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**PROGRESS IN THE IMPLEMENTATION OF THE AARHUS
POLICY STATEMENT ON ENVIRONMENTAL MANAGEMENT
IN ENTERPRISES: CENTRAL AND SOUTH EASTERN EUROPE**

submitted by

The Regional Environmental Center for Central and Eastern Europe
through the Ad Hoc Working Group of Senior Officials

BACKGROUND DOCUMENT



UNITED NATIONS
ECONOMIC COMMISSION FOR EUROPE

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List of Abbreviations

ABEI	Aarhus Business and Environment Initiative
BAT	Best Available Techniques
BERCEN	Balkan Environmental Regulatory Compliance and Enforcement Network
CEE	Central Eastern Europe: the Czech Republic, Hungary, Poland, Slovakia and Slovenia
CETE-5	The Central European Transition Economies of the Czech Republic, Hungary, Poland, Slovakia and Slovenia
CEU	Central European University
CG	Challenge Grants
CP	Cleaner Production
CR	Corporate Responsibility
CSP	Country Strategy Paper
DANCEE	Danish Cooperation for Environment in Eastern Europe
EAP	Environmental Action Programme
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EECCA	Eastern Europe, Caucasus and Central Asia: the formerly called NIS (Newly Independent States) or CIS (Commonwealth of Independent States) or G12
EESD	Energy, Environment and Sustainable Development
EIB	European Investment Bank
EM	Environmental Management
EMAS	Eco-management and Audit Schemes
EME	Environmental Management in Enterprises
EPA	Environmental Protection Agency
EPCEM	European Postgraduate Course in Environmental Management
EPE	European Partners for the Environment
ERA	European Research Area
ERT	European Round Table for Industrialists
ESCO	Energy Service Company
ET	Environmental Technology
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GEF	Global Environmental Facilities
GTN	Global Technology Network
IFC	International Financial Corporation
IFIs	International Financial Institutions
IIE	Institute of International Education
IMPEL	(Network for the) Implementation and Enforcement of Environmental Law
INEM	International Network for Environmental Management
IPPC	Integrated Pollution Prevention and Control
ISO	International Standardisation Organisation
MAP	Mediterranean Action Plan
MIP	Multi-Annual Indicative Programme
MUNEE	Municipal Networks for Energy Efficiency
NAESCO	National Association of Energy Service Companies
NCPCs	National Cleaner Production Centers
NEFCO	Nordic Environment Finance Corporation
NGO	Non-Governmental Organisation
NIB	Nordic Investment Bank
NIS	Newly Independent States (now EECCA)

OECD	Organisation for Economic Cooperation and Development
PP	Pollution prevention
PPP	Polluter pays principle
PPS	Purchase parity standardisation
PRTR	Pollution release and transfer registers
QRA	Quick Response Awards
R&D	Research and development
REC	The Regional Environmental Center for Central and Eastern Europe
RENEUER	Regional Network for the Efficient Use of Energy Resources (SEE)
RET	Renewable energy technology
SAP	Stabilisation and association process
SD	Sustainable development
SEE	South Eastern Europe: the Balkan States of Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Serbia and Montenegro (including Kosovo/a), FYR Macedonia and Romania
SETE-7	South Eastern European Transition Economies (SEE) of Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Serbia and Montenegro (including Kosovo/a), FYR Macedonia and Romania
SIDA	Swedish International Development Agency
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organisation
USAID	US Agency for International Development
USDOC	U.S. Department of Commerce
VOC	Volatile organic compounds
WBCSD	World Business Council for Sustainable Development

Foreword

As part of the “Environment for Europe” process since 1993, the EAP Task Force has sought to integrate environmental considerations into the transition to democratic, market-based societies in Central and South Eastern Europe and Eastern European Caucasian and Central Asia (EECCA). This report examines the development of environmental management in enterprises since 1998 across Central and South Eastern Europe.

Robert L. Nemeskeri prepared this report with the valuable assistance of Peter Bodo and Roman Vyhnanek, all of whom work for the Regional Environmental Center for Central and Eastern Europe (REC). This paper complements a similar report that the OECD/EAP Task Force secretariat prepared for the EECCA region, and draws upon the structure and concepts used in that report. Credit is due to all organisations and persons who have invested substantial time and effort in collecting and disclosing the information utilised in this report. The author wishes to thank the donors who supported the initiative and development of this publication, namely DG Environment, the Danish Environmental Protection Agency, the Finnish Ministry of Environment, and the Government of Flanders, Belgium.

This report reflects the views of the REC/EAP Task Force Secretariat and not necessarily those of the REC, the EAP Task Force or their members.

Executive Summary

In their *Policy Statement on Environmental Management in Enterprises*, adopted at the Aarhus “Environment for Europe” conference in 1998, ministers invited the EAP Task Force to prepare a report for their next meeting, to assess progress in the implementation of the Policy Statement. This report responds to the invitation. It provides a broad-based overview of progress in implementing the Policy Statement since Aarhus. It uses the thematic structure provided in the Policy Statement, focusing on the general framework conditions that enterprises operate under, characterised by (a) the economic and (b) environmental policy frameworks, as well as on (c) key activities to build capacities and promote environmental management in enterprises (EME), such as education, institutional arrangements, environmental management systems, business partnerships and financial mechanisms. The main results from the report are briefly summarised below.

The Aarhus Policy Statement on EME, in which environment ministers committed to catalyse, facilitate and strongly support the implementation of effective EME in CEE, the Baltics, SEE and EECCA, has resulted in a notable increase in support for environmental management. However, this increase has been at least as much the result of market pressures as of local government support. The efforts of local governments in following up the adoption of the Aarhus Policy Statement have been limited. International donors, investors and business operators have contributed significantly to improving environmental performance in CEE and the Baltics. These entities have also started to slowly improve production practices in SEE.

There is a significant difference between the levels of development (and thus between economic and environmental performance) in the CEE, Baltic and SEE economies. Bulgaria and Romania, in the group of EU accession countries but situated in the Balkan Peninsula, lag behind other accession countries.

Economic and political framework conditions have benefited the development of EME in CEE and the Baltics, while in SEE these conditions have generally remained unfavourable. However, some progress has been achieved in a general economic context and in enterprise reform in SEE, with perhaps the exception of Croatia. The development in SEE is still overshadowed by a depressed investment climate that prevents the modernisation of productive capital, and a backlog of reforms in the utility sector that prevents the removal of tariff subsidies that provide perverse incentives for the inefficient use of natural resources.

In CEE and the Baltics the environmental policy framework, its motivation and incentives are relatively well developed, although there is still much to be done in terms of efficient enforcement and compliance promotion. Meanwhile environmental management supporting policies are only now being developed in SEE. The weakness of enforcement and compliance promotion systems and/or ineffective economic instruments and insufficient measures to support enterprises in achieving compliance tend not to encourage EME. As a result, non-compliance strategies and tactics in dealing with environmental requirements are frequently the most cost-efficient options for enterprises across the region.

This situation reduces the potential of “win-win” environmental management opportunities, as the economic benefits of such measures are reduced due to low expenditures on compliance with environmental regulation and subsidised resource prices. Despite this, many “win-win” opportunities exist, as documented in a large number of demonstration projects. In particular, low and no-cost environmental management opportunities remain easily accessible, but companies rarely exploit them as they lack incentives to develop the expertise to identify and implement such measures. Business networks have been set up to disseminate environmental management information; FDI, EC and other international (and local) dedicated eco-funding programmes are also driving environmental management in CEE and the Baltic companies. Larger environmental management investments are still more difficult to realise as finance is not readily available, with the exception of the energy efficiency field.

Despite these facts, most countries in CEE, the Baltics and even SEE have achieved more or less substantial progress since the Aarhus conference, and have moved closer to achieving the basic capacity level for cleaner production. There are now dozens of cleaner production, pollution prevention and environmental management centres established throughout the regions, although equipped with varying degrees of capacity and resources. Donor support for various training programmes (albeit sometimes uncoordinated and isolated) also deserves credit. The initiative to develop cleaner production services, however, requires further support from donors and local governments if these initiatives are to increase and provide cascading effects across the economies of the regions. Unless efforts are increased, the impact of these initiatives will remain limited and potentially many of the cleaner production service providers will disappear.

Governments (including those ministries and agencies responsible for economic and industrial development and environmental protection), along with enterprises in CEE, the Baltics and SEE, have a key responsibility for promoting and sustaining EME. Unless the economic and financial instruments and the enforcement and compliance promotion systems and regimes are improved, there will be limited scope for market forces to stimulate “win-win” environmental management opportunities, which would improve the competitiveness of their economies in the framework of the EU. Hence, the market forces that are already starting to play a role need to be bolstered by the continuation of well-targeted government support if the build-up of stronger and more sophisticated capacities for cleaner production in the regions is to take place. Educational and informational environmental management measures are an appropriate response to the actual situation, as they contribute to improving the basic capacity level in the long-term, and have proved that they can stimulate entrepreneurial cleaner production initiatives. In conjunction with this, support might be provided for a transitional period for large environmental management investments. (Examples of this type of support include subsidised finance from environmental funds and from instruments such as the NEFCO’s Facility for Cleaner Production, or from ESCO-type energy efficiency companies.) There would be various payback periods, especially when this would contribute to reducing environmental pressure in pollution hot spots, and provided these entities supported and did not undermine the emergence of more commercial forms of finance.

Introduction

At the fourth “Environment for Europe” Conference in Aarhus in 1998, ministers adopted the Policy Statement on EME, in which they expressed their commitment to “facilitate and strongly support the implementation of effective EME in CEE/NIS....” The Policy Statement originated from the recognition that progress in the implementation of measures to promote EME had been less than hoped for, due to a variety of obstacles in enterprises and in the policy and economic contexts within which they work. Moreover, the low levels of donor support for such activities, despite the potentially high benefit/cost ratios, had further hampered progress.

In the Policy Statement ministers also invited the EAP Task Force to facilitate the implementation of the Policy Statement and to prepare a report for the next “Environment for Europe” Ministerial Conference, assessing progress in the implementation of the Policy Statement.

This report responds to the invitation. It provides a broad-based overview of the progress made in implementing the Policy Statement since the Aarhus Conference. In doing so, this paper uses the thematic structure provided in the Policy Statement, focusing on each of the key determinants for the successful promotion of EME listed below.

First, this report focuses on the general framework conditions that companies are operating under. This includes the signals that companies are receiving from the market, and which are essentially influenced by general economic policies. Aspects such as the macro-economic health of the economy, the investment climate, progress with enterprise reforms, as well as the pricing of natural resources, are reviewed and the relevance of these factors identified in terms of firms’ behaviour.

Second, the signals provided through environmental regulations are analysed. Environmental regulations play a key role in influencing firms’ behaviour, as they determine the cost of non-compliance, as well as the general awareness of environmental matters within enterprise management. The role of economic instruments in setting prices for key resources, the effectiveness of environmental standards, monitoring and enforcement are all reviewed.

Third, the existence of various capacity building approaches that can help to foster the dissemination of EME is reviewed. The availability of environmental expertise in cleaner production centres, as well as access to improved management practices such as ISO 14000, are assessed. These arrangements can play a key role in overcoming one of the most important obstacles to the introduction of better environmental practices in enterprises: i.e. the lack of motivating information.

The last chapter examines the availability of financing mechanisms to support the implementation of environmental measures in enterprises, as well as the availability of support from donor countries for EME projects.

Each of these areas is reviewed, with a focus on the actual situation and the main improvements. This report is primarily based on information that is available in international literature, and on the findings of the Aarhus Business and Environment Initiative (ABEI) eco-efficiency country reviews.

Overall Economic Context

The general economic context is crucial if we are to appreciate the incentive structure under which companies operate. The minimum prerequisites for environmental management measures in enterprises are as follows:

- Enterprises have cash-flow (or other forms of finance) available for investment and have confidence that the framework conditions for the investment will remain stable in the longer term.
- Companies operate as profit maximisers, actively seeking cost reduction opportunities.
- Investment into environmental management measures yields reasonable financial returns, either through cost reductions on the inputs required for the company's processes or on waste generated, or through the increased competitiveness of products.

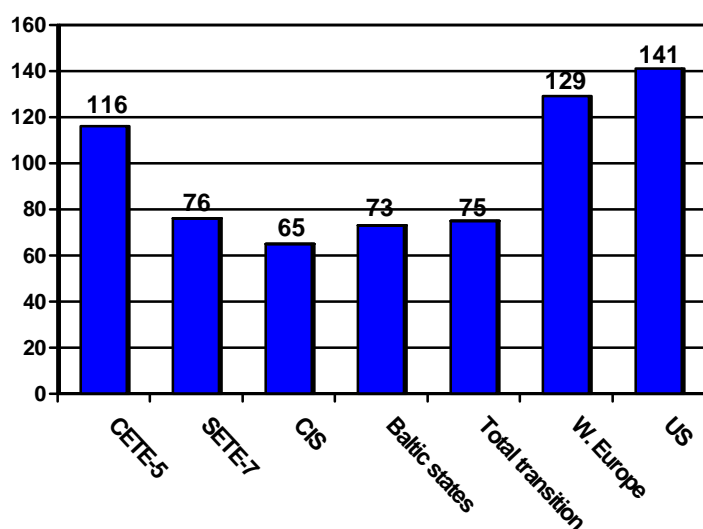
Enterprises receive important signals about their expected behaviour from the market place. In this respect, the general economic situation, the investment climate, progress in enterprise reform, resource pricing and pressure from consumers all provide an indication of the capacity and probable willingness of companies to invest (time and money) in environmental management projects. Each of these indicators is discussed below.

The general economic context is improving across the entire region, but with differing levels of current development

The economic transition has been most successful in CEE and Estonia. These countries have received the most Foreign Direct Investment (FDI) during the past decade, while SEE countries are still struggling to revive their economies. The process is being slowed down by the fact that many SEE countries need to rebuild their infrastructure after destruction during the SEE war(s). Neither have the Baltic states achieved their pre-transition level of economic output after the collapse of their main market, Russia. However, annual economic growth in the last four years has shown great improvements in the Baltic states, and there are also signs of recovery in the SEE states, indicating a more promising economic climate for environmental management development in the future.

The levels of economic activity in CEE, the Baltics and SEE are compared to those of Western Europe and the US in figures 1 and 2 below.

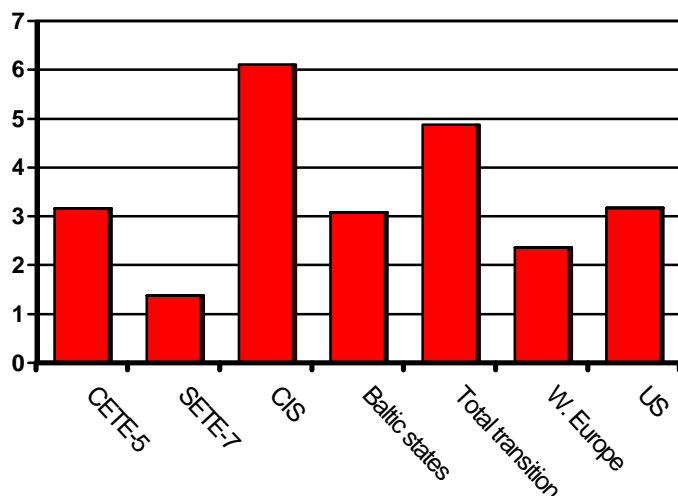
Figure 1: Economic activity (2001 versus 1989 = 100)



Source: UNECE: The Restructuring of Coal Industries in Transition Economies — An Overview of the Last Decade, Energex 2002 Conference, Krakow

OVERALL ECONOMIC CONTEXT

Figure 2: Economic activity, average annual growth rate (% during 1998-2001)



Source: UNECE: The Restructuring of Coal Industries in Transition Economies — An Overview of the Last Decade, Energex 2002 Conference, Krakow

The investment climate varies greatly from region to region

One of the explanations for the ineffectiveness of growth in generating investment is found in the unfavourable investment climate and the risks involved in SEE. CEE and the Baltics on the other hand have shown great improvements. In an assessment of country risks by World Markets, a market intelligence and analysis firm, country risks in the CEE countries are seen as low to moderate. The Baltic states also fall in the moderate category, with only Latvia falling in the upper field of the medium-risk band. The SEE countries cover a broad range of risk, with Croatia, Bulgaria and Romania slightly below the risk level of the Baltic states, while Serbia and Montenegro and Bosnia and Herzegovina remain in the very high risk category, even under the EECCA ratings (see table 1 below).

As a consequence of these diverse investment climates, the pace of modernisation and the direction of operational capital (including investments into the development of cleaner production techniques) show large discrepancies from region to region. In some countries the productive capital has been continuously eroded, leading to excessive production costs, high pollution, as well as safety and health risks for workers, the general public and the environment. In other countries, robust FDI inflow has made the slow but steady extension of sound environmental techniques possible.

Table 1: Country risk rating

Country	Current Overall Risk		Political Risk	Economic Risk	Legal Risk	Tax Risk
Luxemburg	1.15	INSIGNIFICANT	1.0	1.0	1.0	1.5
Netherlands	1.27	NEGLIGIBLE	1.5	1.0	1.0	1.5
United Sates	1.51	NEGLIGIBLE	1.5	1.5	1.0	1.0
Slovenia	1.9	LOW	1.5	2.5	2.5	2.0
Hungary	2.06	MODERATE	2.0	2.0	2.0	2.0
Poland	2.06	MODERATE	2.0	2.0	2.0	2.0
Czech Republic	2.14	MODERATE	2.0	2.5	2.0	2.0
Slovakia	2.17	MODERATE	2.0	2.5	2.0	2.5
Estonia	2.38	MODERATE	2.5	2.5	2.5	2.0
Lithuania	2.38	MODERATE	2.0	2.0	2.5	2.5
Croatia	2.5	MEDIUM	2.5	2.5	2.5	2.5
Latvia	2.5	MEDIUM	2.5	2.5	2.5	2.5
Turkey	2.75	MEDIUM	3.0	2.5	2.0	3.0
Bulgaria	2.76	MEDIUM	2.5	2.5	3.0	3.0
Romania	2.8	MEDIUM	3.0	2.5	3.0	3.0
Russia	3.11	SIGNIFICANT	3.0	3.0	3.0	3.0
Ukraine	3.26	SIGNIFICANT	3.5	3.5	3.0	3.0
Moldova	3.27	SIGNIFICANT	3.5	3.5	3.0	3.0
Macedonia (FYR)	3.29	SIGNIFICANT	3.5	3.5	3.0	3.0
Armenia	3.31	SIGNIFICANT	3.5	3.5	3.0	3.0
Kyrgyzstan	3.36	SIGNIFICANT	3.5	3.5	3.0	3.0
Azerbaijan	3.37	SIGNIFICANT	3.5	3.0	3.5	3.0
Georgia	3.41	SIGNIFICANT	3.5	3.5	3.0	3.0
Albania	3.68	HIGH	3.5	4.0	3.5	3.5
Uzbekistan	3.69	HIGH	3.5	4.0	4.0	3.0
Tajikistan	3.73	HIGH	4.0	3.5	3.5	3.5
Turkmenistan	3.79	HIGH	4.0	4.0	4.0	3.5
Belarus	3.82	HIGH	3.5	4.0	4.5	4.0
Serbia and Montenegro	3.88	HIGH	4.0	4.5	3.5	2.5
Bosnia and Herzegovina	4.0	VERY HIGH	4.0	4.0	4.0	4.0
Iraq	4.63	EXTREME	5.0	4.5	4.5	4.5
Afghanistan	5.0	EXTREME	5.0	5.0	5.0	5.0

Source: World Markets website, August 2002

Despite notable progress, local enterprise reform lags behind the EU. This hinders the wide-scale dispersal of environmental management

According to the *EBRD Transition Report 2001*, the past year has seen sustained reforms across many countries and areas of transition, as measured by the EBRD's transition indicators. The enterprise reform indicators are indicated in table 2, below.

A number of countries that were lagging in reforms, such as Bosnia and Herzegovina, Serbia and Montenegro, and Russia, have made significant progress over the past year as a result of favourable political and economic developments. At the same time, several advanced transition countries that are candidates for EU accession have continued to make steady progress in strengthening the performance of their market-supporting institutions. In both the leading and the less advanced countries, perhaps the greatest advances over the past year have occurred in the financial sector.

To complement the insights provided by the transition indicators, the EBRD and the World Bank launched the second stage of the Business Environment and Enterprise Performance Survey in 2002. The Survey asked enterprises to evaluate economic governance and state institutions, and to assess the extent to which the business environment creates obstacles to the growth of their own business.

OVERALL ECONOMIC CONTEXT

Table 2: EBRD enterprise reform indicators

Country	Large-scale privatisation	Governance and enterprise restructuring
AL	2+	2
BiH	2+	2-
BG	4-	2+
HR	3	3-
CZ	4	3+
EE	4	3+
YU	1	1
MK	3	2+
HU	4	3+
LV	3	3-
LT	3+	3-
PL	3+	3+
RO	3+	2
SK	4	3
SI	3	3-

1 Low level of private ownership.

2 Comprehensive schemes almost ready for implementation; some sales completed.

3 More than 25% of large-scale enterprise assets in private hands or in the process of being privatised (with the process having reached a stage at which the state has effectively ceded its ownership rights), but possibly with major unresolved issues regarding corporate governance.

4 More than 50% of state-owned enterprises and farm assets in private ownership and significant progress on the corporate governance of these enterprises.

4+ Standards and performance typical of advanced industrial economies: more than 75% of enterprise ownership with effective corporate governance.

1 Soft budget constraints (lax credit and subsidy policies weakening financial discipline at the enterprise level); few other reforms to promote corporate governance.

2 Moderately tight credit and subsidy policy but weak enforcement of bankruptcy legislation and little action taken to strengthen competition and corporate governance.

3 Significant and sustained actions to harden budget constraints and to promote corporate governance effectively (e.g. through privatisation combined with tight credit and subsidy policies and/or enforcement of bankruptcy legislation).

4 Substantial improvement in corporate governance, such as an account of active corporate market control; significant new investment at the enterprise level.

4+ Standards and performance typical of advanced industrial economies: effective corporate control exercised through domestic financial institutions and markets, fostering market-driven restructuring.

Source: EBRD Transition Report 2001 — Energy in Transition

To complement the insights provided by the transition indicators, the EBRD and the World Bank launched the second stage of the Business Environment and Enterprise Performance Survey in 2002. The Survey asked enterprises to evaluate economic governance and state institutions, and to assess the extent to which the business environment creates obstacles to the growth of their own business.

The 2002 survey shows that the business environment has improved significantly across most countries of the CEE, Baltic, SEE and EECCA regions since 1999, and that this cannot be solely due to an upswing in the periodic business cycle. Moreover, some of the less advanced transition economies in SEE and EECCA have seen strong improvements in economic governance, helping them to narrow the gap with the more advanced reformers. The unevenness of the business environment for different types of firms — such as small, newly established private firms and large, state-owned enterprises — has also reduced. These developments suggest that less advanced transition economies may now be able to move beyond the stage of partial reforms, characterised by insecure property rights, corruption and limited available investment, which have held back their progress over the first decade of transition.

Where enterprise management is not exposed to competition and not forced to act in a transparent, accountable manner, and where companies operate with soft budget constraints and political connections, the pressures to control costs and improve operational efficiency, including environmental performance, are reduced.

Despite large-scale privatisation across most of the regions, and the vast majority of enterprises now being privately owned,¹ the progress of enterprise reform has differed in the companies acquired by large international entities versus those that are locally owned. Many companies with insider (employee) corporate control have posed a chronic and critical problem throughout the transition period in all regions. At the outset of transition many enterprises inherited old-style managers who lacked the skills and initiative for restructuring or market competition.

While the quality of management is one important determinant of the efficiency of enterprises, the financial constraints that they operate under are equally important. Practices that still play an important role in many regional countries, such as weak enforcement of bankruptcy legislation, barter and a backlog of arrears, contribute to reducing incentives for firms to restructure and limit access to finance for necessary investments.

Countries achieved scores in a broad range from 1 to 3+/⁴ in the EBRD indicators on enterprise reform,¹ indicating how differently countries are performing and are being managed/governed, even within sub-regions, e.g. Serbia and Montenegro versus Bulgaria.

FDI levels in CEE and the Baltics contribute to improvements in the environmental performance of economies and enterprises, while in SEE much remains to be seen

Poland, the Czech Republic and Hungary share the majority of foreign direct investment (FDI) inflow within the region. All three countries enjoy a favourable combination of geographical position, absorptive and innovative R&D capacity, well-trained human capital and encouraging competition climates. They also have a clear legislative background and, until recently, effective investment incentives. However, some of these capacities have now become more limited, and the recent inflow of FDI has decreased in these countries as a result of increasing labour costs, the decreasing proportion of relevantly trained workforce, and the pressures of EU competition regulations. Meanwhile, more resources are being channelled into the rapidly progressing Baltics and even to SEE economies.

