vis other policy options should result from evaluation of the overall policy package and be based on a consultative process involving all major stakeholders. As noted above, the dynamic events occurring in the transition period create a tremendous scope (and need) for new and more effective policy instruments. Notwithstanding the numerous, and sometimes daunting, challenges posed by the reform process now underway, opportunities for improving existing economic instruments and introducing new ones abound.

Take advantage of opportunities for introducing new economic instruments

Most CEEC/NIS countries inherited systems of pollution charges and fines from the era of centralised planning; these systems have undergone (and are undergoing) at least some level of reform in most countries. Other, new instruments promise additional benefits. Taxes or charges on products having negative environmental impacts are one such option already put into effect in some countries: Hungary and Latvia have successfully implemented charges on various products (see Table 2), while Slovenia has recently introduced a CO₂ tax. The application of “green” taxes may get a boost from recent developments in EU policy, which appear to be attaching greater significance to them. Developments associated with the Kyoto Protocol on Climate Change are also likely to raise the

BOX 8

A Checklist for the successful implementation of economic instruments

Pre-implementation studies investigating the potential effects of the policy package, in particular the calculation of the abatement costs in each sector, equity implications and the benefits and costs of improving eco-efficiency.

In case of environmental taxes/charges: early and greater involvement of tax/fiscal authorities.

Extensive consultations with stakeholders and the public.

Early announcement of the economic instrument.

Introduction of economic instruments within a policy package of complementary measures.

Gradual imposition of the instrument (e.g. phased-in charge/tax rate).

Recycling of revenues to:

- charge/tax (e.g. for environmental measures, via rebates or investment incentives);
- provision of information and training;
- related environmental sectors (e.g. some revenues of a waste tax going to the waste sector);
- reduce other taxes such as taxes on labour.

Increasing incentive effect, via:

- gradually increasing the real price signal over longer periods;
- gradually reducing exemptions.

Evaluation measures designed into the administration of the economic instrument.

Source: Adapted from EEA (1996)

appeal of economic instruments, particularly those related to greenhouse gas emissions, such as emissions trading. Box 8 provides a checklist of important points to be considered in the design and implementation of new economic instruments.

Ensure that the objective(s) of economic instruments are clearly and explicitly specified

As tools of environmental policy, the environmental objectives of each instrument, and how those objectives will be achieved, should be clearly spelled out by those promoting the instrument and in its enabling legislation or directive. The extent to which an instrument's objective is to raise revenue, rather than, or in addition to, providing a direct incentive to change polluting behaviour, and the use of the revenues should also be specified. Establishing clear objectives will help

make an instrument more understandable and, hopefully, acceptable to those affected as well as providing a sound basis for future evaluation of the instrument.

Economic instruments currently in effect should be systematically evaluated

It is widely understood that many economic instruments in CEE and NIS countries generate revenues; however, little is known about the "front end" incentive effect of such instruments (e.g. charges, taxes), despite the fact that this is stated as an official objective of most economic instruments. Do such instruments really encourage polluters to change their behaviour? Or, is their sole practical function to raise revenue? Robust answers to these questions would have important implications for the design and implementation of economic instruments and suggest options

for improving them. Economic instruments should generally be evaluated according to the criteria suggested by OECD: environmental effectiveness; economic efficiency; administration and compliance costs; dynamic effects (innovation); and soft effects (capacity building, awareness raising).²⁹ Given the evolving economic and environmental circumstances in the region, regular evaluation would provide useful feedback for modifying and adapting the instruments to their changing context. The effects of economic instruments that extend beyond the environmental sphere should also be periodically assessed (e.g. distributional effects on different segments of society, impacts on competitiveness).

Strengthen existing economic instruments

It may sometimes be more effective and feasible to improve existing economic instruments than to introduce entirely new ones. For example, the base rates of many environmental charges and fines in CEEC/NIS are low (see Section 3.1.2.), far too low to provide either meaningful incentives to reduce pollution or to generate substantial revenues. Though concerns about the “ability to pay” can be legitimate, experience in the region shows that high charge rates can be implemented successfully without adversely affecting economic development (see the example of Poland in Section 3.1.2.). Similarly, the implementation of a number of economic instruments in CEEC/NIS suffers from unnecessarily complicated and heavy administrative burdens. These burdens could be significantly lessened by: reducing the overall number of pollutants subject to charges and fines, simplifying the methodologies for calculating charge amounts and involving fiscal (i.e. tax) authorities in the collection of payments.