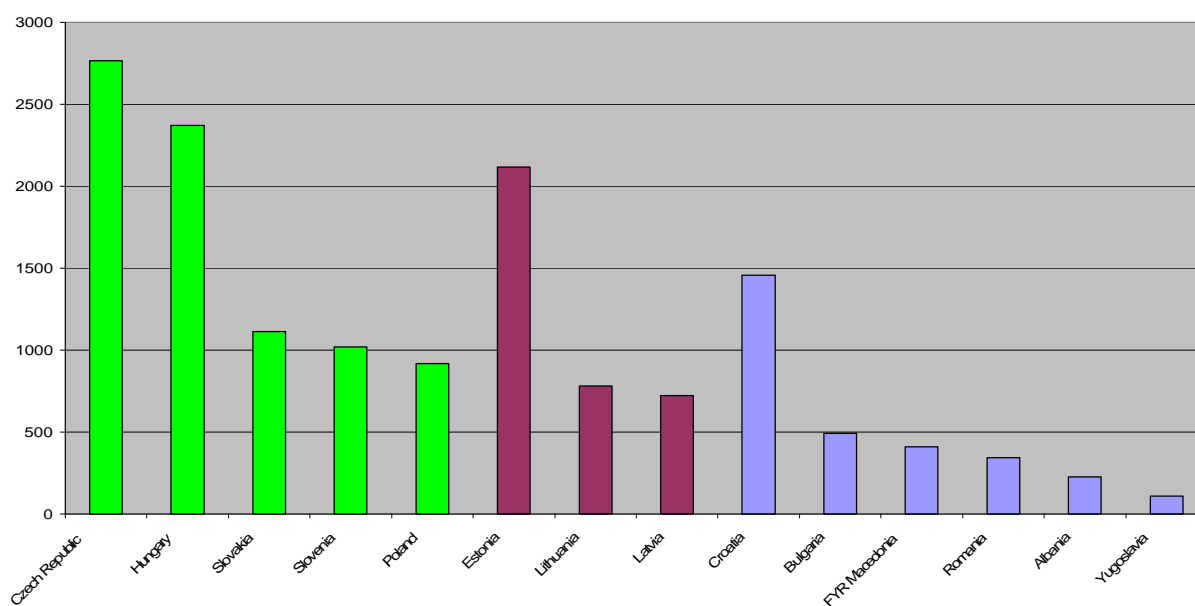
The unsatisfactory investment climate in the SEE states, due to recent wars and weak political, legal and institutional frameworks, has contributed to a failure to attract significant amounts of FDI, especially in comparison to CEE countries. Hence FDI has not played as much of a role in the restructuring of the old SEE enterprises as it has in the CEE and Baltic regions. As a consequence, SEE enterprises have yet to substantially benefit from the positive environmental impacts that FDI can potentially generate through the transfer of modern technology and know-how.

¹ *EBRD Transition Report 2000 — Energy in Transition*, European Bank for Reconstruction and Development, London.

OVERALL ECONOMIC CONTEXT

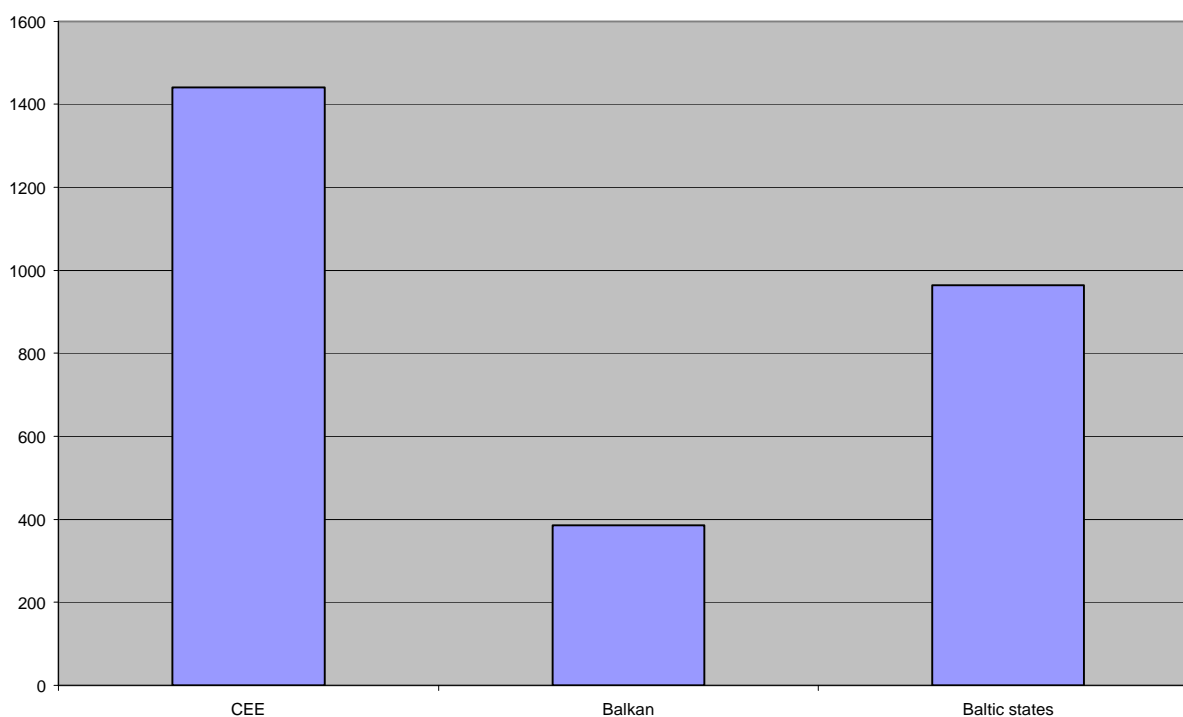
Figures 3 and 4 and table 3 show the levels of FDI attracted by countries in the regions:

Figure 3: FDI/capita in the region (1990-2001)



Sources: UNECE: Economic Survey of Europe, 2002, No. 2; Eurostat 2002, Statistical Yearbook on Candidate and South-East European Countries

Figure 4: Cumulative FDI/capita in the region (1990-2001)



Sources: UNECE: Economic Survey of Europe, 2002, No. 2; Eurostat 2002, Statistical Yearbook on Candidate and South-East European Countries

Table 3: FDI in the region for the period 1990-2001 (USD million)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Poland	10	117	284	580	542	1,132	2,768	3,077	5,130	6,474	8,293	6,995
Czech Republic	132	513	1,004	654	869	2,562	1,428	1,300	3,718	6,324	4,986	4,916
Hungary	311	1,459	1,471	2,339	1,146	4,454	2,275	2,173	2,036	1,970	1,649	2,443
Romania	0	40	77	94	341	419	263	1,215	2,031	1,041	1,037	1,157
Croatia	0	0	16	120	117	114	511	533	932	1,479	1,115	1,447
Slovakia	18	82	100	195	269	308	353	220	684	390	1,925	1,475
Bulgaria	4	56	42	40	105	90	109	505	537	819	1,002	694
Estonia	..	..	82	162	215	202	151	267	581	305	387	542
Lithuania	..	..	8	30	31	73	152	355	926	486	379	446
Latvia	..	..	29	45	214	180	382	521	357	347	410	177
Slovenia	4	65	111	113	117	151	174	334	216	107	136	503
Serbia and Montenegro	..	..	..	..	..	..	0	740	113	112	25	165
FYR Macedonia	0	0	0	0	24	9	11	16	118	32	176	443
Albania	0	0	20	58	53	70	90	48	45	41	143	207
Bosnia and Herzegovina	..	..	..	..	0	0	0	0	100	90	150	130
<i>Memorandum items:</i>												
CETE-5	476	2,236	2,970	3,880	2,942	8,606	6,998	7,105	11,784	15,265	16,990	16,333
SETE-7	4	96	155	312	640	703	984	2,316	3,663	3,412	3,472	3,948
Baltic states	..	..	119	238	460	454	685	1,142	1,863	1,139	1,176	1,165
Total above	..	..	5,021	6,305	5,813	13,828	13,987	19,570	24,091	26,554	27,046	28,360

Source: UNECE: Economic Survey of Europe, 2002, No. 2

Considerable reforms throughout the region in pricing of the energy utility sector

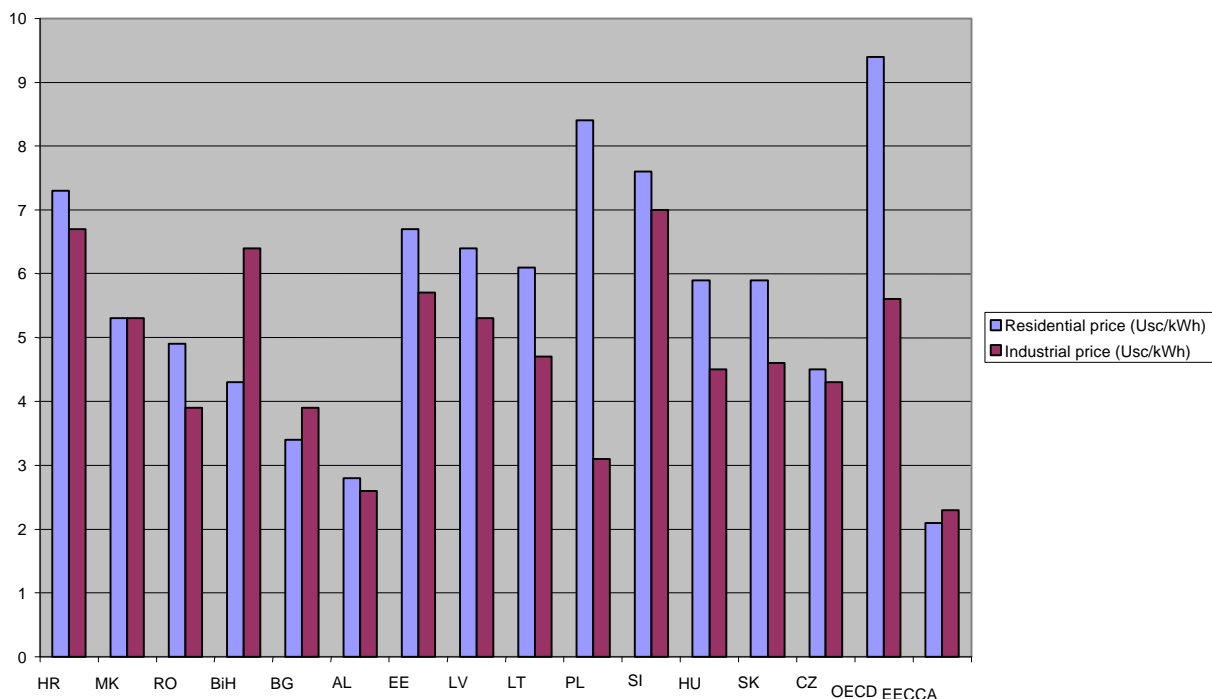
The countries of the region inherited a system of state-owned monopolies for the provision of key utility services such as gas, electricity and water, with tariffs hugely subsidised by the central state budget. As a consequence industrial enterprises and consumers had no incentives to save energy and water. It has been shown empirically that high energy prices tend to reduce the energy intensity of the economy.²

Considerable progress has been made in power pricing in the region. The extent of energy under-pricing has been greatly reduced in most countries. In many countries (e.g. Poland, Slovenia, Croatia) the residential power prices are close to the OECD average, while the industrial price in some cases even exceeds this (e.g. Slovenia, Estonia, Croatia). However, in some cases the political acceptance was balanced against tariff reforms, and thus the incentive effect on energy intensity did not become apparent (e.g. Bulgaria, and industrial prices in Poland, both countries with energy-intensive production).

² EBRD Transition Report 2001 — Energy in Transition, European Bank for Reconstruction and Development, London.

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Figure 5: Residential and industrial power prices in the region



Sources: EBRD Transition Report 2001; IEA: Key World Energy Statistics 2001

In addition to under-pricing, another distortion can be the difference in prices between consumer groups. In some SEE and most EECCA countries residential tariffs are lower than industrial prices, although this does not reflect the relative costs of supplying these two categories. In Western Europe industrial prices are about two-thirds the price charged to households. In the regions under discussion this indicator ranges from 0.76 to slightly above 1.0, with the exceptions of Poland (0.37), where energy-intensive heavy industry is over-subsidised, and Bosnia and Herzegovina (1.49), where relatively high power prices exist and affordability problems might rise among households.³

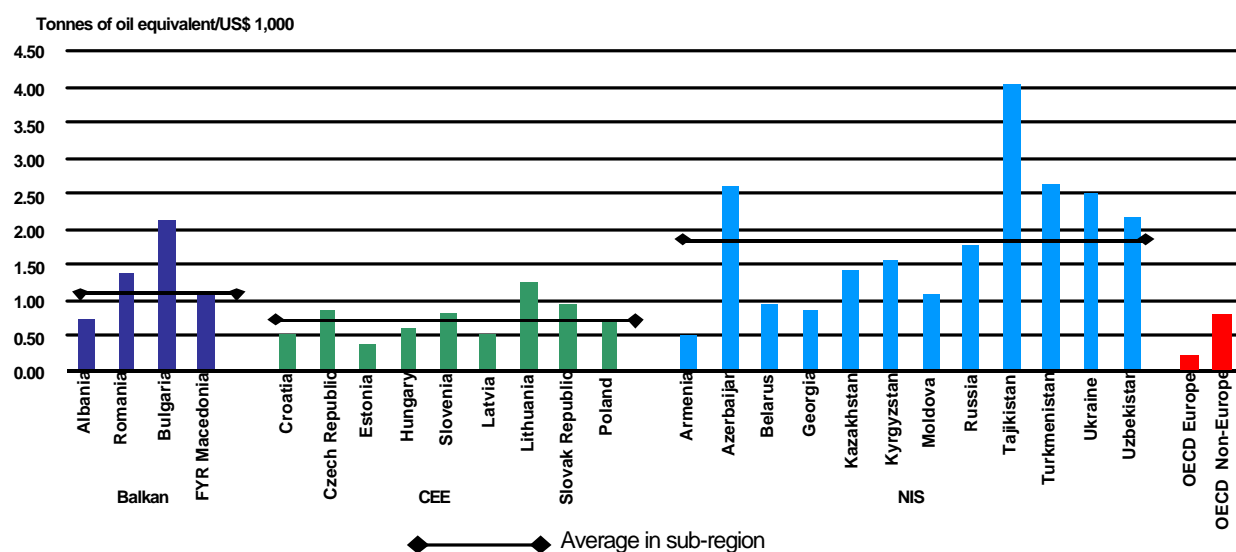
For EU candidate countries considered as a whole, energy intensity was five times higher than that of the European Union in 1990. Progress made in the candidate countries reduced this divergence to four in 1997. With the exception of Bulgaria, since 1990 the lowest performers have made major progress. Estonia improved its energy intensity by an average 5.3% per year, Romania and Lithuania by 3.2%, Poland by 2.9%, Slovakia by 2.7% and the Czech Republic by 1.5%.⁴ Some of these good performers applied the highest rates within their region (e.g. Estonia, Poland in the case of residential prices).

³ EBRD Transition Report 2001

⁴ EC DG TREN, 2001, Annual Energy Review 2000

Figure 6: Energy intensity in the transition economies and OECD in 1998

Energy intensity in 1998



Sources: EBRD, IEA, OECD and World Bank.

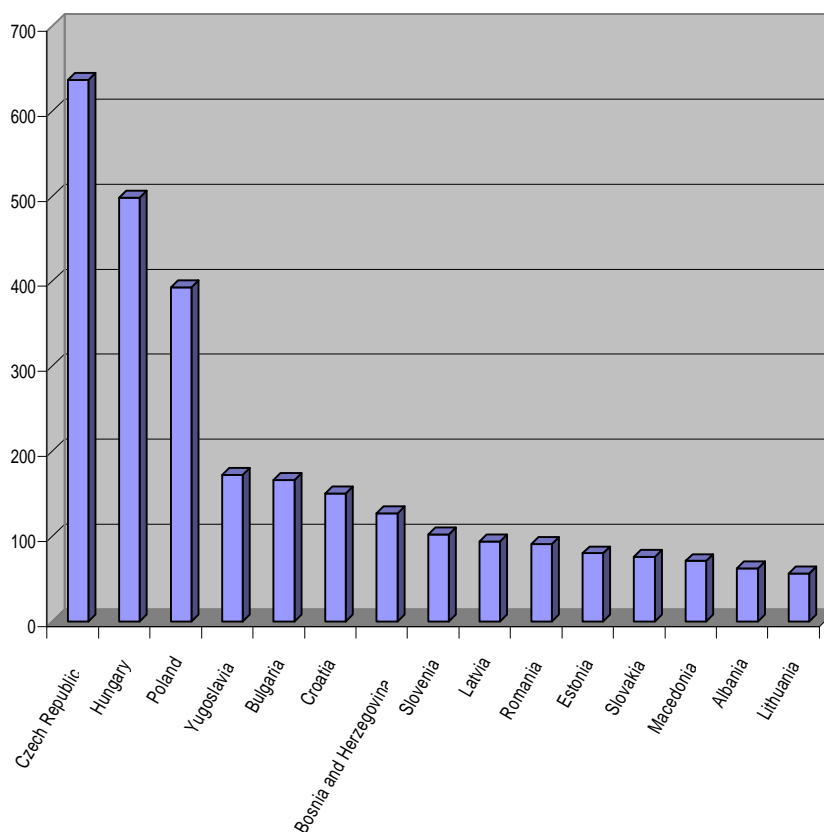
However, there is still a lot of potential to improve the environment through the introduction of more resource-efficient techniques and technologies. Pricing reform can be continued at the pace of household income increases; however, a carefully thought-out and well-established subsidy scheme is needed to avoid adverse affects on the lower-income citizens. The expected higher ratio of technology transfer into SEE countries (including the second-wave accession countries) should cause a considerable improvement in energy intensity.

Pressure from consumer markets is still weak but improving in CEE and the Baltics, while almost non-existent in SEE

Pressure from domestic markets on enterprises to improve their environmental (and public safety and health) performance has been improving in CEE and the Baltic states. This is the result of the extensive awareness-raising activities undertaken by active international and local environmental and consumer protection NGOs, the greatly increased focus of academia and the media, and the various government initiatives. Civil society in CEE and the Baltics is well constructed and equipped. The legal and policy framework has been approximated to the EU's, and information is disseminated to the public. Meanwhile in SEE states the market still does not emphasise the environmental and public health aspects of production and services, which is largely due to the weakness of the civil societies there (i.e. their low capacity to participate in decision-making in most instances). Although environmental NGO's exist in all SEE states, their numbers, membership and resources are still limited (see figure 7). As a consequence, NGO activities are mostly driven by the availability of donor financing, which appears to involve a focus on educational programmes rather than fully blown campaigns. Compliance monitoring is generally carried out through simple visual observations with few follow-up activities to ensure compliance. An indication of the relative weakness of domestic pressures is also indicated in the very low numbers of companies registering for various environmental management or performance certificates. Similarly, consumers often lack information or have very low willingness and ability to pay for the development of a serious demand for "green" products.

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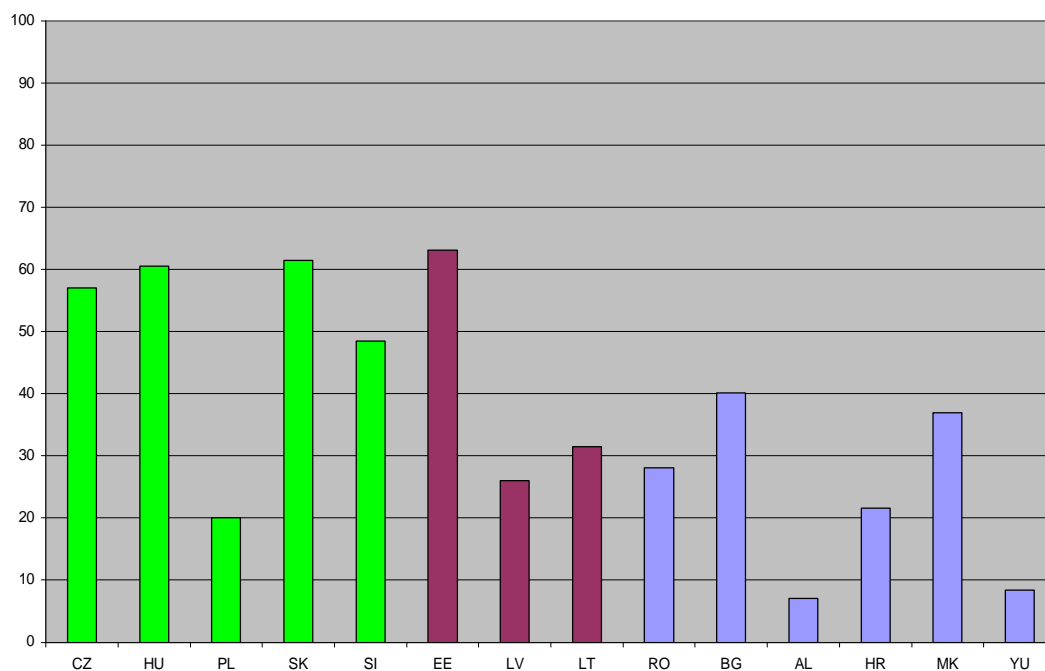
Figure 7: Number of active environmental NGOs in the region



Source: REC NGO Directory 2001

Pressures from external markets indicate similar patterns. Products manufactured in CEE and the Baltics for mainly European markets (see figure 8 and table 4) must meet EU/world quality environmental and health standards, further strengthening the internal market pressures in these countries. In SEE economies, however, the much weaker export potential (exports tend to concentrate on commodities from extractive industries) cannot compensate for the lack of domestic pressures. SEE consumer markets traditionally exert little pressure on producers of commodities to improve their environmental performance, because these commodities are not directly consumed by the end-users, who are the main drivers of environmental market pressure. Instead they provide inputs to the intermediate stages of the production process, which are often performed abroad. Raw/semi-raw materials are bought by international traders and industrial companies who transform them into final consumer goods, such as cars and electrical appliances, and thus generate most of the value added and other benefits in the production-trade-consumption cycle, where, ultimately, commodities play only a minor role. While consumers recognise the final products and may have preferences about their environmental performance (for a car this may be fuel efficiency or recyclability of components), they do not generally have such preferences concerning the commodity inputs of which these products are composed.

Figure 8: Export as % of GDP in 2000 (HR and YU in 1999)



Source: Eurostat 2002: Statistical Yearbook on Candidate and South Eastern European Countries

Table 4: The share of the EU market in foreign trade (exports)

Country	EU share of exports	Year	Source
Hungary	74.2%	2001	Hungarian Ministry of Foreign Affairs (2002)
Slovakia	78%	2001	Slovakian Ministry of Economy (2002)
Poland	69%	2001	Polish Ministry of Foreign Affairs (2002)
Slovenia	63%	2001	German Federal Foreign Office (2002)
Estonia	69%	2001	Statistical Office of Estonia (2002)
Latvia	65%	2001	Latvian Development Agency (2002)
Lithuania	49.9%	2001	Lithuanian Development Agency (2002)
Romania	63.8%	2001	Romanian Ministry of Foreign Affairs (2002)
FYR Macedonia	48 %	2000	http://www.balcantrade.org/
Bulgaria	51.7%	2001	http://www.balcantrade.org
Serbia and Montenegro	45.48%	2001	http://www.ekonomist.co.yu/
Some EECCA countries:			
Russia	35%	2000	http://europa.eu.int/
Ukraine	18.3%	1999	Ukrainian Centre for Economic and Political Studies (2000)
Kazakhstan	22.7%	2000	http://kazakhstan-gateway.kz/

Environmental Policy Framework

In terms of the incentive structure under which companies make decisions to optimise production processes, major signals are also provided through the environmental policy framework. Several factors influence the response of enterprises to environmental regulations:

- The *economic and technical feasibility* of environmental requirements. If the implementation of environmental requirements imposes excessive cost on the company (i.e. profitability or competitiveness is threatened), then compliance and thus the introduction of sound environmental management measures is heavily deterred. The same applies to regulations that cannot be achieved technically because of absurdly stringent standards.
- The *coherence* of the requirements. Where the environmental requirements are unclear or even contradictory, or they change frequently over time, companies will often be reluctant to adopt compliance measures, due to the perceived uncertainty and risk that these measures may become obsolete.
- The *incentives*, both positive and negative. Among the key determinants of enterprise behaviour with respect to environmental requirements is the level of environmental charges/taxes/fines, as well as the probability of these charges being effectively collected. Whether enterprises comply with environmental regulation depends upon the relative costs of compliance versus non-compliance. When the probability of being caught outside compliance is small, and/or fines for non-compliance are low, non-compliance might be the more cost-effective approach for companies to follow. Where this is the case, it discourages the adoption of effective environmental management. Similarly, positive incentives encourage EMEs as they may lead to the reduction of costs and an increase in profits.
- The compliance *information* that is available to firms. Information on environmental requirements and the means that are available to achieve them is often lacking, or difficult for enterprises to collect. Where such information is easily available, companies are encouraged to develop effective environmental management.

Environmental regulations and standards influence enterprise decision-making and compliance

The approximation of EU legislation, including that of the Environmental Acquis, has already been completed and agreed upon in the CEE and Baltic states that will join the EU in 2004. Several of the environmental directives focus heavily on industry-relevant matters. These include the directives of Integrated Pollution Prevention and Control (IPPC), Large Combustion Plants, Dangerous Substances to Water, Eco-management and Audit Schemes (EMAS), Asbestos, Waste Framework, Hazardous Waste, Hazardous Waste Incineration, Urban Waste Water Treatment, Landfill, Industrial Emissions of Volatile Organic Compounds (VOC), Seveso I and II, and the Eco-label. Table 5 below indicates the derogations negotiated between several accession countries and the EC. Bulgaria and Romania are also working hard to meet the European environmental criteria so they can join the EU in 2007.

Table 5: Transition periods agreed at provisional closure of environment chapters

Sector Directive	Transition periods agreed at provisional closure of Environment Chapter (November 5, 2001)					
	CZ	EE	HU	LT	PL	SLO
Water						
- Urban waste-water treatment	2010	2010	2015	2009	2015	2015
- Dangerous substances					2006	
Waste						
- Landfill		2009 ¹			2012	
- Packaging	2005		2005	2006	2007 ³	2007
- Shipment of waste					2012	
Air quality						
- VOCs stage I		2007			2005	
- Sulphur content of fuel				2007	2006	
Industrial pollution						
- Large combustion plants			2004			
- IPPC	2012 ²				2010	2011
Radiation Protection						
- Medical exposures					2006	

Source: Danish EPA website, 2002

¹ Oil shale only (hazardous waste).

² Request implies transitional period under LCPs Directive for one existing plant and will be dealt with once this directive has been revised (end-2001).

³ For certain types of waste the period could be extended to 2012 after EU accession.

* Note: Transition periods cover until December 31 of the requested year.

CZ: Czech Republic, EE: Estonia, HU: Hungary, LT: Lithuania, PL: Poland, SLO: Slovenia

The legislative and policy frameworks have been reviewed in all SEE countries in recent years, as indicated in table 6 below.

Table 6: When did the following administrative bodies review their framework laws and regulations?

Country	Albania	BiH	Bulgaria	Croatia	Macedonia	Serbia	Montenegro	Romania
Ministry of Environment	2001	2001	2001	2000	2000	2001-2002	2001	2001
Environmental Agency	N/A		1999					
Environmental Inspectorate/ Agency	1998				2000			2001
Responsibilities of the inspectors	1996			1994			1996	2000
Laws on air pollution	Draft		2001	1995		1997	2001	1993 1995 2000-2001
Laws on water	Draft		1999 and EU 2002	1995		1993	1997	1996
Laws on waste	Draft		2000	1995		1996	2000	2001
Laws on noise			1999	1990		1992	1995	1995, 1997
Laws on urban planning	1998		2001	2000		1997	2000	1991, 2000
Laws on soil	2000		2000			1994	1997	1995
Laws on energy	1995		2000	2001				N/A

Source: REC, the BERCEN Secretariat (2002): Assessment of Environmental Enforcement Agencies in the Stabilisation and Association Process Countries

Where regulatory requirements are not clear, or are even contradictory, they may generate a “wait-and-see” attitude in enterprises and paralyse decision-making. This is particularly the case when contradictory or differing regulations

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require different technological or organisational solutions. Environmental investments are often expensive and long-term in nature, which means that investment decisions will only be taken if the actual requirement and its future evolution seems certain, so as to avoid the investment becoming obsolete after a short period of time. The business community have frequently identified clarity, predictability, and economic realism as their key requirements for complying with environmental regulations. Similarly, the excessive cost that may be involved in understanding regulatory requirements and translating them into measures at the enterprise level may dissuade compliance.

Although the CEE and Baltic countries have already developed their EU compliant legal framework, their entire regulatory reform is far from complete. After the framework laws, the supporting lower level regulations and standards that are now being developed will take several more years to complete. Meanwhile, either the old standards or various European standards are being used provisionally.

The effectiveness of the recently developed legal system has also been somewhat undermined by the failure of the regulated community to understand the new requirements, due to the incomprehensibility of the legal language and the complexity of the regulatory system. In some cases, implementing regulations are not disseminated adequately, leading to a lack of awareness among enterprises about the requirements.

The CEE and Baltic systems of environmental quality standards are quite comprehensive and often ambitious, covering the pollutants that need to be measured in the EU, and mandating low concentrations of contaminants. They more often apply risk assessment as a standard setting methodology, rather than the risk management approach used in most advanced OECD countries. However, ambient standards are determined by making human exposure as low as possible. In determining the standard consideration is given to the technical or economic feasibility of meeting the quality standard (i.e. risk management factors). Compliance with the new standards is sometimes negatively influenced by the differing views of local scientists and engineers, who argue about the risks involved, and their social and economic costs and benefits, while officials responsible for enforcement hesitate to act decisively and properly, as they are afraid of being accused of incompetence at a later date.

The incentive function of economic instruments is still limited, due to the need to balance political acceptability and economic efficiency with environmental effectiveness

The economic instruments applied in CEE, the Baltic and SEE countries can be characterised as fiscal rather than environmental measures, since their main objective is to generate revenues. The rates are generally still too low to have an incentive effect, i.e. to change polluter behaviour. Revenues generated by environmental levies are not always earmarked for environmental funds in the majority of the countries in the region. Although the income of these environmental funds should be strictly disbursed for investment into the development of environmental infrastructure and other activities, such as environmental research, awareness-raising campaigns and educational programmes, the practice often indicates alternative or even irrelevant usage.

Environmental policymakers are facing a real challenge in combining aspects of economic efficiency and political acceptability on one hand, and the environmental effectiveness of economic instruments on the other. The need for a balanced approach is not only notably visible in the case of excise taxes that are levied on mineral oil products, but also in the context of full cost recovery in the water and waste sectors. Table 7 shows that while tax rates on motor fuels are generally lower in accession countries than in the EU, applying purchase parity standardisation (PPS) the situation changes so that the majority of accession countries, especially those in CEE, pose a much higher burden on consumers than is the case in western Europe.

Table 7: Comparison of tax rates on motor fuels (unleaded petrol and diesel) in European countries in 2000 (unit: euro per kilolitre; PPS unit: euro per kilolitre)

Country	Unleaded petrol EUR/kl	Country	Unleaded petrol PPS EUR/kl	Country	Diesel EUR/kl	Country	Diesel PPS EUR/kl
Romania	204	Luxembourg	321	Romania	112	Luxembourg	234
Latvia	211	Switzerland	365	Lithuania	129	Lithuania	258
Estonia	224	Ireland	366	Bulgaria	135	Austria	275
Lithuania	243	Austria	397	Estonia	166	Denmark	284
Bulgaria	267	Latvia	424	Latvia	198	Finland	296
Slovakia	268	Greece	425	Slovakia	209	Belgium	301
Czech Rep.	304	Denmark	426	Czech Rep.	229	Sweden	308
Poland	314	Sweden	437	Poland	237	Ireland	318
Greece	321	Spain	442	Portugal	246	Spain	321
Luxembourg	347	Lithuania	484	Greece	247	Greece	326
Portugal	349	Estonia	502	Luxembourg	253	France	351
Hungary	358	Portugal	508	Spain	270	Portugal	358
Slovenia	369	Finland	510	Austria	283	Germany	361
Spain	372	Belgium	512	Belgium	290	Netherlands	362
Ireland	374	Norway	517	Slovenia	290	Estonia	372
Austria	408	Germany	537	Hungary	308	Romania	381
Switzerland	467	France	561	Ireland	325	Switzerland	381
Belgium	494	Slovenia	604	Finland	325	Latvia	399
Denmark	519	Italy	614	Denmark	346	Norway	412
Sweden	529	Netherlands	617	Netherlands	347	Italy	457
Italy	542	Poland	619	France	367	Bulgaria	459
Finland	561	Romania	692	Sweden	373	Poland	467
Germany	562	UK	728	Germany	378	Slovenia	475
France	586	Slovakia	749	Italy	403	Czech Rep.	576
Netherlands	592	Czech Rep.	766	Switzerland	487	Slovakia	583
Norway	651	Hungary	845	Norway	519	UK	713
UK	801	Bulgaria	908	UK	785	Hungary	729

Source: REC: Environmental Taxes in an Enlarged Europe, 2001

Taxes on energy products have been increased in recent years, and the EU requirement on minimum rates for unleaded petrol has been met in four of the candidate countries since 2000. The same situation is found in two SEE countries — Croatia and FYR Macedonia. Diesel taxation is somewhat different as rates exceeding EU requirements are only found in Hungary and Slovenia. The situation regarding levies on energy products other than motor fuels is less “favourable.”

Affordability issues clearly have to be considered, both when an increase in existing environmental/energy taxes and charges is planned, and in the process of planning the introduction of new instruments. Examples of mitigation measures to offset regressive effects should be carefully developed bearing in mind that direct, transparent income transfer to vulnerable citizens is more cost efficient than subsidies. The integration of environmental taxes with other fiscal measures is, so far, quite limited in CEE, and the coordination between environment and finance ministries is generally seen as an area where further improvements are both possible and necessary. An improved dialogue between environmental and fiscal policymakers, and the establishment of inter-ministerial working groups, or “Green Tax Commissions,” could assist in improving both the efficiency and the effectiveness of economic instruments. Experiences from a range of EU member states, such as Denmark, the Netherlands and Sweden, should be transferred to the countries in the region.

A trend toward the simplification of charge systems, in the sense that countries have reduced the number of pollutants subject to emission charges, can be seen. Changes in the administrative system are also having a positive effect because instruments are more efficiently enforced, and countries such as Poland and Slovakia have linked the charge rates to inflation. However, subsidies and in particular cross-subsidisation are still a common tool in the region (and also in OECD countries), contradicting the “no-subsidy” philosophy of the Polluter Pays Principle (PPP). Cross-subsidisation is very high on the political agenda, in particular in the water sector where households

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and industries often face higher water prices than farmers, who are seen as the main beneficiaries of such cross-subsidisation.

The necessity of the increased use of economic instruments in the water and waste sector and, in particular, of user charges for the provision of drinking water, sewerage and waste services is recognised in CEE and Baltic countries, as well as in EU member states, in order to fully implement the PPP. Recent estimates show that the cost coverage of environmental expenditure is 49 percent in Poland, 26 percent in Hungary, eight percent in Slovakia and 79 percent in the Netherlands.⁵ Further implementation of the “no-subsidy” policy clearly requires that payments for services in water and waste sectors rely on user charges covering relevant operation and maintenance, as well as capital costs, regardless of whether these charges are levied on services to the public or private sector.

Table 8: Overview of environmental taxes and charges in Central and Eastern Europe in 2000

Instrument	AL	BiH	BG	Cro	CZ	Est	H	Lat	Lit	Mac	Pol	Rom	Sl	Slo	Yug
Motor Fuel Taxes/Charges															
Excise tax	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fuel product charge			X				X								
Other taxes and charges		X	X									X			
Carbon dioxide tax						X								X	
Value added tax	X	Sales tax	X	X	X	X	X	X	X	X	X	X	X	X	Sales tax
Other Energy Products															
Excise tax	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Other taxes and charges							X					X			
Carbon dioxide tax						X								X	
Value added tax	X	Sales tax	X	X	X	X	X	X	X	X	X	X	X	X	Sales tax
Air Emissions															
Sulphur dioxide tax					X	X		X	X		X		X		
Nitrogen oxides tax					X	X		X	X		X		X		
Emission non-compliance fee			X	X	X	X	X	X	X		X	X	X		X
Transport-related Taxation															
Excise tax			X	X		X		X		X	X	X	X	X	
Annual vehicle tax	X		X	X		X	X	X	X		X	X	X		
Highway toll				X	X		X				X		X		X
Road tax				X	X				X						X
Sales tax		X	X	X			X								X
Import duty	X	X	X	X			X		X	X	X	X	X		X
Registration charge	X	X	X			X		X	X		X	X	X	X	X
Company car tax							X				X				
Air Transport															
Landing/flight taxes	X				X										X
Noise tax/charges etc.							X					X			
Agriculture															
Pesticides										X	X				
Fertilisers											X				
Soil protection charge							X								
Waste-related Product Charges															
Ozone-depleting substances					X			X				X	X		
Batteries/accumulators					X		X	X	X				X	X	
Carrier bags															
Disposable containers/packaging						X	X	X	X		X				
Tyres			X		X		X	X	X						
Light bulbs								X							
Lubricants								X							
Refrigerators							X								

⁵ REC (2001): *Environmental Taxes in an Enlarged Europe, An Analysis and Database of Environmental Taxes and Charges in Central and Eastern Europe*

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Instrument	AL	BiH	BG	Cro	CZ	Est	H	Lat	Lit	Mac	Pol	Rom	Sl	Slo	Yug
Waste															
Municipal waste user charges	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Waste disposal charge/tax				X	X	X	X	X		X	X	X	X	X	
Waste non-compliance fees			X	X		X	X	X	X		X	X	X		X
Deposit refund schemes	X		X	X	X		X		X		X	X	X		X
Levy on nuclear energy			X		X		X	X					X		
Instruments for Managing Water Quality															
Water user charge	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sewage charge		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Water effluent charge/tax		X		X	X	X		X	X		X	X	X	X	X
Water pollution non-compliance fee	X		X	X			X	X	X	X	X	X	X		
Instruments for Managing Water Quality															
Water extraction charge/tax		X		X	X	X	X	X	X	X	X	X	X	X	X
Natural Resource Mining															
Mining charges/taxes	X	X	X	X	X	X	X	X	X	X	X		X		X
Instruments for Biodiversity and Nature Protection															
Charges for conversion of agricultural and forest land				X	X								X		
Hunting charges			X	X		X	X		X		X	X		X	
Fishing charges			X	X		X		X	X		X	X			
Natural park entrance charges				X							X	X			
Nature protection non-compliance			X	X		X	X		X		X	X	X		X
Tree cutting charges/taxes		X	X	X			X	X	X		X	X			
Tree cutting non-compliance fee									X		X	X			

Source: REC (2001): Environmental Taxes in an Enlarged Europe

Alb – Albania; BiH – Bosnia and Herzegovina; Bul – Bulgaria; Cro – Croatia; CR – Czech Republic; Est – Estonia; H - Hungary; Lat – Latvia; Lit – Lithuania; Mac – FYR Macedonia; Pol – Poland; Rom – Romania; Sl – Slovakia; Slo - Slovenia; Yug – Yugoslavia

In most countries in the region environmental policy uses emission charges and fines to control pollution levels. When judiciously applied, these payments can significantly influence the environmental behaviour of enterprises as they increase the cost of pollution and reward efforts to reduce emissions. However, the existing economic instruments in CEE, the Baltics and SEE are frequently ineffective and do not fully correspond to the polluter pays principle, as the actual level of charges and fines is extremely low and the payment is sporadic at best.

Despite the operation of the pollution charge system, its incentive impact on polluters' behaviour has been rather low across the regions. With few exceptions the level of pollution charges is so low (partly because the rates have been eroded by constantly high inflation rates) that the charges provide no incentive for reducing pollution, and thus it is cheaper for enterprises to pay the charge than to invest in pollution prevention and control. Many organisations simply open a new budget line in the expenditure side of their balance sheet and plan to regularly pay the necessary fines to the authorities.

Poor compliance monitoring and enforcement of environmental standards contributes to frequent non-compliance

The current body of EU legislation, the *acquis communautaire*, has grown to more than 300 items and several thousands pages of text in the environment sector alone. It is one of the most advanced and comprehensive environmental legislation systems in the world.

On the other hand, the complexity of the environmental *acquis* creates serious budgetary and institutional demands for the legislations' effective implementation. As a result, all member states experience a certain degree of difficulty with effective implementation and enforcement. The challenge the EU applicant countries are facing is much more serious than that of the current member states, as they have committed themselves to implement the entire current *acquis communautaire* in a short period of time before accession. Even the transition periods requested for the most difficult directives are considered very demanding. This situation creates the risk of a growing gap between the legal requirements and their practical implementation, when a lot of new EU legislation suddenly comes into force in the years ahead, without much effort devoted to institutional strengthening and capacity building. The apparent implementation gap in the current member states, as indicated by the growing number of court cases related to environmental directives, is also not very helpful in setting the applicant country priorities for full and rapid implementation.

Compliance monitoring and enforcement are key determinants of enterprise strategies to cope with the environmental policy framework as they directly impact on the costs of compliance/non-compliance, in other words the cost of effective/ineffective resource usage that enterprises apply in their decision-making. While the monitoring system determines the probability of a regulatory offence being identified, the enforcement tools set out the probability that an offence will be sanctioned as well as the level of the sanction. Both compliance monitoring and enforcement systems can be considered weak across the region, though in varied ways, which directly contributes to lowering the companies' costs to non-compliance, and therefore discourages more serious efforts towards improving their environmental management.

Across the region monitoring of actual discharges only takes place in limited cases and for a few substances. These actions are not frequent or consistent enough, and in most of the countries industrial and agricultural discharges are only self-reported or estimated (as a function of the employed technology, input of materials, level of production, or similar parameters). When the authorities want to take samples from companies they indicate their intention and pre-arrange their visits, so companies are forewarned and can prepare favourable samples. This, too, lowers the incentive impact of pollution charges, because polluters do not have to worry much about being seriously caught in negligence.

In the REC's contribution to the Sixth Environmental Action Programme of the EU,⁶ the following enforcement obstacles were highlighted for the region:

- The impacts and effectiveness of sanctions are often too low.
- Human resources of executive enforcement are limited not only by the insufficient number of staff, but sometimes by a low level of experience and expertise.
- Coordination and cooperation between different ministries is often an essential problem or even non-existent.
- The competences for compliance promotion are scarce or totally missing, resulting in the predominant application of "command and control principle," similar to that practiced in communist times.

The EC network for the Implementation and Enforcement of Environmental Law (IMPEL) provides appropriate and effective routes for identifying and using member states' experiences and resources in implementation and enforcement. The EC, after some preliminary discussion with IMPEL, created a parallel network, the Accession Countries' Impel network (AC-IMPEL) to do the same across CEE and the Baltics. Similarly, the Balkan Environmental Regulatory Compliance and Enforcement Network (BERCEN) was established by high-level officials from the environmental ministries of SEE, in Tirana in December 2001. BERCEN operates under the

⁶ REC (2000): *Applicant Countries' Contribution to the Sixth Environmental Action Programme*

framework of the stabilisation and association process, the European Union's strategy for creating the conditions needed to integrate the countries of SEE into European structures. BERCEN facilitates, assists and promotes the enforcement of regulations throughout SEE by disseminating information, finding common denominators for cooperation and developing projects of common interest with the countries participating in the network.

The members of BERCEN work together to advance the application and implementation of environmental legislation and to increase the effectiveness of enforcement agencies and inspectorates.

According to the BERCEN Secretariat,⁷ in evaluating the function of the SEE inspectorates, a system must be developed from the tools available in the inspecting organisation. Most inspectorates make an annual plan but clear enforcement strategies have not yet been developed in all of them. This may mean that the annual planning is only a routinely made procedure due to the law that requires compulsory inspections. Due to the lack of human resources, the quality of inspections themselves might be impaired; hence the expressed need for training in monitoring, enforcement and compliance promotion practices.

Theoretically, the inspectors have all the tools required to perform their jobs. However, there seems to be a recognised need for training in the technical aspects of enforcement, in the implementation of the laws and in the management of human resources. These areas need to be strengthened as soon as possible.

Inspectors are not allowed to investigate accounting or bookkeeping in relation to suspected false reporting of waste handling, disposal costs, purchases of fuels from suppliers who mix chemical waste with their products, illegal cross-border transportation of waste, and the like. This indicates the immediate need for the development of more intelligent legislation and procedures.

Table 9 below shows the current capacity levels at SEE authorities.

Table 9: Capacity levels of SEE inspectorates.

Country	Albania	Bosnia and Herzegovina	Bulgaria	Croatia	Macedonia	Serbia	Montenegro	Romania
Number of inspectors	42	N/A	400	33	8	39	4	1,883 at 42 county inspectorates (400 deal with enforcement)
Number of inspection visits/year	1,000	N/A	14,600	2,850	1,000	4,560	231	Ca. 150,000, comprising 100,000 enforcement, 50,000 permit
Percentage of biologists	20	N/A	N/A	N/A	No	12.5	0	N/A
Percentage of technical personnel	20	N/A	N/A	N/A	20	45	75	N/A
Percentage of chemists	20	N/A	N/A	N/A	60	5	0	N/A
Percentage of lawyers	4	N/A	N/A	0	20	2.5	0	Low
Average years of experience	15	N/A	N/A	N/A	5-6	18	20	N/A
Training of management (weeks/year)	2	N/A	N/A	No	1-2	N/A	0	3-4 days/ inspector/year
Training of staff (weeks/year)	3	N/A	N/A	1	1	1	0	3
Management budget	No	N/A	N/A	No	Yes	N/A	0	N/A

Source: REC, the BERCEN Secretariat (2002): Assessment of Environmental Enforcement Agencies in the Stabilisation and Association Process Countries

Lack of compliance promotion and other support for companies

CAPACITY BUILDING

There are only a limited number of compliance promotion activities in CEE and the Baltics while they are almost non-existent in SEE. In all regions these activities are undertaken with varying degrees of effectiveness. They are usually carried out outside environmental inspectorates, in the form of general information provision by NGOs and cleaner production centres. Enforcement authorities have not been really active in encouraging pollution prevention and EME (although there are isolated cases of in-country activities in this area, mainly with donor assistance). Similarly, the lack of environmental information available to the public through pollution release and transfer registers (PRTRs) and other means helps to avoid serious and effective pressure from local communities and environmental NGOs. As a consequence, industrialists are often unaware of preventive strategies and feel they have not much to gain from them.

On the regulatory and authority side it has been recognised that, in parallel to legal transposition, efforts are also needed to practically achieve implementation and enforceability of environmental legislation. In the context of the “approximation process” it is clear that there is a considerable need for the associated countries to receive support in the implementation of the environmental acquis, in addition to improving enforcement procedures. As with compliance monitoring and enforcement, compliance promotion is supposed to be amongst the basic tasks in the day-to-day work of inspectors, and a cornerstone in a systematic compliance and enforcement strategy. However, the majority of countries in the region, including the most developed ones, do not yet have a systematic approach to compliance promotion.

It is therefore necessary to develop a system that promotes compliance by helping companies in their capacities, and motivating them by offering information and potential economic benefits (i.e. better management of their resources and/or their risks). The institutional base for this can be strengthened by the development (in SEE) or the improvement of existing organisations such as cleaner production centres, pollution prevention and environmental management networks. There are now more attempts at trials and adaptation of voluntary agreements and other progressive approaches between companies and authorities (with the potential for civil society to watch and comment on them) taking place in the higher developed economies of the region. However, very few of them have yet been piloted. Nevertheless, the strength of external and growing domestic pressures are expected to stimulate the spread of various voluntary approaches, as can be seen in boxes 1 and 2 below.

Box 1: Voluntary agreement initiative in Estonia

Source: ABEI II Final Report, Country Review, Estonia 2002

The Estonian Ministry of Environment has signed voluntary environmental agreements with the following industrial enterprises:

- AS Norma (galvanic);
- AS Kunda Nordic Tsement (cement producer);
- AS Nitrofert (fertilizer producer);
- AS Elcoteq (electronic manufacturer).

These voluntary agreements represent a pivotal, new approach in environmental protection. This is an attempt to apply “win-win” solutions. Agreements do not include direct financial duties for either industry or the ministry. The MoE has promised to inform industry about upcoming changes in environmental legislation, and includes representatives in the design of new normatives and regulations. For its part, industry voluntarily undertakes some environmental tasks which would remarkably improve the state of the environment but which are not directly required by existing environmental legislation.

⁷ REC, the BERCEN Secretariat (2002): *Assessment of Environmental Enforcement Agencies in the Stabilisation and Association Process Countries*

Box 2: Fine suspension system in Poland

Source: PANEK-GONDEK, Krystyna (2002): Experience of the Inspectorate for Environmental Protection in Implementation and Enforcement of Environmental Law in Poland, at the Conference Proceedings of the Sixth International Conference on Environmental Compliance and Enforcement, San Jose, Costa Rica

The main objective of the fines is to stimulate pro-environmental measures by industrial plants. Therefore, if a fined plant undertakes the obligation to implement a project to eliminate the cause of the sanction imposed within a specified time (no longer than five years), the fine may be temporarily suspended. If the goal is achieved within the specified time, the fine is cancelled if it is lower than the investment outlay. If the fine is higher, the plant pays only the difference. Thus, the fine suspension system converts sanctions into investments to eliminate environmental law transgression. In 2001, units of Inspector for Environmental Protection issued 668 decisions suspending penalties for a total amount of PLN 168.9 million (approximately USD 41 million). Of the 238 plants using the suspension system that were able to complete investments eliminating the cause of non-compliance by the end of 2001, as many as 236 (99%) met the deadline. (In 2000 the proportion was 94%). It should be stressed that the high efficiency of the suspension system has been observed for a number of years; the system strongly stimulates business entities to undertake pro-environmental measures.

If control measurements are taken in a plant and, based on the results, an administrative fine is imposed, the plant also has to cover the costs of the measurements. If the results demonstrate that the plant operates in accordance with the law, the costs of the inspection are covered by the state budget. In 2001, 3,612 decisions were issued which imposed on the inspected plants the obligation to pay total inspection costs of PLN 5.4 million (about USD 1.3 million). (In 2000, 3,567 decisions were issued for a total amount of PLN 3.2 million, or roughly USD 0.8 million.) As in previous years, a high level of effectiveness in collecting these payments was reported in 2001: 92.8% versus 90.1% in 2000.

Capacity Building

There are several well-recognised approaches towards building the capacities required for improving the environmental performance of enterprises. Of these, the provision of information, environmental education, institutional arrangements, environmental management systems and business partnerships are considered below.

Information, education and training

Provision of information, education and training on EME are key capacity building and promotion tools. Often “win-win” opportunities (where environmental and economic benefits can be realised simultaneously) go unnoticed by companies that lack information or expertise to identify these opportunities and their potential benefits. OECD country governments have long recognised this and developed tools to help overcome this obstacle to EME. Many OECD countries have developed telephone hotlines, websites and technical brochures to advise companies on regulatory requirements and on best available techniques (BATs) and technologies to comply with them. The latter will be inevitable if the IPPC Directive of the EC is to be met.