Involve key stakeholders early in the design and implementation of economic instruments

The constructive involvement of key interest groups will ultimately lead to more effectively designed and implemented economic instruments. While environmental authorities might take the initiative in reforming or introducing new instruments, it will be particularly important to engage ministry of finance officials early in the process, especially if any of the revenues to be generated will be earmarked for special purposes. This obliges environmental authorities to be able to communicate with finance officials and other stakeholders in a “common language” and to persuasively demonstrate the benefits of economic instruments to people who are not environmental specialists. These other stakeholders will include (at a minimum) members of other ministries, parliament, industrial groups and environmental citizens’ organisations — the latter of which may be very helpful in building public and political support for economic instruments.

Review the earmarking of revenue generated by economic instruments and its use

Revenue raising appears to be the *de facto* primary function of many economic instruments in CEEC/NIS; much (if not most) of this revenue is earmarked for environmental protection purposes and administered by environmental funds. Earmarking raises a number of legitimate concerns (see Section 3.1.1.), often cited by ministries of finance. These concerns require well-reasoned responses from the proponents of earmarking. The dominant function of most economic instruments as revenue raising mechanisms requires that any evaluation of their environmental effectiveness must include an evaluation of how that revenue is used, i.e. an evaluation of environmental funds. Though funds have been endorsed as potentially effective mechanisms for financing

environmental protection during the transition period (provided they meet certain conditions as specified in the St. Petersburg Guidelines), they are not without their potential drawbacks, and careful design and management of the funds is essential for them to realise their potential. Countries preparing for EU accession will also have to ensure that any subsidy schemes for environmental protection (e.g. funds) comply with the EU's Guidelines on State Aid for the Environment and competition laws.

Environmentally harmful subsidies should be reduced or eliminated

Though subsidies of many sorts have been substantially reduced as budgets have come under strain and economic reform has progressed, significant state aid continues to flow to activities and industrial sectors which have detrimental environmental impacts. This is particularly the case with economic sectors such as energy, heavy industry, transport and agriculture, which formed the backbone of CEEC/NIS economies under centralised planning. Even relatively small reductions in such subsidies can result in important environmental gains. However, the important economic and social role played by such sectors should be taken into account, implying a gradual reduction of subsidies with appropriate provisions made for assisting those most seriously affected.

Establish "green budget" commissions to spearhead more environmentally sustainable economic and fiscal reform

Experience in some OECD countries has shown such commissions to be effective in integrating environmental concerns into economic development and making fiscal policies both more environment-friendly and economically sound. Typically involving representatives from the major government and non-government stakeholders, these commissions have helped countries

like Norway, Sweden, Denmark, Belgium and the Netherlands shift tax burdens from public "goods" (e.g. labour, income) to public "bads" (e.g. pollution and resource consumption) and to reform environmentally harmful subsidy schemes. Given the renewed interest being expressed in "green" taxes by the European Commission and their potential role in helping countries meet obligations under the Kyoto Protocol, the establishment of green budget commissions in CEEC/NIS would be very timely.

Chapter 5: References and Further Reading

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Annex I: Selected Socio-Economic Indicators for CEE and NIS Countries

	UNIT	B&H	BUL	CRO	CZE
Population	mIn	4.1	8.3	4.5	10.3
Area	1000 km ²	51	111	56	79
GDP 1991-7 (% change)	%	...	-30.5	-18.2	-0.8
GDP 1997 (% change to previous year)	%	39	-6.9	6.5	1.0
GDP per capita, real, 1997	USD	1,087	1,227	4,267	5,050
GNP per capita at PPP, '97	USD	...	3,860	...	11,380
Private sector, share in GDP in mid-1998	%	35	50	55	75
Agriculture sector, share in GDP in 1997	%	...	25.9	10	4.8
Industry sector, share in GDP in 1997	%	...	29.4	24	35.0
Inflation 1996 (annual average)	%	...	123	3.5	8.8
Inflation 1997 (annual average)	%	...	1082	3.6	8.5
Average monthly wages, 1997	USD	...	105	605	340
Unemployment 1997 (% of labour force)	%	...	13.7	17.5	5.2