Higher education that incorporates environmental management aspects into industrial training programmes lays the foundation for spreading knowledge and skills to a wider group of future professionals and decision-makers. In addition, the introduction of environmental management courses into a variety of faculties and specialities can spread the idea of preventive approaches to groups that would not otherwise attend environmental training programmes. While the result from such efforts will only show over the long-term, they constitute an indispensable element of strategy to promote environmental management across the economy, including at the micro level.

The ABEI country reviews (see Annex) collected by the REC have included an incomplete list of educational and training opportunities in a selection of countries. The indicative dataset (table 10) illustrates that where the basic

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incentive framework exists for environmental management applications —mostly in the forerunner accession countries — the number of students per year receiving environmental management or environmental technology-related degrees is relatively high. From the SEE countries we have not received a report on this issue, with the exception of Bulgaria, where four universities offer environmental management programmes. According to our understanding, these data on formal and informal environmental educational opportunities across the region are rather incomplete. For instance, in Hungary today very few higher educational institutions, be it in the fields of management or law or technical matters, provide education without requiring at least one course on relevant environmental issues.

Important educational opportunities are also provided through training programmes by international and foreign universities. While it is difficult to estimate the real extent of this type of activity, its impact is probably significant. Several experts of this relatively new field of science practicing across the region today have received their advanced diplomas abroad, either in Western Europe or North America. Specifically, masters programmes exist in Sweden, the Netherlands (e.g. the European Postgraduate Course in Environmental Management — EPCEM at Vrije Universiteit), and at the Central European University (CEU) in Budapest.

Besides universities and institutions for professional training, business networks also offer a wide range of training services throughout the CEE countries.

Table 10: Environmental education programmes in selected CEE countries

University	Course	Start date	Degree	Students/year
Bulgaria				
<i>Varna University</i>	Environmental Management		Univ. diploma	N/A
<i>Sofia University</i>	Environmental Management		Univ. diploma	N/A
<i>Rousse University</i>	Environmental Management		Univ. diploma	N/A
<i>Gabrovo University</i>	Environmental Management		Univ. diploma	N/A
Czech Republic				
80 programmes on ecology and environmental protection				830
<i>University of Chemical Technology</i>	Training centre for cleaner production			N/A
<i>Polytechnic Institute in Brno</i>	Training centre for cleaner production			N/A
<i>Polytechnic Institute in Zlín</i>	Training centre for cleaner production			N/A
<i>School of Mining - Technological University in Ostrava</i>	Training centre for cleaner production			N/A
Estonia				
<i>Tallinn Technical University</i>	Environmental Techniques	1996	BS (4 years) MS (+2 years)	50 4
	Chemistry and Environmental Protection Technology			N/A
	Training courses for waste-water treatment		-	30
<i>Tartu University</i>	Environmental Technology		BS (3 years) MS (+2 years)	N/A
	Environmental Health at Faculty of Medicine	2001	MS	N/A
<i>Turi College of the Tartu University</i>	Basics of Environmental Protection	1996	Univ. diploma (4 years)	30
	Training courses for environmental advisors		-	N/A
<i>Estonian Agricultural University</i>	Environmental Economy			N/A
<i>Tallinn Pedagogical University</i>	Environmental Management	1999	B.S.	10-20
<i>Euro University</i>	Environmental Management		BS (3 years)	N/A
Hungary				
In the field of environmental protection, about 40 secondary schools			Secondary level	3-4,000 (2001)
Colleges and universities covering environmental disciplines			College and university diploma	1,478 (2001)
Advanced education in the environmental field also exists at postgraduate levels			College and university diploma:	N/A

University	Course	Start date	Degree	Students/year
			MEng, MSc and PhD	
Poland				
	About 100 specialisations on environment protection in the country		Higher education	N/A
	About 80 specialisations on environmental engineering		Higher education	N/A
	A few courses on ecology		Higher education	N/A
	Management (incl. environmental protection), about 500 places in the country		Higher education	N/A

Source: REC (2002): ABEI II Final Report: Country Reviews

Institutional arrangements

Institutions such as cleaner production (CP), pollution prevention (PP) and environmental management (EM) centres, and other business networks can play a key operational role in supporting EME. In particular CP centres can provide a mechanism for involving stakeholders and for organising the crucial information, education and training functions mentioned above. CP centres may also play a role in the identification and preparation of viable CP investment projects.

A recent REC survey found there has been important progress in setting up CP, PP and EM centres across CEE, the Baltics and even in SEE. The United Nations Industrial Development Organisation (UNIDO), United Nations Environment Programme (UNEP), and supportive European governments, including Austria, Norway and Switzerland, have played a major role in financing these institutions and their facilities. However, many of these institutions have been organised around academia, thus their operational management and their results reflect the scope and efficiency that can be expected and achieved in academic settings, for better or worse.

The Basic Capacity Level is the level thought to be needed for further dissemination of the CP concept and principles throughout industry and society by the host country. Specifically, it involves creating: (a) an active core of CP advisors and trainers, (b) a set of CP case studies, demonstration projects and model business plans, (c) a functioning CP centre or centres, (d) training materials in the local language, and (e) cleaner production principles included in university course curriculum, such as business administration, engineering and economics.

The “Scandinavian approach” to CP goes even beyond these steps. For example, the experts from the Norwegian Ministry of Environment coach the freshly trained CP engineers, help them to identify CP project opportunities in their own companies, and, moreover, they train “financial engineering-efficient” approaches to generate financing for these project opportunities. The Nordic Environment Finance Corporation (NEFCO) backs many of these well-designed and well-presented eco-investment opportunities. Each CP engineer then identifies several CP projects annually. The results are said to be very encouraging, thus this approach deserves further attention across CEE, the Baltics and SEE.

Clearly, there is now a great need to strengthen and coordinate the efforts of these existing institutions in their methods and procedures in order to increase efficiency. It is also important to generate higher recognition from their local governments, as support for their activities rarely exists. In some countries, new CP centres should be established (e.g. in Serbia and Montenegro, FYR Macedonia, etc.) to better address vital information flow, training and compliance promotion.

Table 11 on the following pages provides basic information on these institutions across the region, including their contact details.

Table 11: CP, PP, EM centres in CEE, the Baltics and SEE

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
Association of Industrial Ecology	Albania		NGO linked to an industry organisation		c/o Fakulteti I Shkencave Natyrove Dept. I Kimiste Industriale Prof. Ilirian Malollari Rruga Duresit, P-69, Tirana, Albania Tel./fax: (355-4) 226-724 E-mail: ilire.malo@excite.com			

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
Renter for Environmentally Sustainable Development (CESD) <i>Centar za okolisno održivi razvoj (COOR)</i>	Bosnia and Herzegovina	2000	Non-governmental organisation	N/A	Stjepana Tomica 1 71000 Sarajevo Bosnia and Herzegovina Tel: (387-33) 212-466 / 212-467 Fax: (387-33) 207-949 E-mail: coorsa@bih.net.ba Web: www.coor.ba	<ul style="list-style-type: none"> • CP demonstration project: introduction of CP in small slaughterhouse industry. • Two studies: textile industry and dairy industry in BiH as a contribution to the RAC/CP project. • Pollution reduction at source: priority action in National Environmental Action Plan (NEAP) for BiH. • LIFE Third Countries project: Capacity building in CP, aiming to train 60 professionals from industry, government, universities and NGOs on CP and demonstrating CP in 10 industries. 	< USD 10,000 Grants	Full-time: 5 Part-time: 5

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
Regional Environmental Center, BiH country office	Bosnia and Herzegovina		International organisation	REC CEE	Kosevo 40 71000 Sarajevo Tel: (387-33) 219-756, 219-757 Tel/Fax: (387-71) 219-757 E-mail: nseremet@rec.org.ba Web: www.rec.org.ba			Full-time: 7
Clean Industry Center	Bulgaria	1995	Unit of Bulgarian Industrial Association	ICC, CEFIC	c/o Bulgarian Industrial Association 16-20 Alabin St., 1000 Sofia, Bulgaria Tel: (+ 359-2) 980-3055; E-mail: brankov@bia-bg.com Web: http://b2b.bia-bg.com/biasite/act_cleanindustry.asp			
Bulgarian Business Leaders Forum	Bulgaria	1998	Non-profit association	12 founding, 69 ordinary and three honorary members IBLF	42, Slaviyanska Str. 1000 Sofia, Bulgaria Tel: (+359-2) 986-5202 Fax: (+359-2) 986-5625 E-mail: office@bblf.bg Web: www.bblf.bg			Ms Dessislava Miteva, BBLF Executive Director (as of January 2003)

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
Croatian Cleaner Production Center	Croatia	2000	NGO established by APO (Hazardous Waste Management Agency). Ministry of Economy, Chamber of Commerce and Ministry of Environment represented on board	MEDA, cooperation with CPCs in Czech Republic and Slovakia	Savska cesta 41/IV HR-10000 Zagreb Croatia Tel: (385-1) 617-6736 Fax: (385-1) 617-6734 E-mail: cro.cpc@apo.tel.hr Web: www.cro-cpc.hr			
Croatian Business Council for Sustainable Development	Croatia	1997	Non-profit institution	25 member companies; WBCSD	Hotel Opera Zagreb, Rooms 201+203 Krsnjavoga 1 HR-10000 Zagreb Croatia Tel: (385-1) 483-6653, 483-6650 Fax: (385-1) 483-6771 E-mail: hropsor@zg.hinet.hr Web: www.voda.hr/hropsor	<ul style="list-style-type: none"> • Co-organiser of Regional Conferences for Sustainable Development (since 2000; Zagreb, Budapest, Vienna). • Environmental reporting, eco-efficiency case studies. 		
Association of Producers of Environmental Systems	Czech Republic			Czech IPPC Bureau				

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
Business Leaders Forum	Czech Republic	1992	Association of companies	46 members of private companies / IPWBLF	Palac Lucerna Stepanska 61 116 02 Prague 1 Czech Republic Tel: (420-2) 2421-6275 Fax: (420-2) 2421-3957 E-mail: blf@blf.cz , Web: www.blf.cz	<ul style="list-style-type: none"> • Education: Manager Shadowing Programme for university students. • Programme for handicapped young people. • Annual Health and Environment Award for Companies, Municipalities and NGOs, since 1990. • Social Responsibility and Public-Private Partnership Programmes. 		Full-time: 3
Cleaner Production Center	Czech Republic	1994	Civic association	UNIDO/UNEP CPN, INEM, Czech IPPC bureau	Ditrichova 6, 120 00 Prague 2, Czech Republic Tel: (420-2) 2492-0265, (420-2) 2492-1269, Fax: (420-2) 2491-2490 E-mail: info@cpc.cz Web: www.cpc.cz	<ul style="list-style-type: none"> • More than 150 CP projects in the period 1995-99. • Signature of Cleaner Production declaration in 2000 by MOE. • 165/2000 		Full-time: 6

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
						governmental decree on National Programme of CP. <ul style="list-style-type: none"> • Projects in Croatia, FYR Macedonia, Moldova, Kazakhstan, India. 		

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
Czech Environmental Management Center	Czech Republic	1992	Civic association, certified in ISO 9001/2000	50 members / ICC, INEM, WBCSD, Czech IPPC bureau, cooperation with CIC Bulgaria and PPC Romania	Jevanska 12 100 31 Prague 10 Czech Republic Tel: (420-2) 7478-4447 Fax: (420-2) 7477-5869 E-mail: cemc@cemc.cz Web: http://www.cemc.cz	<ul style="list-style-type: none"> National EMAS, National EMS Standards, voluntary registration of EMS certificates. EMS Training (ICC/UNEP), National Focal Point, more than 100 experts trained. EMS implementation in 20 companies (six certified) POEMS Projects in Belarus and Romania, cooperation in Lithuania. Publisher (environmental aspects of business, alternative energy, waste forum). 	300,000 Services: 32%, Advertising: 22%, Grants: 33%, Members' fee: 13%	Full-time: 10
Czech Pollution Prevention Center	Czech Republic	1995	Part of CEMC	Czech IPPC bureau	Jevanska 12 100 31 Prague 10 Czech Republic Tel: (420-2) 7478-4447 Fax: (420-2) 7477-5869 E-mail: cemc@cemc.cz Web: http://www.cemc.cz	<ul style="list-style-type: none"> Czech National Plan for Waste Management. IPPC application support (seven companies). 	N/A	N/A
Czech Business Council for	Czech Republic	1994	Hosted by CEMC	WBCSD	Jevanska 12 100 31 Prague 10 Czech Republic	<ul style="list-style-type: none"> Scenarios for Czech Republic. 	N/A	N/A

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
Sustainable Development					Tel: (420-2) 7478-4447 Fax: (420-2) 7477-5869 E-mail: cemc@cemc.cz Web: http://www.cemc.cz	<ul style="list-style-type: none"> • Tri-partite Agreement on Cooperation in Environment with MoE and Confederation of Industry. 		

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
National Cleaner Production Centre	Estonia	1992	Civic organisation, hosted by the Centre for Development Programs EMI-ECO. Also a civic organisation	Member of: INEM, ENTO, Chamber of Environmental Auditors of Estonia, National Association of Management Consultants in Estonia	Peterburi Road 46-111 11415 Tallinn, Estonia Tel: (372-6) 139-709 Fax: (372-6) 139-708 E-mail: emieco@emieco.ee Web: www.emieco.ee	<ul style="list-style-type: none"> • National Environmental Strategy • Cleaner production Chapter, 1996 • Cleaner Production Declaration signed by MoE Estonia in 1999 • Implementation of Cleaner Production Programme in 20 companies • Approx. 80 Feasibility Studies and 120 implemented CP projects • Preparation of Cleaner Production projects for loan application (2 companies) • EMS Projects in companies (7 certified) • CP projects in cooperation with 	300,000 /Year Env. Services: 100%	10 (Four in env. programme)

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
						NEEG in food and wood industries (integrated Environmental and Energy Management)		

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
Estonian Institute for Sustainable Development Stockholm Environment Institute – Tallinn	Estonia	1992	The Environmental Management Program is part of SEIT		P. O. Box 160 10502 Tallinn Estonia Tel.: (372-6) 276-102 Fax: (372-6) 276-101 E-mail: postmaster@seit.ee Web: http://www.seit.ee			16 (Four in EM programme)
Hungarian Business Leaders Forum	Hungary		Business association	84 corporate, 18 associate and 11 honorary members; IBLF	Borbolya utca 9, fsz.4 1023 Budapest Hungary Tel: (36-1) 326-2153 Fax: (36-1) 326-2153 E-mail: mblf@axelero.hu www.mblf.hu	<ul style="list-style-type: none"> • Millennium Award from HRH Prince of Wales. • Kecskemét Incubator House for 40 SMEs in cooperation with government. • 900 young people assisted by project on how to become an entrepreneur. • Co-organiser of Regional Conferences for Sustainable Development (since 2000; Zagreb, Budapest, Vienna). 	N/A	Full-time: 2

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
						<ul style="list-style-type: none"> Environmental reporting and "Business World for the Environment" award. 		

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
Hungarian Association for Environmentally Aware Management (KÖVET-INEM Hungária)	Hungary	1995	Non-profit, non-governmental organisation with a special public benefit status	56 / INEM	Munkácsy Mihály u. 16 1063 Budapest Hungary Tel.: (36-1) 473-2290 Fax: (36-1) 473-2291 E-mail: kovet@mail.neti.hu Internet: http://www.kovet.hu	<ul style="list-style-type: none"> • Practical publications on environmental management: five guides, four handbooks, one CD, etc. • Seven large conferences, more than 50 short training sessions. • 56 member companies, 80-100 other business partners • Approx. 30 demonstration projects (environmental management tools). • Over 10 large international projects completed successfully (Phare, LIFE, DBU, Leonardo, Hungarian Government, etc.). 	Category 3 Project applications: 64%, Grants: 13% Membership fees: 11% Services: 10%	Full-time: 8 Part-time: 1

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>		<i>EM = environmental management</i> <i>ET = environmental technology</i>		<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>	
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)	
Association of Environmental Enterprises	Hungary	1992	Non-profit organisation in the public's interest	Associated member of FEAD	Hegedûs Gyula u. 68 1133 Budapest Hungary Mail address: P.O. box 8 1364 Budapest Hungary Tel/fax: (36-1) 350-7271 Tel/fax: (36-1) 350-7274 E-mail: kszgysz@axelero.hu Web: www.kszgysz.hu ; www.kawe.hu	Operating the Professional Information System of Environmental Protection on the internet. Information in the Environmental Sector series of yearbooks, with company profiles. Protection of the Environment Award. Awarded to companies and persons involved in the environmental industry for the protection of the environment, and for outstanding environmental activities. Series of conferences on environmental issues (nine conferences, each with 200 participants). Website containing information on EU environmental policy.		Full-time: 4 Part-time: 2	
Hungarian Cleaner Production Centre	Hungary	1997	Hosted by Budapest University of Economic Sciences and Public Administration	N/A	Budapest University of Economic Sciences and Public Administration Fövám tér 8 H-1093 Budapest Hungary Mailing address: P.O. box 489	Training in CP and EMS. CP assessments. Environmental accounting. Assessment of European Union environmental regulations. Policy advice to the Ministry	Category no. 3 Grants from environmental funds 20% Contracts with UNEP and UNIDO 30%	Full-time: 4 Part-time: 1 External: 5	

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
					1828 Budapest Hungary Tel: (36-1) 215-5808 Fax: (36-1) 215-5808 E-mail: cleaner@enviro.bke.hu Web: http://hcpc.bke.hu	of the Environment and Ministry of Economic Affairs. Participation in higher education.	Contracts with ministries 30% Other 20%	
Latvian Pollution Prevention Center	Latvia				Dzirnavu iela 140-118 1050 Riga Latvia Tel: (37-1) 720-4118 Fax: (37-1) 720-4118 E-mail: lppc@lppc.lv Web: http://www.lppc.lv			
Environmental Management and Audit Institute	Lithuania	1998	Non-profit organisation, public institution	ICC INEM Confederation of Lithuanian Industrialist's Engineering Ecology Association	Domininkonu 4 2001 Vilnius Lithuania Tel: (37-05) 262-5871 Fax: (37-05) 262-5871 E-mail: avai@ktl.mii.lt	1. Integrated Product Policy (Lithuanian Model). 2. EMS implementation in nine countries (three certified). 3. EMS training >50 experts trained. 4. Published book (ISO 14000) 5. National environmental management audit strategy in industry.	2 Env. Services: 40% Grants: 40%	Full-time: 5 Part-time: 5 External: 10

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
Institute of Environmental Engineering	Lithuania				Kaunas University of Technology K. Donelaicio 20-307 3000 Kaunas Lithuania Tel: (37-07) 224-655 Fax: (37-07) 209-372 E-mail: jurgis.staniskis@apini.ktu.lt			

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
Responsible Business Forum	Poland	2000	Association		ul. Bruna 16/11 02-594 Warsaw Poland Tel: (48-22) 825-8153 Fax: (48-22) 825-7745 E-mail: biuro@fob.org.pl Web: www.fob.org.pl			Full-time: 3
Pollution Prevention Center (SOZO)	Poland		Part of University		c/o Technical University of Lodz ul. Stefanowskiego 4/10 90-924 Lodz Poland Tel: (48-42) 631-3703 Fax: (48-42) 636-5285 E-mail: sozopl@sjr.p.lodz.pl			
International Business Leaders Forum Representative	Poland			IBLF	c/o Potworowski Kinast Grant Thornton Jasna 1 00 013 Warsaw Poland Tel: (48-22) 827-3246 Fax: (48-22) 696-2360			
The "Polish Cleaner Production Movement" Society	Poland	1989	Registered society, acting within the Polish Federation of Engineering Societies, administrated by the Polish Cleaner Production Centre in Katowice	The Society acts within the framework of UNEP TIE. Locally, the Society is a registered member of the Polish Federation of Engineering Societies	P.O. box 1388 ul. Krasinskiego 13 40-019 Katowice Poland Tel/fax: (48-32) 256-5507 E-mail: polccp@programcp.org.pl Web: www.programcp.org.pl	<ul style="list-style-type: none"> • 12 regional CPCs. • 225 companies certified in Polish CP schemes. • 40 CP training cycles for industry, authorities and other organisations (so 	<100,000 National Fund for Env.: 60% Membership fees: 20% Foreign: 20%	Full-time: 3 External experts: 1,335, of whom 60 registered

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
						<p>called CP schools, about six-months each, including education, design and implementation).</p> <ul style="list-style-type: none"> • 668 CP projects (case studies). • 1,335 experts graduated from CP schools. 		
Polish Cleaner Production Centre	Poland	1989	Structure of the Polish Federation of Engineering Societies			<ul style="list-style-type: none"> • 12 regional CPCs. • 224 companies certified in Polish CP schemes. • 667 CP case studies. • 1,334 experts graduated from CP schools. 	<100 000 National Fund for Env.: 60% Membership fee: 20% Foreign: 20%	Part-time: 3 External experts: 40
Clean Production Action	Poland				E-mail: pawel@otzo.most.org.pl			
Pollution Prevention Centre, Opole	Poland	1996	Hosted by Atmoterm S.A. (joint stock company)		c/o Atmoterm S.A. ul. Langowskiego 4 45-031 Opole Poland Tel: (48-77) 4426-666 Fax: (48-77) 4426-695	<ul style="list-style-type: none"> • EMS implementation in seven companies (five certified). • 54 case studies of waste 	500,000 E/Y	Full-time: 10 Part-time: 5

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
					E-mail: office@atmoterm.pl ; warszawa@atmoterm.pl	minimisation projects. <ul style="list-style-type: none"> • Two brochures published. • Five seminars and workshops for chemical industries. • Ten regional ISO 14001 seminars. 		
Romanian Cleaner Production Centre	Romania	1999			c/o University Politehnica of Bucharest 313 Spl.Independentei Bucharest 6 RO 77206 Romania Tel: (40-21) 402-9693 Fax: (40-21) 410-1367 E-mail: mircea.grigoriu@kappa.ro Web: www.rcpc.pub.ro			

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>		<i>EM = environmental management</i> <i>ET = environmental technology</i>		<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>	
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)	
Pollution Prevention Center (Centrul de Prevenire a Poluarii -CPP)	Romania	1995	Non-governmental and non-profit organisation (foundation), independent legal entity, non-advocacy	INEM, Agreements with Czech Environmental Management Centre, Bulgarian Clean Industry Centre, and Moldavian Cleaner Production and Energy Efficiency Centre, cooperation with different Romanian specific organisations	Theodor Sperantia 98, bl.S28 Sc.A, et.3, ap.10, 74317 Bucharest 3 Romania Tel: (40-21) 327-4795 Fax: (40-21) 327-4796 E-mail: cpp@pcnet.ro Web: http://users.pcnet.ro/cpp	Waste minimisation impact/demonstrative programmes/projects (>12). EE demonstrative projects (>8) and CP projects for industry (>4). Pollution prevention and EMS projects (>7). Training courses (with self-financing, including the related training kits, delivered free) on: EMS, env. audit, PP (for specialists of >7 organisations). Environmental services (assessment studies, EMS, monitoring) (>100). Training manuals (with self-financing, delivered free to hundreds of industrial specialists) on: CP, PP, working tools regarding evaluation and implementation of PP programmes, EMS, guide for effective public involvement in decision-making processes regarding location of municipal solid waste facilities.	40,000-50,000/Year Env. services: 75-80%, Grants: 20-25%	Full-time: 3 (technical engineers) Part-time: 3 (technical engineers) External: ~8 (different backgrounds)	

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>	<i>EM = environmental management</i> <i>ET = environmental technology</i>	<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>		
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)
Slovak Cleaner Production Centre	Slovakia	1994	Originally a civic association. Since the second half of 2002 a limited company	Around 40 individual members, City of Martin, General Credit Bank, three production companies – all until Nov. 2002	Pionierska 15 83102 Bratislava Slovakia Tel: (421-2) 4445-4328 Fax: (421-2) 4425-9015 E-mail: scpc@scpc.sk Web: www.scpc.sk	<ul style="list-style-type: none"> • CP projects in 169 enterprises. • Combined projects with EMS (and QMS) in 31 enterprises. • Health and safety projects for six companies. • 1,222 participants in training courses; 428 certified. • CP declaration signed by minister of environment in 1999. • PREPARE: preventive approaches in Europe, EC-based network for CP. Established in 1992. SCPC acts as secretariat in 2002-2003. 	<500 000/Year	Full-time: 9 Half-time: 2 Civil servants: 2 External: c. 40
Slovak Pollution Prevention Center	Slovakia	1995	Merged with SCPC in April 1999					
Eco business	Romania		Hosted by the Romanian	EPCE	4100 Miercurea – Ciuc			2 in EBP

CP, PP centres and EM, ET, SD, CR associations in CEE				<i>CP = cleaner production</i> <i>PP = pollution prevention</i>		<i>EM = environmental management</i> <i>ET = environmental technology</i>		<i>SD = sustainable development</i> <i>CR = corporate responsibility</i>	
Organisation	Country	Date established	Legal status / hosting institution	Members / membership, relations	Address	Main achievements in eco-efficiency issues (Number of projects, trained experts, etc.)	Annual turnover 2001 / main sources in %	Staff (full-, part-time, external)	
Club			Environmental Partnership Foundation. Activities include the Eco Business Program (EBP)		str. Harghita 7/A/6 C.P. 141 Romania Tel: (40-266) 310-678 Fax: (40-266) 310-686 E-mail: office@fpc.topnet.ro , epce@topnet.ro Web: http://www.epce.ro				
Association of Industrial Ecology in Slovakia	Slovakia		Civic association	INEM	Drienova 24 826 03 Bratislava Slovakia Tel: (421-2) 4333-0833 Fax: (421-2) 4829-7546 E-mail: mail@aspek.sk Web: http://www.aspek.sk	<ul style="list-style-type: none"> • Enviro-catalogue of environmental products and services. 			
Chamber of Commerce and Industry Slovenia	Slovenia		Business association	ICC	Dimiceva 13 SI-1504 Ljubljana Slovenia Tel: (386-1) 589-8000 Fax: (386-1) 589-8100 E-mail: janja.leban@gzs.si Web: www.gzs.si				
ECO Center for Sustainable Development	Kosovo (UNMIK)		Association	Cooperation with Croatian members of association	E-mail: bdobruna2001@yahoo.com E-mail: ecocenterbd@yahoo.com				

Environmental management systems and other voluntary approaches

Environmental management systems (EMS) are advanced tools for improving the quality of environmental management and performance, and thus the eco-efficient operation of enterprises. They are non-mandatory for governments, although most large international and local corporations driving the CEE and Baltic economies practice the prudent approach of selecting partners for their supply chain from certified and therefore quality controlled companies. This practice is becoming more prevalent in the management of local enterprises and also in some public procurement.