	UNIT	ARM	AZE	BEL	GEO
Population	mIn	3.7	7.6	10.2	5.4
Area	1000 km ²	28	87	207	70
GDP 1991-7 (% change)	%	-58.9	-55.1	-26.7	-63.6
GDP 1997 (% change to previous year)	%	3.1	5.8	10.4	11.0
GDP per capita, real, 1997	USD	435	509	1,314	968
GNP per capita at PPP, '97	USD	2,280	1,520	4,840	1,980
Private sector, share in GDP in mid-1998	%	60	45	20	60
Agriculture sector, share in GDP in 1997	%	30.1	20.0	15.0	28.2
Industry sector, share in GDP in 1997	%	25.2	24.8	37.4	9.6
Inflation 1996 (annual average)	%	18.7	19.7	53	39.4
Inflation 1997 (annual average)	%	14.0	3.5	64	7.3
Average monthly wages, 1997	USD	79 ¹	...
Unemployment 1997 (% of labour force)	%	10.7 ²	19.3	2.8 ²	5.2

Abbreviations: "... " = data not available; "LC" = local currency; "PPP" = purchase power parities; "ARM" = Armenia; "AZE" = Azerbaijan; "BEL" = Belarus; "B&H" = Bosnia and Herzegovina; "BUL" = Bulgaria; "CRO" = Croatia; "CZE" = Czech Republic; "EST" = Estonia; "GEO" = Georgia; "HUN" = Hungary; "KAZ" = Kazakhstan; "KYR" = Kyrgyzstan; "LAT" = Latvia; "LIT" = Lithuania; "MOL" = Moldova; "POL" = Poland; "ROM" = Romania; "RUS" = Russian Federation; "SR" = Slovak

ANNEX I: SELECTED SOCIO-ECONOMIC INDICATORS FOR CEE COUNTRIES

EST	HUN	LAT	LIT	POL	ROM	SR	SLO
1.5	10.1	2.5	3.7	38.7	22.5	5.4	2.0
45	93	64	65	313	238	49	20
-20.1	-6.1	-45.5	-35.9	26.3	-12.9	-2.1	3.8
11.4	4.6	6.5	5.7	6.8	-6.6	6.5	3.8
3,230	4,462	2,211	2,581	3,512	1,549	3,624	9,101
5,010	7,000	3,650	4,510	6,380	4,290	7,850	12,520
70	80	60	70	65	60	75	55
6.3	7	7.2	12.8	6.0	18.8	4.8	3.9
19.4	24	21.3	24.4	27.1	35.6	28.2	28.7
23	23.6	17.6	24.7	19.9	38.8	5.8	9.9
11	18.3	8.4	8.9	14.9	154.8	6.1	8.4
257	308	219	207	320	87	283 ¹	920
10.5	10.4	7.0	5.9	10.5	8.8	11.6	14.4

KAZ	KYR	MOL	RUS	TAJ	TUR	UKR	UZB
15.7	4.6	4.3	147.2	6.1	4.7	50.9	23.6
2,671	192	33	16,889	141	470	579	414
-36.9	-44.2	-64.1	-39.6	-59.5	-58.8	-61.4	-14.6
2.0	6.5	1.3	0.8	1.7	-26.0	-3.2	2.4
1,434	366	504	3,056	179	390	976	611
3,290	2,040	...	4,190	930	1,410	2,170	2,450
55	60	45	70	30	25	55	45
10.8	43.4	30	9.7	27.6	19.8	6.0	29
20.4	15.5	29	42.5	19.5	44.3	34.0	19
39.1	30.4	23.5	47.8	418	992	80	54
17.4	25.5	11.8	14.7	87.8	84	16	72
173	49 ¹	81	175	82 ¹	...
4.1 ²	3.2 ²	1.6	10.9	2.9 ²	...	2.3	0.4 ²

Republic; "SLO" = Slovenia; "TAJ" = Tajikistan; "TUR" = Turkmenistan; "UKR" = Ukraine; "UZB" = Uzbekistan

Notes: 1) Wages refer to industry. 2) Officially registered unemployment only.

Sources: EBRD (1998), except: 'GNP per capita' data from World Banks' World Development Report 1998/99.

Endnotes

- 1 The abbreviation "CEE" is used for Central and Eastern Europe (CEEC = CEE countries) in this report and includes the following countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, FYR Macedonia, Poland, Romania, Slovakia, Slovenia and Yugoslavia. From this list, the following ten countries are EU Accession countries: Czech Republic, Estonia, Hungary, Poland, Slovenia and Bulgaria, Latvia, Lithuania, Romania and Slovakia. The abbreviation "NIS" is used for Newly Independent States and includes the following countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, the Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. The abbreviation "EITs" is used for economies in transition and includes both CEEC and NIS.
- 2 It is not the aim of this report to analyse and describe the changes in the state of environment in the region in detail. The interested reader will find more detailed information in related publications of your ministry of environment or other national/local environmental institutions (state of the environment reports; national environmental strategies or action programs) and in international reports. For state of the environment reports with internationally comparable data see for instance: 1) European Environment Agency (1995): *Europe's Environment — The Dobris Assessment*. EEA, Copenhagen. 2) European Environment Agency (1998): *Europe's Environment — The Second Assessment*. EEA, Copenhagen. 3) The series "Environmental Performance Reviews" published by OECD, Paris — among the transition countries that were recently examined were: Poland, Bulgaria, Estonia, Belarus, Slovenia, the Czech Republic and the Russian Federation. 4) OECD/EAP Task Force (1999, forthcoming).
- 3 For details see the cost estimation study prepared for the European Commission by EDC/EPE 1997.
- 4 For a more detailed overview of environmental policy development in CEEC and the NIS in the first years of transition, see: OECD/EAP Task Force (1999, forthcoming).
- 5 Panayotou (1998) differentiates on the term "polluter": "Mistakenly, polluters are thought to be the producers of goods and services; however, consumers are indeed the ultimate polluters since, without demand, the polluting products would not be produced in the first place. In practice, the pollution control costs are shared between producers and consumers according to the elasticity of demand for the polluting product in question. Another misconception of conventional wisdom is that the private sector is the most important, if not the exclusive, source of pollution and environmental degradation while governments are viewed mainly in the role of environmental regulators. In reality, governments and state enterprises are themselves major sources of pollution and environmental degradation, either directly through public production, consumption and investment, or indirectly through subsidization of polluting activities and other misguided policies."
- 6 Information is based on OECD (1996), EEA (1995) and EEA (1998).
- 7 In: *Towards Sustainability — a European Community Programme of Policy and Action in Relation to the Environment and Sustainable Development, Vol. II*, COM (92)23 final, European Commission, Brussels.
- 8 From: *European Commission, Communication on Economic Growth and the Environment. — Some Implications for Economic Policy Making*, COM (94) 465 final.
- 9 From: *European Commission, Communication on Environmental Taxes and Charges in the Single Market*, COM(97) 9 final. This Communication contains, among others, a review of areas where environmental taxes and charges may conflict with other Community policies and regulations, in particular related to the Single Market. There are also guidelines for legislators to avoid conflict with Community policies and regulations.
- 10 Source: OECD/EAP Task Force questionnaire for the "Survey on the Use of Economic Instruments for Pollution Control and Natural Resources Management in the New Independent States." Mimeo, EAP Task Force, May 1999.
- 11 The OECD classification (Publication Revenue Statistics) defines taxes as "compulsory, unrequited payments to general government. Taxes are unrequited in the sense that benefits provided by government to taxpayers are not normally in proportion to their payments." The term "general government" is defined as "supra-national authorities, the

central administration and the agencies whose operations are under its effective control, state and local governments and their administrations, social security schemes and autonomous governmental entities, excluding public enterprises." Note that a tax can be earmarked if it is decided that a certain percentage of the revenue will be affected to a specific purpose (e.g. when part of the gasoline tax is earmarked for building roads). The OECD classification also uses the terms "fees" and "charges" (as opposed to "taxes") and "levies" without giving a precise definition of these terms. In practice, the terms "charges" and "fees" are often used interchangeably and are defined as compulsory required payments to either general government or to bodies outside general government, such as for instance an environmental fund or a water management board. The general term "levy" could be construed as covering all types of compulsory payments. Note that, according to the OECD classification there are "borderline cases" where a levy could be considered as "unrequited," i.e. as a "tax" (if the payment is made to "general government") as opposed to a charge or fee (for instance, in a case where the levy greatly exceeds the cost of providing the service or where government is not providing a specific service in return for the levy). Source: OECD/EAP Task Force questionnaire for the "Survey on the Use of Economic Instruments for Pollution Control and Natural Resources Management in the New Independent States." Mimeo, EAP Task Force, May 1999.