Big differences can be seen in ISO 9000 and 14000 registration practices throughout the region. Although ISO 9000 constitutes, in principle, a good basis for the implementation of ISO 14000, it would be overly optimistic to assume that all ISO 9000 companies will soon apply for the environmental management standard. The reasons for this are that (a) ISO 14000 is still much less pervasive in the western market economies than is ISO 9000, and hence less frequently a business requirement; and (b) the openness of SEE economies, in terms of the magnitude of trade with the rest of the world, is still somewhat limited and more concentrated on commodities (e.g. minerals and agricultural products) where market pressure on environmental quality is less profound. Therefore, unless these countries shift their economies from the production of commodities to higher processed goods, or there is an increase in domestic pressure for better environmental management practices, the proliferation of ISO 14000 certificates in SEE will be very slow.

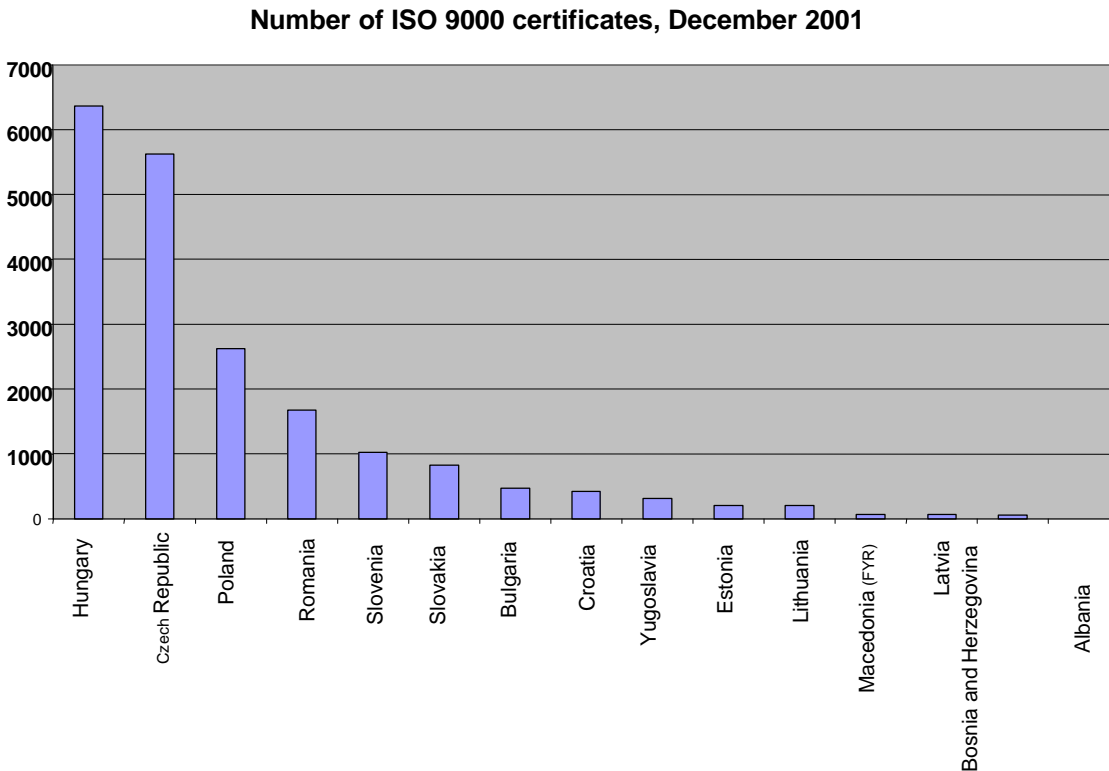
As can be seen from table 12 and figure 11, currently the top-runners in ISO 14000 are Hungary in 22nd place and Slovenia in 34th, while in the registration per GDP Hungary takes 13th place and Slovenia comes a remarkable 4th in the world. Figures 9 and 10 indicate the number of ISO 9000 and 14000 certificates, respectively, across the region.

Table 12: ISO 14001 country ranking (certifications) as of June 2002 (Total: 40,825 in 112 countries) Source: INEM: www.inem.org, ISO speedometer, 2002

1 Japan (9,323)	57 Russian Federation (14)
2 Germany (3,450)	58 Croatia (10)
3 United Kingdom (2,722)	59 Pakistan (10)
4 Spain (2,426)	60 Venezuela (9)
5 Sweden (2,367)	61 Tunisia (8)
6 USA (2,040)	62 Bulgaria (6)
7 China (1,625)	63 Morocco (6)
8 Australia (1,370)	64 Saudi Arabia (6)
9 Italy (1,295)	65 Zimbabwe (6)
10 France (1,126)	66 Bolivia (5)
11 Taiwan (1,024)	67 Lebanon (5)
12 Netherlands (1,022)	68 Mauritius (5)
13 Denmark (984)	69 Nigeria (5)
14 South Korea (969)	70 Romania (5)
15 Canada (930)	71 Syrian Arab Republic (5)
16 Switzerland (883)	72 Brunei (4)
17 Brazil (700)	73 Cyprus (4)
18 Finland (688)	74 Latvia (4)
19 Thailand (552)	75 Namibia (4)
20 India (400)	76 Puerto Rico (4)
21 Malaysia (367)	77 Algeria (3)
22 Hungary (340)	78 Barbados (3)
23 Singapore (333)	79 Kenya (3)
24 Norway (304)	80 Kuwait (3)
25 Poland (294)	81 Monaco (3)
26 Mexico (266)	82 Oman (3)
27 Czech Republic (252)	83 Andorra (2)
28 Ireland (247)	84 Bahrain (2)
29 Austria (223)	85 Bangladesh (2)
30 South Africa (221)	86 Belarus (2)
31 Argentina (209)	87 Botswana (2)
32 Indonesia (199)	88 Cameroon (2)
33 Hong Kong (165)	89 Ecuador (2)
34 Slovenia (152)	90 Greenland (2)
35 Belgium (130)	91 Guatemala (2)
36 Philippines (120)	92 Guyana (2)
37 Egypt (100)	93 Honduras (2)
38 Turkey (91)	94 Iceland (2)
39 Portugal (88)	95 Malta (2)
40 Israel (75)	96 Qatar (2)
41 Slovak Republic (73)	97 Saint Lucia (2)
42 Greece (66)	98 Sri Lanka (2)
43 New Zealand (63)	99 Yugoslavia (2)
44 United Arab Emirates (49)	100 Zambia (2)
45 Iran (44)	101 Belize (1)
46 Colombia (41)	102 Dominican Republic (1)
47 Vietnam (33)	103 FYR of Macedonia (1)
48 Costa Rica (30)	104 Ghana (1)
49 Uruguay (29)	105 Kazakhstan (1)
50 Lithuania (25)	106 Macau (1)
51 Estonia (24)	107 Myanmar (1)
52 Liechtenstein (20)	108 Palestine (1)
53 Chile (17)	109 Panama (1)
54 Jordan (16)	110 Paraguay (1)
55 Luxembourg (16)	111 Trinidad & Tobago (1)
56 Peru (15)	112 Ukraine (1)

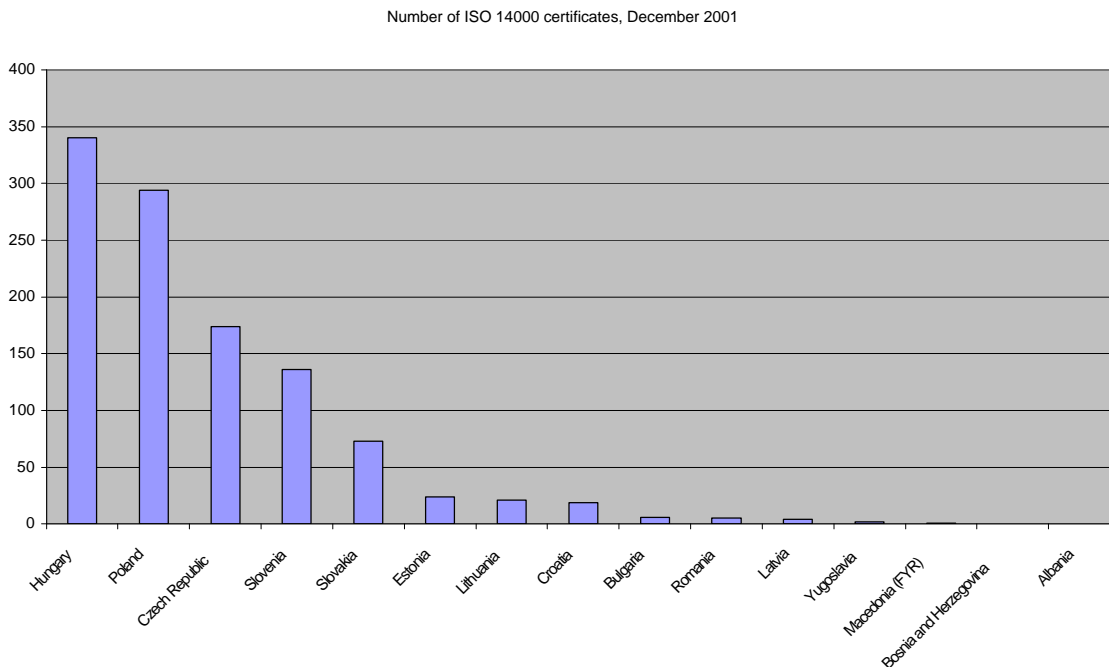
CAPACITY BUILDING

Figure 9: Number of ISO 9000 certificates



Source: International Organisation for Standardisation <www.iso.org>, 11th Cycle, 2002

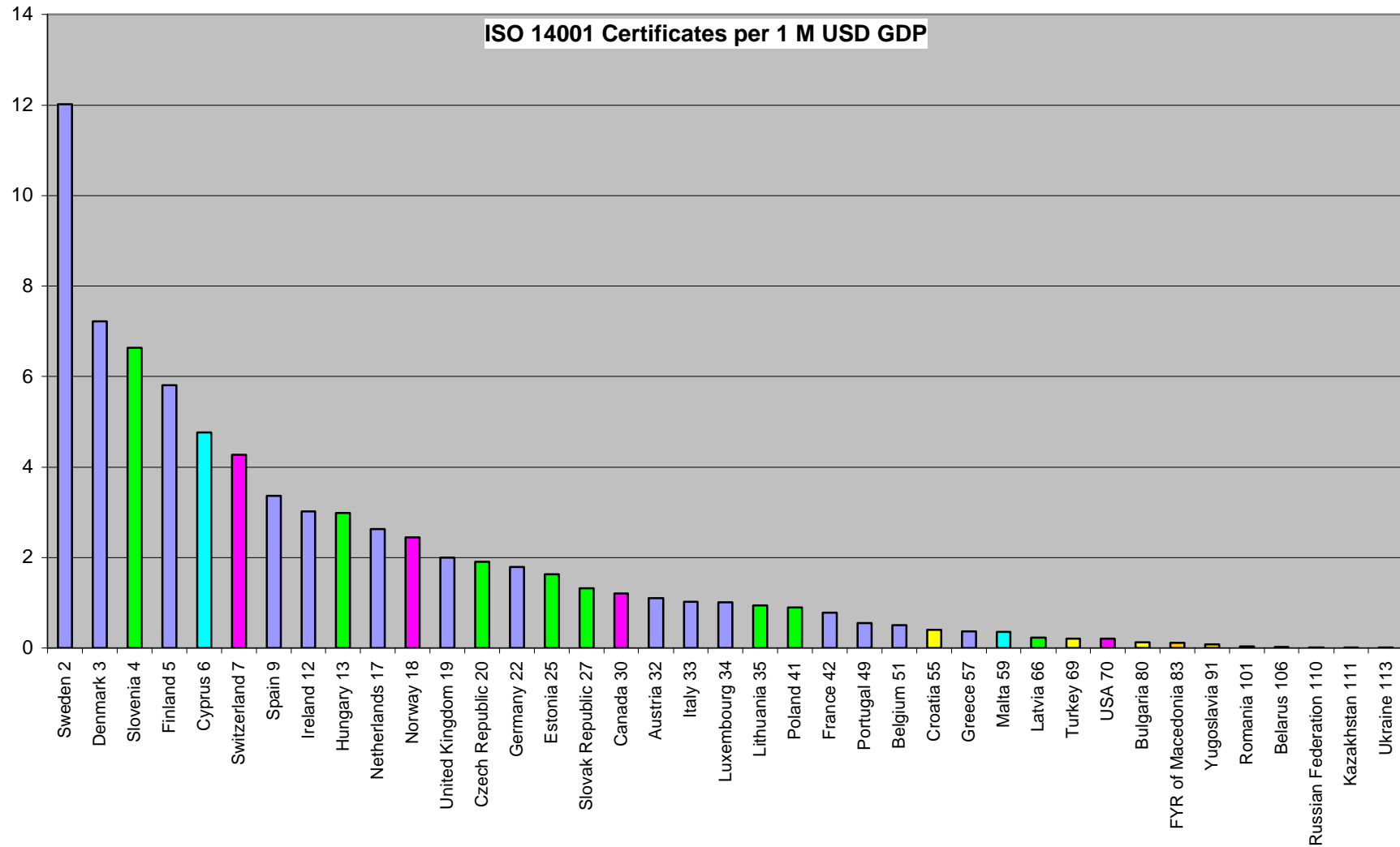
Figure 10: Number of ISO 14000 certificates



Source: International Organisation for Standardisation <www.iso.org>, 11th Cycle, 2002

The promotion of the even more comprehensive EMAS registration system is certainly insufficient throughout the entire region, often due to the awkward management of environmental ministries.

Figure 11: ISO 14001 certifications / million USD GDP



Source: INEM <www.inem.org>, ISO Speedometer, 2002

Please note that Liechtenstein comes top of this list with 27 certificates per USD 1 million of GDP.

FINANCIAL MECHANISMS TO SUPPORT EME

Product labelling has proven a powerful tool in providing consumers with the necessary information to make environmentally aware choices in their consumption. Although progress is painfully slow, improvements can be seen in the use of this tool in the more developed markets of the region.

The REC 2002 ABEI II final report outlined the main obstacles to environmental labelling in the majority of regional countries:

- No institutional basis for eco-labelling procedures.
- Lack of expertise in the environmental evaluation of products.
- High costs of product labelling for enterprises.
- No recognition of local eco-labels in foreign markets.
- Capacity-building processes in this area are insufficient.

Figure 12: Examples of CEE environmental labels (Estonia, Hungary)



Source: REC, 2002: ABEI II Final Report, Country Reviews

The systematic application of more advanced EME tools such as *environmental or sustainability reporting* and *environmental accounting* remains the exception rather than the rule, and only takes place within international and very large companies in the region. Even corporations that have started to use environmental reporting do not follow a rigorous and consistent criteria and methodology, and consider these exercises for marketing and public relations purposes only. This will only improve with the increasing sophistication and environmental awareness levels of the local markets.

International business partnerships

Supporting the implementation of EME through the establishment of business partnerships has been practised by various international business organisations. The underlying idea is that partnerships will lead to the transfer of technological and management know-how and that partnerships, once established, will provide economic, social and environmental benefits in the longer term.

With a budget of tens of millions of US dollars, USAID has financed the Ecolinks programme, implemented by the Institute of International Education (IIE) and the REC. The programme has been running for over five years in the CEE, Baltics, SEE and EECCA regions and is probably the largest such environmental initiative. The programme allows for partnerships between regional companies and municipalities (or other levels of government), and American or regional companies and municipalities for know-how and/or technology transfer. Possible funding includes costs for travel and site visits, feasibility studies and investment on a cost-sharing basis. Dozens of so called “challenge grants,” with a typical size of USD 50,000 each, have been allocated to partnerships across the region.

Topics include: Cleaner Production, Environmental Management Systems, Water Quality Management and Global Climate Change. By the end of 2001 grantees had obtained more than USD 30 million in additional funds for projects in which Ecolinks contributed, indicating a notable multiplier effect for every grant dollar awarded. However, the experience gained from these projects suggests that unless the establishment of partnerships is supported quite massively by donors (Ecolinks' Challenge Grants fund up to 75% of the project cost), western partners are unwilling to engage in risky environments, such as SEE and EECCA.

The Aarhus Business and Environment Initiative (ABEI) has been another major initiative for improving environmental quality across Central and Eastern Europe. This programme has relied on, and drafted from, the knowledge of such organisations as the European Round Table for Industrialists (ERT), World Business Council for Sustainable Development (WBCSD), International Network for Environmental Management (INEM), and European Partners for the Environment (EPE). The activities of these organisations have been managed by two secretariats, with the REC covering CEE, the Baltics and SEE, and the OECD covering EECCA. In addition to several hardships experienced in financing this initiative, some major lessons have been learned, including the fact that top-down, elitist approaches (i.e. foreign experts and governments "preaching" to their eastern counterparts) are not effective tools for speeding up the otherwise already changing CEE and Baltic state economies in their environmental management undertakings.

A number of other significant international partnerships have been set up across the regions, including several local nodes for WBCSD and INEM, and for the Business Leaders Forum initiated by the Prince of Wales.

All chambers of trade and industry and chambers of engineers in CEE and the Baltics (and some in the SEE countries) have their networks set up for international cooperation, and the continuous improvement of their standards and procedures contributes greatly to the economic and environmental performance of the enterprises in these countries.

Financial Mechanisms to Support EME

According to OECD's assessment *Environmental Trends in Transition Economies: How are Environmental Investments Financed?* (published in 1999, but still quite valid), macroeconomic imbalances and weak financial institutions have constrained the supply of affordable capital for investments by enterprises and public institutions throughout the region, though this is now changing in the advanced reform countries of CEE and the Baltics. Nonetheless, environmental investments in the advanced reform countries, as a percentage of GDP, compare favourably with those in OECD countries. Environmental funds and policy reforms that have prompted enterprise demand for environmental investments have been important factors.

The polluter pays principle (PPP) states that enterprises should use their own resources — and raise their own financing — to make the investments necessary to meet environmental policy requirements. Implementing PPP has been an important policy goal for many countries in the region but has proved difficult to achieve, in particular where enterprises face economic crisis and macroeconomic conditions are unstable. In response, many governments have tried to strengthen the supply side of environmental financing by using environmental funds and other instruments.

Many CEE EU applicant countries (i.e. Bulgaria, the Czech Republic, Latvia, Lithuania, Poland, Slovenia and Slovakia) have established environmental funds. According to REC experts working intensively with the region's environmental funds and setting up networks for CEE and SEE, these instruments have played a noticeable role in financing environmental investments in their respective countries. Furthermore, it is expected that these funds will be significantly involved in EU accession-related financing, either as implementing agencies or indirectly as co-financiers.

FINANCIAL MECHANISMS TO SUPPORT EME

Besides conforming with basic standards and principles, funds interested in administering EU financial assistance will be expected to meet further requirements specific to the EU and its various assistance programmes. EU accession will also affect the funds' post-accession roles as mechanisms for channelling state aid for environmental projects (e.g. assisting the EU Structural and Cohesion Fund). Nevertheless, the European Commission may find some funds and their operation in accession countries to be incompatible with the principles of a common market within the definition of article 92 of the EU Treaty, and therefore in violation of EU rules concerning competition and state aid for environmental protection. The mentioned EU rules do provide for exceptions regarding state aid. However, it will be necessary for candidate countries to acquire prior authorisation from the European Commission as to their eligibility for at least one of the exceptions under article 92. To achieve this authorisation, it is likely that the applicant countries will be required to conduct further assessment and study work and, consequently, to adjust some principles and change selected operations undertaken by the environmental funds.

SEE countries undergoing economic restructuring and institution building, with a long-term goal of EU accession, have already acknowledged the possible benefits of an environmental fund. Macedonia established its environmental fund in 1998, although its revenues currently limit its environmental impact or impact on the supply/demand of environmental financing. Croatia also established an environmental fund in 2000.

Representatives of environmental funds in the region participate in the CEE Environmental Fund Network meetings, organised by OECD and the REC. Contacts and the exchange of experiences from these meetings have continued and developed into the establishment (at the end of 2000) of the SEE Network of Environmental and Finance Specialists, which works in conjunction with the existing CEE Environmental Funds Network.

Table 14: Environmental funds in EU candidate countries

Source: REC (2001): Environmental Funds in EU Candidate Countries

	Bulgaria National Environmental Protection Fund	Bulgaria National Trust EcoFund	Czech Republic State Environmental Fund	Hungary Central Environmental Protection Fund (CEPF) Environment Protection Fund Appropriation (EPFA) since 1999
Total revenue/expenditure in 2000 (EUR million)	26 / 28.35	3.53 / 5.01 (1999)	98.35 / 78.66	111.86 / 112.78
Major revenue sources in 2000 (% of total revenue)	Product charges: 87% Non-compliance fees: 4.5% Loan repayments with interest: 4.1%	Data for 1999: Debt swap: 94.6% Financial operations: 5.4%	Pollution charges: 50.3% Loan repayments with interest: 40.0% Financial operations: 8.0%	Product charges: 51.0% Loan repayments with interest: 9.7% Privatisation: 5.2% Budgetary aid: 30.5%
Major fields of expenditure in 2000 (% of total environmental expenditure)	Air: 8.5% Waste: 25.8% Water: 48.2% Other: 15.7%	Air: 53.1% Waste: 32.7% Water: 13.8%	Air: 42.6% Waste: 10.4% Water: 40.3% Nature conservation: 6.7%	Air: 5.72% Waste: 12.5% Water: 36.9% Clean-up/accidents: 10.1% Public purposes: 12.9% Product charges refund: 5.3%
Primary disbursement mechanisms in 2000 (% of total environmental expenditure)	Grants: 59.6% Interest free loans: 30.0% Other: 10.5%	Grants: 98.2% Interest free loans: 1.8%	Grants: 69.4% Soft loans: 26.0% Interest subsidies: 4.6%	Grants: 94.8% Interest free loans: 5.2%

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	Lithuania Environmental Investment Fund	Estonia Environmental Fund (until 1999) Environmental Investment Centre (since 2000)	Latvia Environmental Protection Fund	Slovenia Environmental Development Fund
Total revenue/expenditure in 2000 (EUR million)	3.24 / 0.83	16.30 / 10.03	16.00 / 17.40	24.40 / 29.34
Major revenue sources in 2000 (% of total revenue)	Pollution charges: 38.0% Foreign loans: 60.1%	1999 (EF): Pollution charges: 42.3% Natural resource fees: 21.5% Privatisation: 23.3% Tree-cutting fees: 9.0% 2000 (EIC): Budget transfers: 99.3%	N/A	Loan repayments with interest: 59.6% Privatisation: 10.4% Foreign loans: 25.9%
Major fields of expenditure in 2000 (% of total environmental expenditure)	Air: 36.2% Waste: 11.4% Water: 52.4%	Waste: 11.4% Water: 35.2% Nature protection: 11.2% Education/awareness: 6.4% Mineral resource management: 6.9% Forestry management: 12.9% Fishery management: 5.4%	N/A	Air: 45.1% Waste: 15.5% Water: 35.1%
Primary disbursement mechanisms in 2000 (% of total environmental expenditure)	Interest-free loans: 98.3% Soft loans: 1.1%	Grants: 100%	N/A	Soft loans: 100%

	Poland Krakow Provincial Fund for Environmental Protection and Water Management	Poland National Fund for Environmental Protection and Water Management	Poland EcoFund	Slovakia State Fund for the Environment
Total revenue/expenditure 2000 (EUR million)	26.34 / 19.71	391.20 / 304.77	41.79 / 33.49	37.03 / 24.56
Major revenue sources in 2000 (% of total revenue)	Pollution charges: 46.7% Loan repayments with interest: 39.9% Financial operations: 12.2%	Pollution charges: 27.8% Loan repayments with interest: 59.2% Foreign grants: 3.8% Natural resource fees: 6.9%	Debt for the environment swap: 81.1% Financial operations: 9.7% Foreign grants: 9.1%	Pollution charges: 61.9% Privatisation: 25.4% Budgetary transfers: 8.9%
Major fields of expenditure in 2000 (% of total environmental expenditure)	Air: 17.0% Water: 68.9% Clean-up of contaminated sites: 4.8%	Air: 34.2% Waste: 9.1% Water: 40.3%	Air: 25.4% Baltic sea protection: 28.9% Climate protection: 22.5% Nature protection: 18.3% Waste management: 4.9%	Air: 8.0% Waste: 11.8% Water: 69.3%
Primary disbursement mechanisms in 2000 (% of total environmental expenditure)	Grants: 15.3% Soft loans: 84.7%	Grants: 25.6% Soft loans: 72.0% Environmental equity investments: 1.8%	Grants: 100%	Grants: 83.2% Soft loans: 16.8%

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In 1999, environmental funds accounted for about 35% of estimated finance in Poland; about 25% in Hungary and Lithuania; and 5% in Russia. However these numbers can vary significantly, due to the changing management and their concepts about the funds. In a number of regional countries the ministries of environment have not been stable and highly systematic managed units of the respective governments (e.g. in Hungary the minister of environment changed twice in just a few months in 2000).

Environmental funds generally fall into two groups: those capitalised by domestic revenues generated principally from environmental fees and fines or product charges; and those established and capitalised by donor grants or international financial institution loans. In most countries in the region government environmental funds have provided only limited support for manufacturing enterprises. Most funds have focused on infrastructure projects, such as municipally owned waste-water treatment plants, or projects in the power sector.

Government environmental financing programmes, as well as user charges, have been crucial in helping to finance municipal infrastructure and services in OECD countries and in some CEE, Baltic, SEE and EECCA countries. Ideally, revenue from user fees should provide the bulk of financing for municipal environmental infrastructure. As infrastructure investments involve high initial costs, these must usually be financed by loans, bond issues or other sources. During the transition, municipalities have faced, and still do face, difficulties in putting such mechanisms into practice. These problems include obtaining financing for investment in the context of high interest rates and the banks' low capacities and understanding of environmental investments; and the difficulty of many users, especially households, in paying the fees necessary to cover debt repayments.

New and creative approaches will be needed to finance municipal services. Some approaches, such as issuing municipal bonds, are already being tried in advanced transition countries. Others, such as public-private partnerships, have been little used in the region so far. Harnessing foreign direct investment (FDI) and other private flows more effectively for environmental purposes is a key challenge for countries in the region. Private capital flows, including international loans and equity investments, to developing and transition countries have expanded rapidly over the past decade. FDI has grown rapidly in CEE and the Baltics. The interaction between FDI and the environment is a complex topic of ongoing policy debate. In the advanced reform countries, there has been a strong flow of FDI to the industrial sector. There, many large foreign investors have introduced stronger environmental management and made investments that have reduced pollution. While in the less developed SEE countries much of the FDI has gone to natural resource extraction. Mining, forestry, and other natural resource activities have extensive impacts on natural environments; while some projects have paid attention to environmental issues, systemic monitoring of this sector is still needed.

The list below is intended to be indicative and is far from being a complete source of all available potential EME financing sources in the region. However, most major international funding instruments currently active in EME investment in the region have been mentioned.

UNEP

Financing Cleaner Production (DTIE). Funded by the Norwegian government. Five demonstration countries, not including EECCA. DTIE is in the process of promoting spin-off and follow-up projects in CEE, SEE and EECCA.

UNEP RET/EE Investment Advisory Facility. With GEF funding, UNEP runs a service that helps financial institutions evaluate renewable energy technology (RET) and energy efficiency (EE) projects in developing countries and transition economies. This is a quick turn-around facility providing in-house or consultant support to analyse such areas as financial risk, legal reviews, project or company valuation, O&M cost reviews and independent project assessment.

In addition, a GEF-funded UNEP project, which helps NCPCs to provide better services and training in energy efficiency issues, is currently being piloted in the Czech Republic, Hungary and Slovakia. The UNEP Mediterranean

Action Plan (MAP) programme also provides financial support within its geographic framework, which covers most SEE countries. Targeted fields of activity include CP.

UNIDO

- Support in establishing National Cleaner Production Centres. Objectives: capacity building, transfer of know-how. So far 21 centres have been established, including three in CEE.
- Assisting technology transfer.
- Training on information management and dissemination.
- Raising awareness through seminars, conferences and workshops; through media campaigns and demonstration projects.

UNECE

The Energy Efficiency 21 Project (EE-21), launched in 2000 as a follow-up to EE 2000, assists the ECE member states to implement greenhouse gas mitigation strategies and to develop related energy efficiency investment projects. The project aims to support economies in transition to mobilise market forces and private sector lending and investment in energy efficiency. The project is financed by a United Nations trust fund, with support from France, Norway, Italy, the EU SAVE Programme, US Dept. of Energy, USAID, and the Alliance to Save Energy MUNEE Project.

The main focus is the development of energy efficiency investment projects, capacity building, involvement of the private sector, government policy and institutional reforms, standards and labels. An EE-21 website was developed to allow the distribution of multi-lingual information, exchange of knowledge and online training (www.ee-21.net). The Project Plan (2000-2003) features three sub-projects in selected SEE and EECCA countries:

1. RENEUER: Regional Network for the Efficient Use of Energy Resources (SEE);
2. Rational and Efficient Use of Energy and Water Resources in Central Asia;
3. UNF/UNFIP Energy Efficiency Investment Project Development for Climate Change Mitigation (Belarus, Bulgaria, Kazakhstan, Russia and Ukraine).

EU

EU pre-accession instruments

During the period 2000-2006 financial assistance from the European Community to candidate countries in CEE and the Baltics has been, and will continue to be, provided through three instruments: the PHARE programme (Council Regulation 3906/89), ISPA (Council Regulation 1267/99) and SAPARD (Council Regulation 1268/99). The ten countries in the region that have applied to become EU members are Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. The year 2000 saw the emergence of two new financial pre-accession instruments: ISPA and SAPARD. The overall pre-accession assistance is EUR 3 billion per year (1997 figures) during the 2000-2006 period, half of which is allocated to PHARE. The precise appropriations for 2001 are EUR 540 million for SAPARD, EUR 1,080 million for ISPA, and EUR 1,620 million for PHARE, amounting to an overall budget of EUR 3,240 million.

ISPA supports large-scale infrastructure projects in the fields of transport and environment (50% each), while SAPARD helps to prepare countries for the acquis in the fields of agriculture and rural development. PHARE remains the sole instrument providing pre-accession support for institution building in all acquis-related areas.

Co-financing with international financial institutions

Pre-accession aid does indeed play its full role when it mobilises funds from international financial institutions (IFIs). With this in mind, the European Commission signed a memorandum of understanding on March 2, 1998 with the [European Bank for Reconstruction and Development](#) (EBRD) and the [World Bank](#) to reinforce their cooperation and to facilitate co-financing. Four new partners joined this agreement in October 1998: the [Nordic Environment Finance Corporation](#) (NEFCO), the Nordic Investment Bank (NIB), the [International Financial Corporation](#) (IFC) and the [Council of Europe Development Bank](#). In 1998-1999, over EUR 900 million was mobilised (EUR 150 million from PHARE and EUR 750 million from IFIs) for investment projects in the areas of transport and the environment. Thus for every euro provided in grants from PHARE, EUR 5 was mobilised by IFIs. This ratio of leverage reaches 1:8 when the candidate countries' own contributions are taken into account. The EIB works closely with the European Commission in serving the EU's policy objectives and collaborates with the EBRD and the World Bank in the spirit of the memorandum of understanding.

European Community programmes open to accession countries

LIFE, the Financial Instrument for the Environment, introduced in 1992, is one of the spearheads of the European Union's environmental policy. It co-finances projects in three areas:

- *LIFE Nature* aims to conserve the natural habitats and the wild fauna and flora of European Union interest, and in accordance with the birds and habitats directives. This project supports the implementation of nature conservation policy and the Natura 2000 Network of the European Union.
- *LIFE Environment* aims to implement the European Community policy and legislation on the environment in the European Union and candidate countries. This project enables the demonstration and development of new methods for the protection and the enhancement of the environment. Most of this resource is already targeting enterprises to improve their environmental performance.
- *LIFE Third Countries* provides technical assistance to promote sustainable development in third countries. This component of the programme enables a management capacity of the environment, both for administrative partners outside the European Union as well as within companies and the NGOs of these countries.

LIFE is open to all EU countries and to some candidate countries (i.e. Estonia, Hungary, Latvia, Romania, Slovakia and Slovenia) and some third countries bordering the south of the Mediterranean and the Baltic Seas.

ALTENER, the only European Community programme to focus exclusively on the promotion of renewable energy sources, ended its five-year term at the end of 1997. It has now been succeeded by ALTENER II, an initiative that will extend activities in the renewable energies field and make a major contribution to the Community Strategy and Action Plan outlined in the white paper *Energy for the Future: Renewable Sources of Energy*.

The main operational similarities and differences between ALTENER II and ALTENER can be summarised as follows:

Similarities

- Studies, technical assessments, the formulation of norms and standards, and pilot studies designed to set up or reinforce appropriate infrastructures for renewable energy development.

Differences

- ALTENER II provides increased support for information dissemination activities proposed by the Commission.
- ALTENER II provides support for information dissemination activities proposed by third parties.
- ALTENER II provides support for targeted actions designed to speed up investment in renewable energy technologies.
- ALTENER II will make an EU-wide assessment of progress in the adoption of renewable energy technologies.

- ALTENER II will work closely with the associated countries of Central and Eastern Europe, under overall conditions for their pre-accession participation in EU programmes. These conditions vary according to the country concerned and figure in the respective association agreements between themselves and the EU. Extension to Cyprus is also provided for, and, as for most EU programmes, the European economic area countries already take part

ALTENER II focuses on renewable energy sources that are already viable or approaching viability:

- Biomass: energy crops, residues from forestry and agriculture, and municipal waste that can be used to produce solid, liquid or gaseous bio-fuels.
- Solar energy: energy derived from the sun's light and heat and captured by the form and fabric of a building, by solar collectors or by photovoltaic cells for conversion into electricity.
- Small-scale hydroelectricity: energy derived from falling water using units with a generating capacity of up to 10 MW.
- Wind power: harnessed for electricity generation using modern wind turbines. Turbines can be deployed singly, in small clusters or in larger groups (wind farms).
- Geothermal energy: tapping the heat in the earth's crust via boreholes, and bringing it to the surface as hot water.

The SAVE programme is the principal focus of the European Community's non-technological action on energy efficiency. It is the only EU-wide programme dedicated exclusively to promoting energy efficiency and encouraging energy-saving behaviour in industry, commerce and the domestic sector as well as in transport through policy measures, information, studies and pilot actions and the creation of local and regional energy management agencies.

The first SAVE programme was adopted by the European Council in October 1991 and lasted until 1995. Its successor programme SAVE II was adopted by the Council in December 1996 (96/737/EC) for a period of five years (1996-2000). In February 2000 (647/2000/EC) SAVE was integrated into the Energy Framework Programme which outlines the Community's strategy for the five-year period 1998-2002 (99/21/EC, Euratom).

On April 9, 2002, the Commission adopted a proposal for a successor programme to SAVE ("Intelligent Energy for Europe", 2003-2006), which is currently under discussion in the Council and in the European Parliament.

Energy, Environment and Sustainable Development has been one of the four thematic programmes of the Fifth (EC) RTD Framework Programme (1998-2002). For implementation purposes, the EESD Specific Programme has been divided into two sub-programmes, Environment and Sustainable Development, and Energy. Within Environment and Sustainable Development, the work has been divided into Key Actions and generic research activities. The budget of the programme in the period 1998-2002 was EUR 2,125 million, of which EUR 1,083 million went to the Environment and Sustainable Development sub-programme and EUR 1,042m went to the Energy sub-programme (not including nuclear energy).

This programme's successor, the Sixth Framework Programme, represents about four or five percent of the overall expenditure on RTD in EU member states, with a budget of EUR 17.5 billion for the period 2002-2006. Its main objective is to contribute to the creation of the European Research Area (ERA) by improving integration and coordination of research in Europe, which is largely fragmented at present. At the same time research will be targeted at strengthening the competitiveness of the European economy, solving major societal questions and supporting the formulation and implementation of other EU policies.

In SEE a new instrument has been initiated: Community Assistance for Reconstruction, Development and Stabilisation (CARDS). With the Council Regulation (EC) No. 2666/2000 of December 5, 2000, the existing Community assistance (PHARE, Obnova) was expanded and redirected to adjust it to the European Union's political objectives for the SEE. The new CARDS programme of 2000-2006 thus replaces PHARE and Obnova. The wider

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objective of CARDS is to support the participation of Albania, Bosnia & Herzegovina, Croatia, Serbia and Montenegro, and FYR Macedonia in the Stabilisation and Association Process (SAP). For each of the SEE countries, as well as the region as a whole, a country strategy paper (CSP) provides a strategic framework in which EC assistance will be provided in the period 2000-2006. The multi-annual indicative programme (MIP) attached to the strategy sets out the EU response in more detail, highlighting programme objectives, expected results and conditionality in the priority fields of cooperation for the period 2002-2004.

Table 13: Community programmes the 10 CEE candidate countries are eligible to participate in

Programmes	Time framework	Official Journal ref.
1 IDA II	1998-2004	OJ L 203/1999
2 Enterprise & SMEs	2001-2005	OJ L 333/2000
3 Combating Discrimination	2001-2006	OJ L 303/2000
4 Gender Equality	2001-2005	OJ L 17/2001
5 Combating Social Exclusion	2001-2005	OJ L 10/2002
6 Incentive Measures in the Field of Employment	2001-2005	OJ L 170/2002
7 Carnot	1998-2002	OJ L 7/1999
8 ETAP	1998-2002	OJ L 7/1999
9 SURE	1998-2002	OJ L 7/1999
10 Altener	1998-2002	OJ L 79/2000
11 SAVE	1998-2002	OJ L 79/2000
12 Intelligent Energy for Europe	2003-2006	COM (2002) 162 Final (awaiting Community adoption)
13 Marco Polo	2003-2010	OJ C 126E/2002 (awaiting Community adoption)
14 LIFE	2000-2004	OJ L 192/2000
15 Civil Protection Mechanism	2002 onwards	OJ L 297/2001
16 Environmental Protection NGOs	2002-2006	OJ L 75/2002
17 Fifth EC Framework Programme on Research	1998-2002	OJ L 26/1999
18 Fifth Euratom Framework Programme on Research	1998-2002	OJ L 26/1999
19 Sixth EC Framework Programme on Research	2002-2006	OJ C 180E/2001 (awaiting Community adoption)
20 Sixth Euratom Framework Programme on Research	2002-2006	OJ C 180E/2001 (awaiting Community adoption)
21 Safer Use of the Internet	1999-2002	OJ L 33/1999
22 eSafe	2003-2004	COM (2002) 152 (awaiting Community adoption)
23 eContent	2001-2005	OJ L 14/2001
24 Ten-Telecom	2002-2006	OJ C 103E/2002 (awaiting Community adoption)
25 Fiscalis	1998-2002	OJ L 126/1998
26 Fiscalis 2007	2002-2007	OJ C 103E/2002 (awaiting Community adoption)
27 Customs 2002	1996-2002	OJ L 13/2000
28 Customs 2007	2002-2007	OJ C 126E/2002 (awaiting Community adoption)
29 Leonardo da Vinci II	2000-2006	OJ L 146/1999
30 Socrates II	2000-2006	OJ L 28/2000
31 Erasmus World	2004-2008	COM (2002) 401 (awaiting Community adoption)
32 Youth	2000-2006	OJ L 117/2000
33 Culture 2000	2000 – 2004	OJ L 63/2000
34 Media Plus	2001-2005	OJ L 13/2001 & L 26/2001
35 Community Action in the Field of Public Health	2001-2006	OJ C 337 E/2000 (awaiting Community adoption)
36 Injury Prevention	1999-2003	OJ L 46/1999
37 Rare Diseases	1999-2003	OJ L 155/1999
38 Combating Cancer	1996-2002	OJ L 79/2001
39 Health Promotion	1996-2002	OJ L 79/2001
40 Prevention of Aids	1996-2002	OJ L 79/2001
41 Drug Dependence	1996-2002	OJ L 79/2001
42 Health Monitoring	1997-2002	OJ L 79/2001
43 Pollution-related diseases	1999-2002	OJ L 79/2001
44 Daphne	2000-2003	OJ L 34/2000
45 Framework Programme for	2002-2006	OJ L 115/2002

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Programmes	Time framework	Official Journal ref.
Judicial Cooperation in Civil Matters		
46 Pericles	2002-2006	OJ L 339/2001

Keys: OJ = Official Journal of the European Communities (Communications or Legislation series) COM = Commission proposal
Source: DG Enlargement website, 2002

World Bank

The basic goal of World Bank investments is the alleviation of poverty. However, in all project funding environmental components have to be considered. Projects often promote eco-efficiency or CP principles, and certain EM-related activities are included in various World Bank operations. However, these are not usually monitored separately.

European investment Bank (EIB)

In January 1997, the Council of Ministers agreed an envelope of EUR 3,520 million for the lending activities of the [European Investment Bank](#) (EIB) in central Europe, for the period January 1997-January 2000. In January 1998, the EIB's Board of Governors approved an additional pre-accession facility of EUR 3,500 million, which brings the EIB's resources available over the period to EUR 7,000 million. Cyprus is at present also eligible for EIB pre-accession financing.

Source: BEI/02/123 Luxembourg/Budapest, December 16, 2002

EIB Lends EUR 395 Million for Transport and Environmental Projects

During a visit to Budapest today, Mr Wolfgang Roth, vice-president of the European Investment Bank (EIB) signed five loans totaling EUR 395 million for transport and environmental projects in Hungary, respectively with the minister of finance, Mr Csaba László, and the mayor of Budapest, Mr Gábor Demszky.

Three loans totaling EUR 195 million, to the Ministry of Finance, are for a number of road and railroad rehabilitation works throughout Hungary, as well as environmental schemes, including several sewerage networks and water treatment facilities as well as solid waste disposal facilities. The European Commission is co-financing these projects with ISPA funds.

The City of Budapest is receiving a EUR 125 million loan for the rehabilitation of its underground Metro Line 2 and EUR 75 million for financing the second phase of the purchase of 40 tramcars. The loans are part of a EUR 370 million facility approved by EIB's board of directors for transport, health, education and urban renewal schemes in Budapest and follow EUR 110 million for environmental and infrastructures granted by the European Investment Bank in 1998.

Commenting on EIB activities in Hungary, Vice-President Roth said: "The loans signed today bring total EIB lending in Hungary this year to EUR 515 million. Since 1989, when we started lending in Hungary, the EIB has provided a total of EUR 2.64 billion. During the current year, EIB's board of directors has already approved more than EUR 1 billion for new projects in Hungary. This means that during the time leading up to accession, EIB's annual lending to Hungarian projects may well reach EUR 1 billion."

European Bank for Reconstruction and Development

The European Bank for Reconstruction and Development (EBRD) has spent roughly EUR 0.5 billion on projects dealing directly with energy efficiency. The vast majority of EME activities, however, are part of larger restructuring projects. Therefore it is hard to say how much money goes into EME overall. In its *Review of 2000 Operations — Energy Efficiency*, the EBRD states that its commitments during the year totalled EUR 17 million, bringing the EBRD's cumulative commitments in this sector to EUR 188 million.

The Energy Efficiency Department deals primarily with ESCO financing, district heating renovation, public sector energy management programmes (potentially through ESCOs), industrial co-generation projects, renewables, and takes a lead role in climate change initiatives.

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The EBRD currently finances 11 private ESCOs (all funded under multi-project facilities involving large sponsors) and one state-owned ESCO.

The EBRD's aggregate commitment is EUR 88 million, of which EUR 68 million is in loans and EUR 20 million in equity; total projects cost around EUR 250 million. The EBRD covers seven countries: Hungary, Poland, Czech Republic, Slovakia, Lithuania, Romania, and Ukraine.

Nordic Environmental Finance Corporation (NEFCO)

The Facility for Cleaner Production is part of the Nordic Environmental Development Fund, which was established in 1995 by the Nordic ministers of the environment in order to finance environmental projects in neighbouring Central and Eastern Europe. In the first trial period the fund was provided with a total capital of DKK 100 million. In 1999 activities were extended until the end of 2003. Annual contributions in this period are expected to be roughly DKK 35 million. Support can be provided as grants for the procurement of goods or services (cash subsidies), or can be used to reduce the borrower's debt-service costs. The maximum grant is one-third of the total project cost.

The Facility for Cleaner Production is a revolving fund for financing priority cleaner production investments, and targets a specific region within its area of operation, in the first instance the Baltic countries (Estonia, Latvia and Lithuania) and north-western Russia. The fund's objective is to finance (on favourable terms) the implementation of high-priority CP investments with rapid payback (not more than three years) that yield environmental and economic benefits. The basis for providing a loan is the cash flow of the CP investment and the ability of the enterprise to repay the loan over the agreed period. The maximum loan amount is EUR 200,000. The borrower is expected to finance at least 10 percent of the total investment with its own financial resources. Priority is given to projects that have environmental effects in the Nordic region, projects that lead to pollution reduction in the Baltic Sea and the Barents Sea, or projects that reduce trans-boundary and global air pollution. The total amount of the facility is DKK 50 million, corresponding to approximately EUR 6.7 million. The facility was first established in 1997 with DKK 15 million. A further DKK 15 million was added in 1999, and DKK 20 million in 2001.

NEFCO has so far approved 20 loans to Lithuanian enterprises, of which two have been fully repaid and 14 are completed and repaying the loan according to schedule. In Estonia and Latvia activities were started a bit later: two projects have been approved and one is under consideration. In Russia one project has been completed, and six more projects have been approved, but loan agreements have not yet been signed. Of all applications received, a few have been rejected, mainly because of unclear environmental effects or the borrower's weak financial situation.

The distribution per industrial sector (number of projects) is as follows: engineering, 44 percent; wood-working, 22 percent; textiles, 17 percent; infrastructure, 11 percent; other, six percent. In terms of environmental effects and reduced emissions, 24 percent of the projects have a positive effect on climate, 20 percent on acidification, 20 percent on eutrophication, 10 percent on waste, eight percent on VOC, four percent on heavy metals and 14 percent on other areas.

For the purpose of identifying CP projects NEFCO has established agreements with Cleaner Production Centres in each of its target countries (i.e. Russia, Lithuania, Latvia and Estonia). The role of the CP centres is considered vital. Their task is to act as intermediaries between NEFCO and the enterprises applying for loans. Identifying and screening of projects is thus mainly made by the CP centres. Seminars and workshops for industrial enterprises have been arranged in cooperation with CP centres in Russia and Lithuania, funded by bilateral grants. The CP centres also have an important role as project monitors, providing NEFCO with follow-up reports in connection with each disbursement, and a completion report after the project's implementation. The costs for project monitoring are covered by NEFCO through the CP facility, which is intended to be self-sustaining through the interest payments on the loans.

A training programme has been initiated by NEFCO, with the aim of opening up business opportunities to a selection of project developers/advisors/consultants for the identification, development, implementation and monitoring of CP projects in all three Baltic countries. This programme has been financed by bilateral grants from Nordic countries.

In addition, NEFCO has established a special facility of EUR 1 million for CP investments in the Moravia region of the Czech Republic. One project has been approved so far and another is under consideration.

Danish EPA (Danish Environmental Protection Agency)

Danish environmental assistance is channelled through the Danish Cooperation for Environment in Eastern Europe (DANCEE) programme, run by the Danish Ministry of Environment and Energy. From 1991 to 1999 DANCEE implemented approximately 800 projects.

Activities focus on air and water quality, waste, administration of natural resources and control of pollution caused by chemicals. In the future, more emphasis will be laid on institutional strengthening, public participation and involvement of the private sector.

SIDA (Swedish International Development Agency)

Sweden has programmes of development cooperation with CEE/Baltics/SEE and EECCA. In 2001 the support amounted to SEK 1.4 billion. SIDA's cooperation with these regions is divided into three different programmes in different geographical areas.

1. Baltic Sea region. The Swedish Parliament has given priority to six countries: Estonia, Latvia, Lithuania, Poland, Russia and Ukraine. Support is mostly given in the form of Swedish know-how. SIDA can also support investments in the environment, particularly for the Baltic Sea. In 2001 expenditure is estimated at SEK 650 million. These funds are made available through a special budget for Central and Eastern Europe, separate from the development cooperation budget. For certain contributions SIDA also uses funds from the so-called "Baltic Sea Billion," for example, for strengthening the position of Swedish industry in the region.

2. Balkans. The largest partner countries/regions are Bosnia & Herzegovina, Serbia and Montenegro, including Kosovo/a. However, Albania, FYR Macedonia and Croatia also receive support. For this programme SIDA has personnel stationed in the field, in Sarajevo, Belgrade, Tirana, Skopje and Pristina. In 2001 the support is expected to amount to SEK 670 million, outside of purely humanitarian assistance.

3. Caucasus, Moldova and Central Asia. The major partner countries among the developing countries in the former Soviet Union are Moldova and Georgia. In 2001 support amounted to SEK 70 million. In addition a small programme of cooperation amounting to SEK 10 million has been planned for Turkey.

Funds for the latter two programmes are taken from the development cooperation budget, since here it is a question of cooperation with developing countries. The aim of development cooperation is to contribute to creating stable democracies and efficient market economies, and to support social welfare. Cooperation will promote a process of transition in SEE and EECCA from war to peace, from dictatorships to democracy, from planned to market economies, from destitution to social security, from exploitation to sustainable development and from barriers to European cooperation.

Different aspects are given emphasis in different areas. In SEE it is a case of peace and reconstruction. In Russia and the rest of EECCA it is a case of long-term reforms. For the EU candidate countries it is a case of adaptation to EU rules, and preparations for membership. In Sweden's own vicinity one important task is to contribute to the reduction of effluent discharges into the Baltic Sea.

SIDA engages a large part of Swedish society in its cooperation with these regions: Swedish industries,

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municipalities, county councils, government agencies and non-governmental organisations. The Swedish projects contribute to improving know-how and skills in the partner countries. They make it possible for the countries themselves to assume responsibility for their own development. The long-term objective is that Swedish support will no longer be required in the future.