- 12 See, for instance, Daly (1996). Panayotou (1998) is focusing fully on the role of economic instruments for motivating and financing sustainable development.
- 13 See Keating / Center for Our Common Future (1993) for a plain language version of Agenda 21.
- 14 See, for instance: *Commission of the European Communities: Community Guidelines on State Aid for Environmental Protection*. (94/C/72/03); or, *Commission of the European Communities: EC Communication: Environmental Taxes and Charges in the Single Market*. COM(97) 9 final, March 26, 1997.
- 15 Modified after Panayotou (1998).
- 16 According to the World Business Council for Sustainable Development (WBCSD), "eco-efficiency" refers to the efficiency with which environmental resources are used to meet human needs. OECD defines: "Eco-efficiency is reached by the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life-cycle to a level at least in line with the earth's estimated carrying capacity."
- 17 Source: EEA (1996) as cited from European Commission (1993): *Delors' White Paper on Growth, Competitiveness and Employment*.
- 18 Unless otherwise noted all information in section 3.1. is based on Klarer, McNicholas (1999). This publication offers a detailed review on the use of economic instruments in CEE countries.
- 19 See European Commission, *Communication on Environmental Taxes and Charges in the Single Market*, COM(97) 9 final for a review of areas where environmental taxes and charges may conflict with Community policies and regulations.
- 20 Information on full cost pricing is adapted from Panayotou (1998).
- 21 Very little research on the environmental effects of economic subsidies in CEE and NIS countries has been carried out to date. The text in this section is based on one of the few studies available: van Beers and de Moor (1998).
- 22 Information on Almaty emission trading was provided by Alexander Golub.
- 23 Table 9 shows a selection only of environmentally relevant taxes and charges currently in force in Western countries. For example, there are additional taxes in force on energy products (excise taxes and VAT), transport related taxes (import taxes, sales taxes, registration fees and other taxes). There are also numerous charges in force for natural resource management (water, fisheries, forestry, wetlands, land/soil, nature species/wildlife) in Western countries. The interested reader will find more detailed information on these instruments, as well as other types of instruments discussed in section 3.2 in a forthcoming publication of OECD (see www.oecd.org): *Economic Instruments for Pollution Control and Natural Resources Management in OECD Countries: A Survey*. See also Speck (1999a).
- 24 The interested reader will find more information on other environmental charges and taxes that have been evaluated in: Ekins and Speck (1999b), EEA (1996), Speck (1999b) and OECD (1997b). The information provided here is largely based on EEA (1996) and Speck (1999a).
- 25 Information on the US SO₂ emission trading program was provided by Alexander Golub.
- 26 See OECD's forthcoming publication *Economic Instruments for Pollution Control and Natural Resources Management in OECD Countries: A Survey* for more details on current performance bond and liability payment systems.
- 27 See Klarer, Swisher, Kolehmainen (1999) for details.
- 28 See, for instance, the following sources for details: Klarer, Swisher, Kolehmainen (1999). Michaelowa A. (1999): *CDM and JI — Which Instrument is Likely to Have a Higher Impact?* mimeo. Hamway R. and Baranzini A. (1999): *Sizing the Global GHG*

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Ellerman A.D. and Decaux A. (1998): *Analysis of Post-Kyoto CO₂ Emissions Trading Using Marginal Abatement Curves*. MIT Joint Program on the Science and Policy of Global Change. Holtsmork B. (1998): From the Kyoto Protocol to the Fossil Fuel Market. University of Oslo / CICERO, Working Paper 1998:9. Victor D., Nakicenovic N., Victor N. (1998): *The Kyoto Protocol Carbon Bubble — Implications for Russia, Ukraine and Emissions Trading*. IIASA Interim Report IR-98-094.

- 29 See OECD (1997b) and Ekins, Speck (1999b) for useful information on the evaluation of economic instruments.