US Agency for International Development (USAID)

Ecolinks is a USAID-funded programme, started in 1998 and promoting market-based solutions to urban and industrial environmental problems in CEE and EECCA. Ecolinks functions by providing financial assistance and facilitating trade and investment partnering. It is implemented by the Institute of International Education of the US and by the REC.

The grants programme identifies, facilitates, and supports cross-border partnerships either within the region or between the region and the US. There are two types of grants:

- Quick Response Awards (QRA) are up to USD 5,000 and are designed to meet the immediate and small-scale needs of organisations exploring potential partnerships. Activities must either facilitate partner matching for a Challenge Grant or promote environmental trade and investment. QRAs typically provide travel funds to an organisation to visit their potential partner in their home country. They may be awarded in a matter of one to two weeks. While the majority of QRAs support travel between the USA and the region, approximately 12% of the awards are used to support intra-regional travel. Since the programme's inception, a total of USD 7.3 million in added investment has resulted from partnerships developed through QRAs in CEE, SEE and EECCA, the equivalent of USD 5.62 of additional investment for every grant dollar spent.
- Challenge Grants (CG) are up to USD 50,000 and support one-year partnership projects or activities that address specific urban and industrial environmental problems. Recipients are responsible for providing matching resources of 25 percent of the grant value. Former Challenge Grant topics have included Cleaner Production, Environmental Management Systems, Water Quality Management and Global Climate Change. CG projects include mainly pre-investment activities: feasibility studies, pilot projects, ecological and economical analysis of possible solutions, the completion of project documentation intended for further financing/investment etc. By the end of 2001, for data covering both EECCA, CEE and SEE, grantees had obtained more than USD 30 million in additional funds for projects in which Ecolinks had contributed, representing a multiplier factor of 3.9 for every grant dollar awarded.

The Ecolinks Trade & Investment component involves an inter-agency agreement between USAID and the US Department of Commerce (USDOC) that places Ecolinks technology representatives in selected commercial service offices in the region. These "tech reps" identify business opportunities in the environmental sector, to link US environmental technology firms with partners in the region and to assist in financing the associated environmental projects (e.g. a new database and website, which allows for the improved tracking of technology transfer opportunities). These trade and investment activities complement the Ecolinks grants programme, in that the grants programme assists the tech reps in forming trade partners. The tech reps in turn facilitate follow-on financing of projects developed within the grants programme.

The US Environmental Action Program (EAP) Support Program, was initiated in 1995 and ran for six years. The focus was on CEE (USD 17 million) and EECCA. USAID (under its EAP Support Program) conducted a series of educational seminars in Environmental Management Systems for local enterprises as well as pollution prevention audits.

Global Technology Network (GTN) is a USAID programme that promotes business transactions and strategic alliances between US and European firms, through the transfer of US technology to CEE, SEE and EECCA. The programme started operation in 1993. The focus was the environmental and energy technology sector. Countries

covered included Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Hungary, Kazakhstan, FYR Macedonia, Montenegro, Poland, and Romania.

The US Clean Technology Exchange (www.ecolinks.org/) developed through a partnership with the Global Environment and Technology Foundation in 2001. It is an internet-based tool to facilitate the exchange of information on innovative environmental technologies and practices, and to stimulate environmental technology partnerships among CEE and EECCA countries and the US.

EnviroDialogue is sponsored by the Environment and Natural Resources Division of the Bureau for Europe and Eurasia USAID. EnviroDialogue is implemented by DevTech Systems, Inc. The EnviroDialogue topic for 2001 was "The Financial Aspect of Cleaner Production: The What, Why and How of Finance in Cleaner Production as Applied to Central and Eastern Europe and the Newly Independent States."

Through its new Municipal Networks for Energy Efficiency (MUNEE) programme, created in 2001, USAID is seeking a relatively low-cost way to disseminate positive energy efficiency experiences in CEE, SEE and EECCA. The Alliance to Save Energy provides assistance and management for the MUNEE programme. MUNEE aims to strengthen the capacity of regional and municipal stakeholders to develop and attract financing for energy efficiency projects.

In the last decade, a major financial instrument utilised in the region has been the Energy Service Company (ESCO). An ESCO is a business that develops, installs, and finances projects designed to improve energy efficiency and reduce operations and maintenance costs for its customers' facilities. ESCOs generally act as project developers for a wide range of tasks and assume the technical and performance risk associated with the project. What sets ESCOs apart from other firms that offer energy efficiency improvements is the concept of performance-based contracting. When an ESCO undertakes a project, the company's compensation is directly linked to the amount of energy that is actually saved. The comprehensive energy efficiency retrofits inherent in ESCO projects typically require a large initial capital investment and may offer a relatively long payback period. The customer's debt payments are tied to the energy savings offered under the project so that the customer pays for the capital improvement with the money that comes out of the difference between pre-installation and post-installation energy use and other related costs, as described in *What Is an ESCO?*, published by the National Association of Energy Service Companies (NAESCO).

According to *Energy Efficiency at the EBRD, 2002* ESCOs provide strong potential for energy performance contracting and third-party financing. As prices go up and awareness increases, competitive pressures force companies to trim costs. But the market penetration is still too low, due to (a) scepticism of potential clients that there can be a win-win scenario? (b) control: public sector clients are unwilling to involve the private sector? (c) profit: municipal governments frequently object to allowing the private sector to make a reasonable profit; (d) energy costs: regulation and subsidies sometimes result in energy costs that are too low or do not allow the ESCO to retain the benefits; and (e) the legislative framework is not supportive.

Nevertheless, tens of millions of euros have been already mobilised across the region by these ESCOs, which has contributed greatly to much-needed energy efficiency improvements.

Eco-efficiency Country Review: Czech Republic

National report to the Aarhus Business and Environment Initiative II
Under the supervision of Jiri Student, executive director of CEMC

Overall Political and Economic Framework

General Economic Context

Using the gross domestic product (GDP) indicator we can see contradictory trends (see Appendix A — Czech Republic) within the Czech economy. The beginning of the 1990s is characterised by recession (1990-92), which changes to a moderate recovery in the mid-1990s before hitting another economic downtrend from 1997 to 1999.

The start of the economic recovery and was based on an increase in investment demand, which eventually led to increased economic growth in the Czech Republic. Consumer expenditure and demand experienced a revival. Exports of products and services expanded, although in the second half of the decade imports were on the increase as well, causing net foreign demand (i.e. net exports) to become a retarding factor in the terms of economic growth.

Table 1: Inter-annual comparison of GDP growth by main component demand (%)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Internal demand	-21.4	4.7	2.2	8.4	8.4	7.9	-0.9	-3.0	-0.9	4.1
Private consumption	-21.4	8.8	1.2	5.6	5.8	6.9	1.8	-2.9	0.7	1.4
Public consumption	-12.3	-6.7	3.6	3.1	-3.7	3.6	0.9	-0.2	-0.4	-0.2
HTFK	-27.2	16.5	0.2	9.1	19.8	8.2	-2.9	-3.9	-4.4	5.2
Export: goods and services	-6.0	9.5	15.8	1.7	16.7	9.2	8.1	10.7	4.8	18.8
Import: goods and services	-32.8	29.7	23.7	14.7	21.2	14.3	7.2	7.9	4.0	18.7
GDP	-11.6	-0.5	0.1	2.2	5.9	4.8	-1.0	-2.2	-0.8	3.1

Source: Czech Statistics Office

The mid-1990s recovery was initiated by internal demand and short-term investment demand.

Table 2: Contribution to GDP changes (%)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Internal demand	-21.6	4.2	2.1	8.1	8.6	8.2	-1.0	-3.3	-1.0	4.3
Private consumption	-10.6	3.9	0.6	2.7	2.9	3.5	0.9	-1.5	0.4	0.7
Public consumption	-2.9	-1.6	0.8	0.7	-0.8	0.7	0.2	-0.1	-0.1	-0.0
HTFK	-7.5	3.7	0.0	2.4	5.6	2.6	-0.9	-1.3	-1.4	1.6
Change of reserves	-0.6	-1.8	0.7	2.3	1.0	1.4	-1.2	0.4	0.1	2.0
Net foreign demand	-10.0	-4.7	-2.0	-5.9	-2.7	-3.4	0.0	1.1	0.2	-1.2

Source: Czech Statistics Office

The creation of GDP is based on industrial performance, and eventually on the service sector. In 2000 the construction industry managed to slow the steep decline of previous years, although this remained a negative factor.

Table 3: Contribution branch to GDP (current price, %)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
GDP	100	100	100	100	100	100	100	100	100	100	100
Of which:											
Agriculture, forestry, fishery	8.2	5.6	4.6	5.3	4.9	4.7	4.7	4.7	4.6	3.7	3.8
Industry	36.7	37.9	39.4	33.3	33.6	33.3	32.4	34.3	35.3	34.3	34.8
Civil engineering	10.8	8.1	6.9	7.8	7.4	8.7	8.4	8.6	8.0	7.5	7.1
Purchasing, maintenance, entertainment	12.2	13.5	14.2	13.6	13.9	15.0	16.3	14.0	13.8	14.5	14.5
Transport and telecommunication	3.7	4.1	6.1	8.6	8.4	8.1	8.0	7.8	9.3	9.7	9.4
Financing intermediation	4.5	7.5	6.6	6.4	5.8	4.7	4.1	4.1	4.7	4.1	4.2
Commercial services	11.8	11.0	10.5	11.9	12.3	11.6	11.6	12.3	11.0	11.6	11.7
Non-commercial services	12.1	12.3	11.6	13.0	13.7	13.9	14.5	14.1	13.3	14.6	14.5

Source: Czech Statistics Office

The present revitalisation of economic activities in the Czech Republic started in the second half of 1999. The economy started to recover from recession and the rate of economic growth escaped from negative territory for the first time since 1997. This was even true of sectors that had been subdued for a long time (e.g. construction, exports, industry).

During 2000 the rate of economic growth in terms of GDP rose 3.1 percent. Several factors were behind the increase: the big boom in European growth in the same year; the production effect of foreign direct investments (FDI); the efforts of economic and fiscal policies that eliminated the results of some system “failures” in the earlier stages of transformation; the rate of employment and productivity growth; and an improvement in the economic climate. But Czech economic growth is still no higher than the growth of EU countries, Central and Eastern European accession countries, OECD member countries or worldwide average growth (see table 4 below).

Table 4: Economic growth

Region	Economic growth (% GDP)
Czech Republic	3.1 %
European Union (EU-15)	3.4 %
Countries of Central and Eastern Europe (EAC-10)	3.7 %
OECD	4.1 %
World	4.8 %

Source: Czech Statistics Office

The recovery of economic activities took place in a low-inflation environment and during a phase of monetary stability. In spite of an increasing current account deficit, the in-flow of foreign capital and the significant growth of the public finance debt, the central bank found it unnecessary to defend the currency and its exchange rate. The repo rates, as well as other so-called official interest rates (i.e. discount and Lombard rates) remained unchanged throughout 2000. As for the rates of the inter-bank market (PRIBOR), a decreasing tendency became apparent, while aggregate money supply was steady and exchange rates became slightly stronger.

Due to the zero growth of unemployment, social settlement was unimpaired in 2000. This had a nation-wide implication: as a result of the large differences in unemployment from region to region, the issue of unemployment and social tensions shifted from the macro-economic to the regional level.

The Czech government's economic policy and the monetary policy of the central bank focus on increasing production output and macro-economic stabilisation (including fiscal stabilisation). As a result, it is realistic to expect the same or a slightly higher economic growth rate in 2001 and 2002 versus 2000. The majority of domestic analysts agree on this assumption. International organisations, however, are more prudent. The European Commission gave an estimate of 3.5% growth in its prognosis of April 2001; in May 2001 the IMF predicted 3% growth and saw a probable slowdown in domestic demand due to public finance restrictions.

There could be a shift in the tendency outlined above as the repercussions of the World Trade Centre attack on September 11, 2001, hit Europe (i.e. the US economic slowdown gradually shifting to Europe). The impact is already being felt in Germany (Germany could also be on the verge of recession) and one can foresee that the Czech economy will also be affected. The Czech economy is very open and closely tied to EU countries (about 70% of the country's exports go to the EU), while Germany alone receives 40% of Czech exports.

(Appendix A — Czech Republic contains the basic parameters of the Czech economy.)

Economic Reforms Supporting Environmental Management: Accession to the EU

At the meeting of the European Council (EC) in Copenhagen (1993), the EU determined the basic requirements that would ensure that any given country could take on obligations arising from EU membership. At the same time the accession countries were expected to fulfill economic and political conditions in the political field (i.e. the Copenhagen Criteria, the stability of institutions ensuring democracy, state of law and observance of human rights); in the economic field (existence of functioning market economy, ability to cope with the market processes within the EU); and other obligations (ability to assume commitments originating from membership, including the targets of political, economic and monetary union).

After the critical evaluation presented in the annual EC report (1999), the Czech Republic revised the National Programme 2000 in order to fulfill EU requirements. On May 31, 2000, the Czech government approved an extended version of the National Programme of Preparation for EU Membership. This document sets goals that should help the Czech Republic on its way to EU membership. The National Programme primarily mentions the completion of the adoption of European law. It also tackles harmonisation with European markets and gives guarantees for authorised professionals and institutions that oversee adherence to legal requirements and incorporation of the Czech Republic into the structural policy of the EU and into the other development programmes. The schedule of preparations to accession is divided into two groups: short-term priorities that should be fulfilled by the end of 2000; and middle-term priorities that should be completed through 2001 and 2002. The plan runs until January 1, 2003, when the accession of the Czech Republic to the European Union is expected.

In the new National Programme there is no essential shift in the hierarchy of priorities concerning the preparation of the Czech Republic for EU membership, in accord with the goals defined in the Partnership for Accession document. The most prominent areas are: deepening of the democratic system in the Czech Republic; transposition of European law into Czech law; law application and enforcement; economic and social cohesion — regional politics, reform and perfection of public administration and justice preparation and gradual integration to the EU markets; quality of life — environment, economic and fiscal policy, the field of justice and interior affairs, struggle against the organised crime; and other areas. A lot of attention has been paid to the communication strategy of the Czech government concerning European matters prior to EU accession.

According to the EC, in 2001 the Czech Republic:

- Can be regarded as a functioning market economy and should be able to cope with competitive pressures and market forces within the European Union in the near future (on the assumption that it continues to carry out structural reforms until completion).
- Complies with the Copenhagen political criteria.
- Has progressed towards the creation of the legal frame for regional government.
- Respects human rights and freedoms and has created an internal institutional framework in this field.
- Increased its macroeconomic stability; growth has been re-established and, at the same time, favourable results in the field of inflation and external balance have been maintained.
- Made progress in further bank re-structuring and privatisation (though reinforcement of competition and supervision in the financial sector was seen as vital for the reinforcement of macroeconomic policies and for the promotion of economic activities).

The Czech Republic must ensure:

- Sustainability of public finance for the mid-term horizon (privatisation and re-structuring of state-owned enterprises must continue and their management must be improved).
- The focus of authorities on the creation of an environment that stimulates business activities — especially of small and medium-sized enterprises.
- Further improvement of the legal framework (precautionary regulations in the financial sector and their continuous development).
- That an effort on *acquis* transposition is made in the areas of air pollution, waste management, fresh-water quality and in the field of environmental impact assessment (including implementation of a more sophisticated strategy for mid-term financing).
- Better coordination among regular and frontier police as well as customs authorities.
- An improvement in the fight against corruption and organised crime.

The EC report from 2001 states that:

- There was a significant acceleration of legislature harmonisation with the EU *acquis* (domestic market).
- Free flow of capital was reinforced against laundering by the law (although a schedule is still needed for the cancellation of anonymous bank accounts, and the further reinforcement capital market supervision).
- Significant progress was achieved in terms of harmonisation with the *acquis* in the field of intellectual property (it is necessary to improve the efficiency of regulatory bodies).
- Further legislature harmonisation concerning state aid took place (there are some gaps in the field of anti-trust provisions).
- Significant progress was achieved in the liberalisation of the telecommunication market (the supervision body of audiovisual policy needs to be reinforced).
- Progress was achieved in sector policies (government-stimulated enterprises reshaped and sped-up privatisation, mainly through the activities of the Revitalisation Agency, with the exception of the steel industry).
- The transport sector showed harmonisation progress in all branches.
- Social and employment policy complies with EU principles and policy.
- Territorial arrangement is in accord with the EU classification.
- Measures were prepared for practicing common agricultural policy.
- Authorities responsible for standards and certification of goods work well in general.

Regarding environmental management, the Czech Republic has made some progress in rapprochement with the *acquis*, and an overall estimate suggests that a quarter of environmental regulations have been transposed to national legislation. While a transposition of significant general regulations has not yet been completed, this is a

short-term priority of the Partnership for Accession, namely in the fields of air, fresh-water and wastewater management as well as environmental protection and some regulations concerning industry. While preparation has already started, there are gaps in secondary legislature covering economic tools, implementation and enforcement. Even though the government policy is based on the principles of the EU's Sixth Action Plan on the Environment, efforts must be made to reach a full accordance with the environmental *acquis* by the time of accession.

In the field of horizontal legislature and law regulations for chemicals, genetically modified organisms, nuclear safety, radiation protection and noise abatement, it is estimated that about a half of the EU regulations have been transposed. Approximately one third of regulations have been transposed in the fields of industrial pollution control and risk management. As for nature conservation and waste management the level of transposition has reached one fifth of the EU regulations. In the field of air pollution control only one tenth of the engagements resulting from the EU legislature have been transposed. The lowest level of accordance with EU requirements was reached in the field of water quality.

The Czech Republic has prepared implementation plans for rapprochement of individual guidelines as per EU requirements. These plans will become the basis of the investment strategy in the environmental field. Since 1994 approximately CZK 1 billion has been invested in the environment. This amounts to 2.4% of GNP. It is necessary for the Czech Republic to keep or even raise this high level of investment to finish the implementation of the *acquis* before the date of accession. Special attention needs to be paid to the elaboration of financial strategies for legislation in the sectors of air pollution, water management and waste management that require large investments. In general, the technical infrastructure for implementation of environmental legislation is at a relatively high level but it requires modernisation in order to ensure the full enforcement of the *acquis*. Environmental administration in the Czech Republic is organised by the Ministry of the Environment. In recent years the ministry has been strengthened and now employs 397 personnel, or 545 employees including regional branches.

The institutional background of environmental protection and improvement has been in existence for a long time, especially in the areas of nature protection and water sources management. The system of licensing and granting of permissions for pollution-emitting equipment is well defined. A high level of compatibility has been achieved in air-emission monitoring, management of radiation protection, nature conservation and noise abatement.

Changes are needed in other areas such as water management and wastewater management, especially under developing EU policies. Labelling and control of chemicals and control of GMO also require further efforts in terms of institutional mechanisms. The most important changes in the current Czech practice will take place during the implementation of guidelines for industry, especially the IPPC guideline.

Regulation enforcement in the area of the environment is carried out primarily by the Czech Environmental Inspectorate. This consists of a national body and nine regional branches. The number of employees at the inspectorate was strengthened recently, with the total now standing at 491.

The quality of administrative capacity is of great interest since there is a shortage of trained personnel, insufficient financial resources and no clear definition of competency within institutions. There are also some unclear points within administrative reform that will have a large impact on the environmental sector.

Restructuring process and its influence on the environment

The share of private ownership in the Czech Republic was at zero in 1989. Unlike similar countries of the former communist bloc, private entrepreneurship was banned before 1989 and only took place within the black market. After the collapse of communism, the share of private ownership grew in various waves of privatisation until 1996, and has been more or less constant ever since. Three quarters of GDP comes from the private sector. The state holds a significant share in more than 350 companies via its National Property Fund. After the successful sale of Ceska

Sporitelna (the Czech Savings Bank), the state sold its 30% share in Skoda Auto to Volkswagen AG in June 2000. Approval of the new telecommunications law at the beginning of 2000 paved the way for privatization in this sector. On the basis of the European Commission's position, the Czech government adopted resolution no. 306 on "The Strategy for Intensification of Economic Growth" on April 2, 2001. The basis of this strategy is the reinforcement of economic efficiency based on the continuation of successful programmes which focus on the support of investors, investment incentives and industrial zone development. Other focal points of the strategy include support for exports and restructuring processes, and innovation in the business sector and chosen industrial sectors. An important element of the strategy is to concentrate on priorities that connect industrial and SME development (especially in socially and economically impaired areas) through regional development, employment and housing promotion, development of infrastructure, and utilisation of the resulting synergies.

The main financial resources of the strategy will be — aside from the existing means from the 2001 state budget, anticipated recourses from the 2002 state budget and state funds — privatisation revenues, EU programmes, and private sources. Individual programmes of the strategy will stress the principle of sustainable development, such as the support of environmentally friendly management systems (EMS — ISO 14000 series standards or EMAS programmes), waste re-use as secondary material in processing industry, implementation of low-waste and no-waste technologies and the promotion of energy-efficient programmes in the industrial sector in accord the Fifth Action Plan for the Environment.

Consideration of Council Directive 96/61/EC on Integrated Prevention and Pollution Control is an important part of programmes that promote modernisation of the economy. The financing of stabilisation and revitalisation programmes for industrial companies overburdened with debt will also rely on the participation of the National Property Fund.

Investment climate

Approval of the investment incentives law (no. 72/2000), which came into effect on May 1, 2000, created a complete system of investment incentives. The EC acceptance of the law created a transparent and fully trustworthy environment for foreign investors. A favourable investment climate was also supported by resolution no. 1259 of December 11, 2000, concerning the evaluation of the efficiency of investment incentives. The experience of the Ministry of Industry and Commerce, the CzechInvest agency and other interested sectors, together with suggestions from the EU delegation (based on the evaluation of the Czech Republic in the area of enterprise development support) and utilisation of PHARE resources (OMAS report no. R/CZ/P R I/99020), were utilised in the formulation of the governmental resolution.

Two accompanying programmes were adopted under the system of investment incentives: a programme on sub-suppliers promotion and a programme on industrial zones development. The first aimed to raise the competitiveness of Czech suppliers by mediating an information exchange between them and investors. The second programme is subject to approval by the government on annual basis, and its goal is to ensure — through municipality support — the preparation of an area for a specific investor who has claimed investment incentives. These are known as incentive projects. The industrial zone development programme aims, under previously defined criteria, to promote investment preparation for an industrial zone (the so-called development projects). These investment incentives have led to a better investment environment in the Czech Republic, which in turn has attracted a higher inflow of foreign investments.

As a result of the investment incentives law, the Czech Republic became more competitive in the field of foreign investment inflow compared to other central European economies. The whole system of investment incentives has a large impact on the Czech economy, promotes economic rejuvenation and supports the growth of employment, even in those regions impaired by restructuring processes.

The overall influx of foreign direct investments (FDI) to the Czech Republic reached USD 1.3 billion in 1997, USD 2.5 billion in 1998, and USD 5.1 billion in 1999. This puts the Czech Republic first in Central and Eastern Europe in terms of FDI per capita. The total inflow of FDI to the Czech Republic amounted to USD 21.2 billion between 1990 and June 2000 (source: Czech National Bank). There has been a steady increase in greenfield investments, to which the investment incentives have definitely contributed.

Table 5: FDI in Czech Republic (CZK millions)

	1993	1994	1995	1996	1997	1998 *	1999 *	2000 *
Non-manufacturing industry	8,418	11,534	45,249	21,397	28,305	78,538	149,331	122,655
Manufacturing industry	10,632	13,461	22,744	17,378	12,947	41,431	69,481	54,670
Total	19,050	24,994	67,993	38,775	41,251	119,969	218,812	177,326

Source: Czech National Bank

* Until 1997 the data only consisted of FDI to basic capital; from 1998 reinvestment profit and other capital was included.

From 1993 the Ministry of Industry and Commerce and CzechInvest realized more than 106 investment projects in the Czech Republic, achieving a volume of more than USD 3,411.75 million, with an estimated 35,000 new jobs. In the period 1993-1997 decisions were made about 40 investment projects valued at USD 699 million. During the implementation of the new system of investment incentives (i.e. from April 1998 to November 2000) 41 investment projects were started, of which 33 projects were granted investment incentives based on the governmental resolution, and eight projects were granted based on the investment incentives law.

The above-mentioned law came into effect on November 20, 2000, after which 38 companies applied for the investment incentive. Eight projects resulted of the administrative procedure. From the same date, 19 offers of investment incentives were issued, which made a ground for filing the application for granting a *promise of investment incentives* by the investor.

Between 1999 and 2004 CzechInvest has been and still is successful in its strategy. The government originally discussed CzechInvest's strategy on April 7, 1999. The organisation is now working on tens of other projects for foreign and domestic companies. According to some estimates, about 50 companies have submitted proposals to the investment incentive, of which 38 have been awarded the incentive.

Turning to industrial zone construction, 18 municipalities have received a total CZK 149.7 million in grant money. For the year 2000, a total of CZK 400 million was allocated for this purpose. With financing from the state budget and local self-government budget, about 600 hectares of investment-ready areas were prepared in 45 locations. Foreign and domestic investors already occupy about half of these locations. A total of 15,000 workers are expected to find work in the new plants in these industrial zones. The prepared zones have the potential to employ up to 30,000 workers.

The new investment environment created through investment incentives has made the Czech Republic competitive with the other CEE countries, especially Hungary and Poland. Central European countries have started to differ from each other in terms of FDI influx, and the Czech Republic ranks among the best in this respect.

Up to the present time the system of investment incentives under law no. 72/2000 has only been designed for manufacturing industry. There is currently a worldwide trend towards information technology and strategic services for investments and promotion. The term "strategic services" covers selected types of services (namely customer support, shared services, software development, experts and research) the development of which will speed up the implementation of the information society principles in the Czech Republic (i.e. the development of information technologies including infrastructure and human capital expansion).

The Czech Republic now has experience in investment support for individual sectors of manufacturing industry. As a result, there are now plans to extend investment promotion in the country. In view of the current tendency towards

more sophisticated production use, a programme to promote application research will be set up, designed for investors within the system of investment incentives.

Trade and investment flows

Table 6: Foreign trade balance

	1993	1994	1995	1996	1997	1998	1999	2000	Unit
Imports, total	426,084	498,377	665,740	754,670	859,711	914,466	973,169	1,244,243	CSK/CZK mil FOB
Exports, total	421,601	458,842	566,171	601,680	709,261	834,227	908,756	1,121,198	CSK/CZK mil FOB
Balance, total	-4,483	-39,535	-99,569	-152,990	-150,450	-80,239	-64,413	-123,045	CSK/CZK mil FOB

Source: Czech Statistics Office

Despite the negative balance of foreign trade, the rates of export and import growth show a positive tendency in comparison to EU countries (see the following table). The year 2000 was an exception, with imports (13.7%) ahead of exports (12.8%). The deficit growth was tied to economic acceleration in the preceding years (1995, 2000, 2001).

Table 7: Development of foreign trade in comparison with the EU (year-on-year % change, 1995)

	1995	1996	1997	1998	1999	2000	Average 1995 to 2000	2001	
								Q1	Q2
EU exports	7.9	4.3	10.4	7.1	4.8	11.9	7.7	8.7	4.2
EU imports	7.4	3.1	9.0	9.6	6.1	10.9	7.7	6.2	3.1
Czech Rep. exports	17.7	6.2	13.7	11.6	8.4	19.9	12.8	19.8	11.7
Czech Rep. imports	27.0	12.6	10.7	6.2	5.1	20.7	13.7	21.8	12.9

Source: Ekonom magazine, 38/2001

Table 8: Czech Republic, negative contribution of foreign trade to GNP in 2000

Domestic demand	Foreign trade balance	GNP
4.4	- 1.3	3.1

Source: Ekonom magazine, 38/2001

The share of Czech exports to EU countries oscillates around 70%. On the exports side, machinery, transportation and other industrial products play an important role. As for total imports and exports to the EU, the growth rate has shown a tendency to slow down since March 2001.

Investment flows

In 1999 the Czech Republic outpaced Slovenia in terms of FDI per capita. From December 31, 1999, more than half of the total FDI was located in the “third” sector, of which the financial, insurance and trade sectors account for roughly 58%. The strong flow of investments also found its way into the telecommunications sector. The industrial sector received a 45% share of FDI, 44% of which went to four sectors only: the production of other non-metal mineral products, the food and drinks industry, two-track motor vehicles production and tobacco processing. Neither the volume nor the structure of FDI was in line with the needs of the Czech economy in terms of restructuring and modernisation.

The first, relatively mild wave of FDI peaked in 1995, and is apparent in the growth of gross investments from 1995 to 1998. Assuming this tendency remains constant, the impact of the second, larger wave of FDI (peaking in 1999) should reach full potential in 2003.

From 1998 gross investments by companies with foreign participation had a more intensive influence on the development of gross investment expenditures in non-financial companies and financial organisations (i.e. those outside the Czech National Bank). Investments of 100% foreign-owned companies were the fastest-growing sector.

Investments of companies with foreign capital participation (CFCP) in new machinery and equipment formed a bigger part of total gross investments (on average, for the years 1997-2000) than the share of investments from domestic companies. The appearance of these investments in the Czech economy helped the renewal of machinery, a process continuing today. The bigger part of gross investments of CFCP in industry was targeted at a significantly restricted number of companies in manufacturing industry. Of the total 23 sectors, eight received 79% of the total investments. The gross investments of CFCP shared nearly 39% of total investments, which was invested in the industry and construction sectors, while more than 29% of investments went to service industries in 2000.

The share of gross investments of CFCP increased in the information and telecommunication sectors (ICT) in the period. The investment expenditures of these companies contributed to more than 20% growth for the investments in this sector during the past two monitored years. A clear majority of investment volume was designed especially for the development of the telecommunication sector. Investment volumes in information and telecommunication technologies within the manufacturing sector were nearly four times higher in CFCP terms versus domestic investment.

According to a group of experts who gave estimates to the Economist (August 2001), the rate of investments (share of investments/GDP) is 3.0-3.5 percent in the Czech Republic, while the current average in EU countries is only 1.6-2.1 percent. A two-digit growth of gross fixed-capital creation.

Management capacities in companies

In the Czech Republic, there were two million economic subjects kept in files. As the result of Czech market liberalisation and the creation of conditions for a functional economy, the level of Czech managers is catching up with that of EU managers, although Czech managers still lag behind when it comes to speaking a second language. However, the results of the Manager of Year competition (organised annually by the Managers' Association since 1993), show that the difference between managers from domestic and international organisations is fast disappearing.

There is a well-developed network of interest associations, unions and confederations in the Czech Republic. These are mostly grouped together in the Confederation of Industry, Confederation of Employers' and Business Unions, the Chamber of Economy and other confederations founded on a sectoral basis and functioning as part of the Confederation of Industry. Top managers are organised not only within sector confederations but also in managerial associations.

These are:

- the Czech Management Association;
- the Association of Electricity Managers;
- the Czech Association of Information Technology Managers.

The programmes of the above organisations provide information and educational services for their members. The programmes stress the ethics of business undertakings. For example, the goal of the Czech Managerial Association is to achieve at least 25th place in the evaluation of managerial competency as measured by OECD institutions.

Further training of managers focuses on improving foreign language skills, managerial skills, personnel skills, economics etc. Detailed statistical data for managerial training are not available. The Czech Statistics Office's data confirms that the number of regularly employed students at public universities has been increasing since 1994. The 16% of students employed in 2000 slightly exceeded the 1991 level. We assume that a similar trend could be seen in managerial education, even though most of the managers probably use private institutions for their professional training.

Environmental Policy Framework

Environmental structures, policies, strategies and targets (priorities)

Environmental protection is one of the priorities of the Czech Republic's EU accession process. The Czech government has declared it is aware of the marked difference in the level of environmental protection in the Czech Republic compared to EU member states. It is also aware of the large number of regulations that constitute the environmental *acquis* and of the relatively high volume of investments needed to reach the technical level of environmental protection in the EU. The Czech government is motivated by the marked improvements in the level of environmental protection and, at the same time, by the actual improvement—mainly in air and water quality—that was achieved in the 1990s as a result of large environmental investments. In the last five years these investments amounted to more than 2% of GDP (in 1996 the figure was in excess of EUR 1,000 million⁸, approximately 2.7% of GDP). The improvement is documented in annual reports on the state of the environment in the Czech Republic, and also appears in the Environmental Performance Review, conducted within an OECD programme in 1998.

The new vision of institutional arrangements is defined in the updated State Environmental Policy. Its current goals and measures are as follows:

⁸ EUR 1 = CZK 35 in this document

- To create the Council for Sustainable Development as an advisory body of the government, or to make the environmental strategy part of the agenda of the governmental Council of the Czech Republic for Social and Economic Strategy.
- To create conditions for the preparation of concepts, programmes, events, and factual decisions that are significant to environmental protection and sustainable development, at the ministries involved in environmental protection.
- To set up committees for sustainable development in both chambers of Parliament, to discuss the State Environmental Policy, the reports on the state of the environment and sectorial policy of individual ministries in Parliament.
- To set up bodies responsible for creating concepts of sustainable development on the level of upper regional self-governmental units and to promote the establishment of similar bodies at the municipal level.
- Due to high professional demands within the decision-making process, to create the Czech Agency for Environmental Protection in the medium term. The decision-making and control powers regarding EIA, IPPC, accident prevention, decision-making according to CITES, etc. will be concentrated within this agency.
- To strengthen the professional and technical background of the Ministry of the Environment.
- Based on a detailed analysis of the current state: to precisely assess the activities of central bodies of the state administration regarding territorial planning, forest and water management due to the need to consistently enforce the principals of sustainable development at the state and regional levels.
- To strengthen the Czech Environmental Inspectorate as a significant instrument for environmental law enforcement and as a professional background for IPPC.
- To ensure the organisational readiness of the Ministry of the Environment and the regions, in terms of preparing projects that will draw on international funds for the promotion of regional development.

In 1991 the State Environmental Fund of the Czech Republic (SEF CR) was established. This public state-operated financial institution plays an important role in supporting environmental investments of both municipal and other subjects. Direct funding (grants and loans) and indirect funding (loan guarantees, contributions to interest payments) by SEF CR is governed by the Directive of the Ministry of the Environment and by its amendments. The main income of the fund comes from a collection of fees and fines. Part of the jurisdiction in the area of environmental protection was delegated to other ministries: the Ministry of Agriculture (water and forest management), the Ministry of Industry and Commerce (raw materials, energy), the Ministry of Regional Development (territorial planning) and the Ministry of Health.

Harmonisation with EU environmental acquis: implementation plans and estimated costs

In the period January-June 2000 the Ministry of the Environment in co-operation with other ministries elaborated the Implementation Plan for the Environment. The implementation plan represents the next phase of a more detailed and extensive approach to the Approximation Strategy for the Environment, which was accepted by the Czech government via resolution no. 677 from June 28, 1999. Elaboration of the implementation plan was a significant step forward in terms of the Czech Republic's progress in negotiations on the environment chapter. The chapter was opened for negotiation at the beginning of December 1999. In response to the Czech Republic's negotiating position (as stated in the positional document), the European Commission worked out and handed over to the Czech Republic the EU's common position on this chapter in December 1999. The EU called on the Czech Republic to present a more precise and extensive reasoning to accompany applications for the transitional periods outlined in the positional document. The EU also asked for information about the methods of fulfilling the requirements of other directives in which the Czech Republic was not applying for any transitional period, but which are considered vital by the European Union. As a consequence of this requirement, the Ministry of the Environment elaborated the Amendment to the Positional Document (governmental resolution no. 550 from May 31, 2000) and

detailed the additional information for the common position of the European Union for this chapter. The requirements for the transitional periods are factually and chronologically detailed in these documents. Both documents were handed over to the EC at the end of July 2000.

The implementation plan for the environment is divided into three parts:

- *General:* Comprehensive implementation plan for the environmental area This section contains a list of detailed implementation plans, the European Community regulations for which these plans were worked out, obligatory division of direction and coordination according to regulation no. 550, a legislative plan, and a cost estimate for the state budget as well as for the private sector with regard to the implementation of the individual requirements.
- *Mid-level:* Implementation plans for individual sub-areas
This section deals with the ways to secure fulfilling the requirements of the European Community regulations for the individual sub-areas. It sums up elementary information contained in the detailed implementation plans.
- *Detailed:* Implementation plans for individual regulations of the European Community
This section provides detailed solutions of chronological and factual progress in the implementation of individual parts of the regulations, including the anticipated obstacles and suggested solutions. It also evaluates economic costs of the implementation.

The implementation is extremely demanding in two directions. Primarily, the enforcement of institutions with respect to personnel and technical equipment is important, since it is currently at half or two thirds the level of the EC's usual standards. Enforcement of institutions has been taking place gradually since 2000. Another marked enforcement concerns the Czech Environmental Inspectorate (CEI). It is also necessary to reinforce the areas of professional and informational base (PIB), where new professionals are needed due to markedly increased demands on monitoring, processing and providing of information.

Preparation for EU accession and the adoption of the *acquis* must be coordinated with specific national priorities given to serious problems within the Czech Republic. Harmonisation of these priorities is included in the preparation of the new State Policy of Environmental Protection, which emphasises the issues connected with accession in more detail than the State Policy of Environmental Protection passed by the Czech government in 1995. In particular, consistent implementation of the principle of sustainable development will be stressed in the State Policy on Environmental Protection. Also, harmonisation with the Sixth Environmental Action Plan of the European Union and all of the elementary principles of current environmental protection will be emphasised. This means emphasis on the synergy of tools for environmental protection and economic measures, with the aim of dividing the curves of economic growth and various types of environmental burden. In particular, this concerns transition from end-of-pipe technologies to a preventive concept focused on efficient technologies, in other words, transition from environmental effectiveness to economic effectiveness. Apart from protection of human health and ecosystems, part of the approach of the Czech government will be a focus on the integration of environmental protection into sectors that decisively influence its quality, especially in the sectors of energy supply, industry, transport and agriculture. Relatively fast progress was achieved in the areas of public access to information, chemicals management and waste management. On the other hand, adjustments of the current legislature, especially in the area of water protection (i.e. the Frame Directive on Water, in preparation) and waste management, will be more complicated, and will require intensive inter-sector cooperation. Another difficult problem will be the implementation of the Directive on the Integrated Pollution Prevention Control (IPPC) that requires a high level of cooperation among various public service bodies.

In the pre-accession period, the Czech government will have to focus primarily on cooperation with Czech industry. As for the state administration in the area of environmental protection, there is a need to map out all industrial sources of pollution; to modify the current licensing procedure; to amend the EIA law; to prepare enforcement of the IPPC and SEVESO directives; and finally, to improve and unify activities in the areas of inspection and enforcement. Consequently it will be necessary to evaluate investments needed in the private sector in order to satisfy the requirements of the environmental *acquis*. The environmental management programme EMAS has already been initiated by a governmental resolution. Large and medium-sized enterprises are very interested in the implementation of this programme. Nevertheless, it will be necessary to ensure more intensive dialogue with industry. This dialogue has already started with the establishment of the Consultative Forum, which focuses on environmental preparation for EU accession under the Ministry of the Environment. This forum should be further divided into respective sub-sectors and interested parties. It is also necessary to improve cooperation with other

ministries, especially with the Ministry of Industry and Commerce, to ensure implementation of all measures required by the *acquis* in economic sectors.

Sixth Environmental Action Plan

Four priority areas in which action is required have been highlighted. These relate to:

- climate change,
- nature and bio-diversity,
- environment and health as well as quality of life, and
- sustainable use of natural resources and waste management.

The plan stipulates that established environmental objectives should be achieved within ten years. Seven strategies are to be developed by the European Commission in order to establish further quantifiable and time-bound targets. These strategies cover air quality, the marine environment, resource use, pesticides, waste recovery, land-use issues and the urban environment.

Among other things, the plan stipulates that:

- a long-term climate objective is to not exceed a global temperature change of 2°C over pre-industrial levels and to stabilise CO₂ concentrations below 550ppm;
- by the year 2010, 12% of the total use of energy should be derived from renewable energy sources;
- measures are presented within a number of policy areas which will contribute to the fulfilment of the EU's commitment to reducing greenhouse gas emissions;
- the loss of biodiversity should be halted by 2010;
- by 2020 only chemicals that do not have a significant negative impact on health and the environment should be produced and used;
- a more sustainable use of pesticides, as well as a significant overall reduction in risks and of the use of pesticides should be achieved;
- economic growth must be decoupled from resource use;
- the amounts of waste produced must be reduced and recycling and re-use must receive priority.

A number of other fundamental positions have been adopted:

- fossil fuel subsidies should be phased out;
- green public procurement policy should be promoted, including a review of procurement in community institutions.

The plan aims to influence the state and trends of the environment through changes in production and consumption patterns. New ways of involving stakeholders, empowering citizens and encouraging better land-use planning and management decisions are spelled out in a strategic approach where the correct implementation of existing legislation is also seen as particularly important.

The initiatives to be taken with the aim of meeting the objectives shall consist of a range of measures, including legislation, voluntary agreements with industry, improved information and involvement of consumers, enterprises and public bodies. These initiatives shall be presented progressively, and, at the latest, four years after the adoption of the plan.

The plan also foresees the adoption of thematic strategies for priority environmental problems requiring a broader approach. The latter should be ready for implementation at the latest five years after the adoption of the plan.

Environmental standards and permitting

Completely new environmental standards were adopted by the Czech Parliament in 1991 and 1992. These standards were generally derived from standards and limits typical in EU member states. This new legal framework was one of the main reasons for the extensive environmental investment by Czech industry in the 1990s, estimated at CZK 200 billion in total. Environmental investment accounted for more than 50% of all investment in some companies. As a result, atmospheric emissions have been reduced faster than the OECD average over the last 14 years. Discharges into surface waters have also been reduced.

Environmental management system (EMS)

At present there are two standards that can be used to implement environmental management systems in enterprises in the Czech Republic.

These are:

- Technical standard CSN EN ISO 14001 "Environmental Management Systems: Specification with Guidance for Use." This standard has a worldwide impact, and was worked out by the ISO/TC 201 Environmental Management Technical Committee in cooperation with the CEN/CS technical committee.
- Decree no. 93/1836 of the EC, known also as EMAS (from English Eco-Management and Audit Scheme). This decree is obligatory and directly applicable for governments of all EU member states.

The chief reasons for the introduction of the EMAS programme in the Czech Republic are as follows:

- support of these activities is in accord with the commitments of the Czech Republic following the signing of the European Agreement on Association to the EU;
- in accord with the State Environmental Policy, it is necessary to create conditions for the implementation of voluntary activities of industrial enterprises in environmental protection, where the state will create the pertinent legislative and administrative framework;
- the creation of a national EMAS system, which would be gradually recognized by the EC countries, is in the interest of overcoming tariff barriers and increasing the competitiveness of Czech products in the single EU market.

The following table shows how many enterprises had received an ISO 14001/EMAS certificate in the Czech Republic by the year 2000, compared to the other European states.

Table 9: Number of ISO 14001 certifications in individual states

World rank	Country	ISO 14001 Certifications
2	Germany	2,400
23	Austria	223
25	Hungary	195
30	Czech Republic	116
37	Poland	55
40	Slovak Republic	36

Source: KÖVET-INEM Hungary (January 2001)

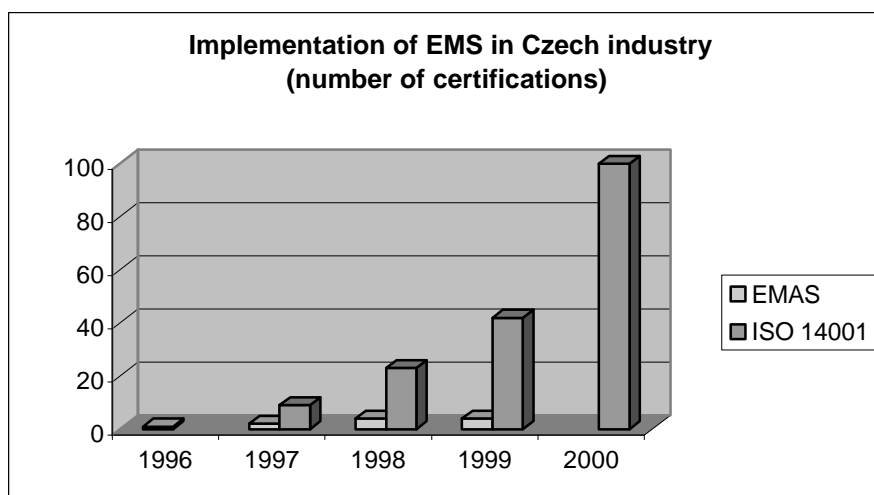
The results of the table above are also confirmed by a comparison of GDP per number of ISO 14001 certifications. The Czech Republic belongs to the group of countries with a high value in this ratio, which indicates an unsatisfactory situation.

Table 10: GNP per certificate

World rank	Country	HDP/ISO 14001 (USD million per 1 certificate)
6	Hungary	385
13	Germany	788.3
14	Austria	825.1
17	Czech Republic	1,000
23	Slovak Republic	1,250
35	Poland	4,782

Source: KÖVET-INEM Hungary (January 2001)

Implementation of EMS systems is more developed in the sectors of manufacturing industry and services. A low level of implementation has so far been reached in agriculture and food industry. It would be efficient to prepare and discuss tools needed to improve the situation (enhanced propagation, financial support, tutorial seminars, etc.).



Source: CEMC

According to CEMC, ISO 14001 is implemented in 180 organisations while EMAS is present in nine. In 2001 the GDP/ISO 14001 indicator (assuming GDP growth of three percent) will reach 306. At this level the Czech Republic would approximate Hungary, which takes sixth place on such an evaluation chart.

Enforcement of Environmental Regulation

The Czech Environmental Inspectorate (CEI) plays an important role in the area of law enforcement. The inspectorate has already been engaged in the activities of the AC-IMPEL programme. CEI also takes part in the Twinning Programme and establishes contacts with inspection bodies in the EU member states. It is already clear that it will be necessary to strengthen CEI, both in terms of personnel and competency, as well as on a technical level. It will be necessary to coordinate competencies of the CEI in individual areas of environmental legislature in such a way to create a unified mechanism of enforcement (especially regarding implementation of the IPPS directive requirements). Presently there are two reforms in a preparatory state, the reform of public services and the reform of justice. Both will be important from the point of view of enforcement and control.

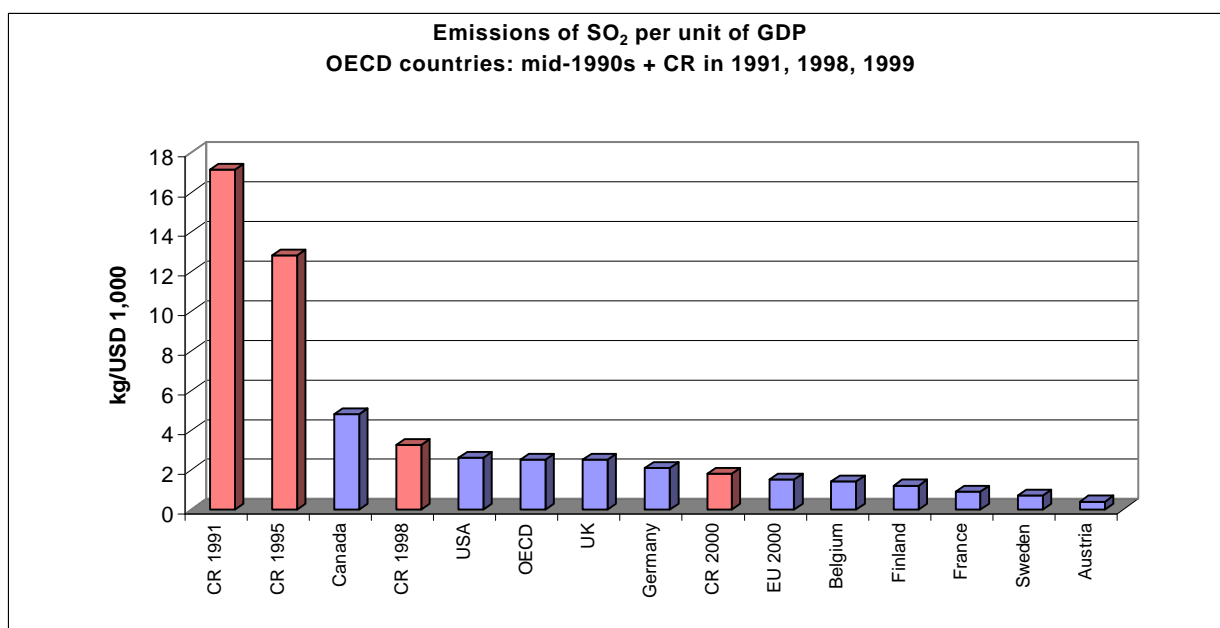
The Czech Environmental Inspectorate

Activities of the inspectorate vary for individual parts of the environment. This is partly because of different historical developments and partly because of different legislature. In general, it can be stated that since the inspectorate's establishment in 1991 it has gradually reached a stable position among the environmental state administration bodies, and has established a place in the current system based on the practical needs of the sector. In harmony with the legislative changes in the 1990s and the increase of the inspectorate's personnel, the range of inspection activities has gradually increased and is now stable. One of the most demanding tasks—professionally, financially and in terms of time—was the enactment of emission limits for current large and medium emission sources. Other demanding tasks include finding a solution to the ecological burden of the past, mapping out waste disposal sites and securing implementation of the law on international trade in endangered species (CITES convention). At present, between 12,000 and 14,000 inspections, audits and controls are performed by the inspectorate annually. Some of these are very complex and extensive, for example the audits of large industrial enterprises, large sections of river basins or large protected areas, and, recently, the inspection of flood damage in Moravia from the perspective of environmental protection. The inspectorate issues approximately 10,000 administrative decisions in administrative procedures (not including emission limits) annually. The number of decisions on emission limits culminated in 1994 (16,185 decisions). The number of positions and expert opinions prepared for other administrative bodies is still increasing, the most important being expert opinions on grant applications to the State Environmental Fund, opinions on ecological audits and reports elaborated within the EIA. An increasing number of complaints received from the public demonstrates the increased general recognition of the inspectorate.

Reductions in the emissions of sulphur dioxide and solid substances

Sulphur dioxide emissions and emissions of solid substances fell by 79.5 percent and 91.6 percent respectively between 1985 and 1998. According to estimates, sulphur dioxide emissions will reach 260kt in 1999, which in comparison with 1985 represents a reduction of 88 percent. The further significant decline of SO₂ emissions in 1999 follows the Clean Air Act No. 309/1991 that introduced new emission limits from January 1, 1999. We therefore consider the estimate of SO₂ emissions in 1999 as reliable as it is based on the new desulphurisation equipment installed at the end of 1998. (Source: OECD Environmental Indicators, 1998; Czech BCSD, based on data from CHMI and CSO, 1991, 1998; Ministry of Environment Assessment, EU, Czech Republic, 2000.)

Reduction of environmental pollution

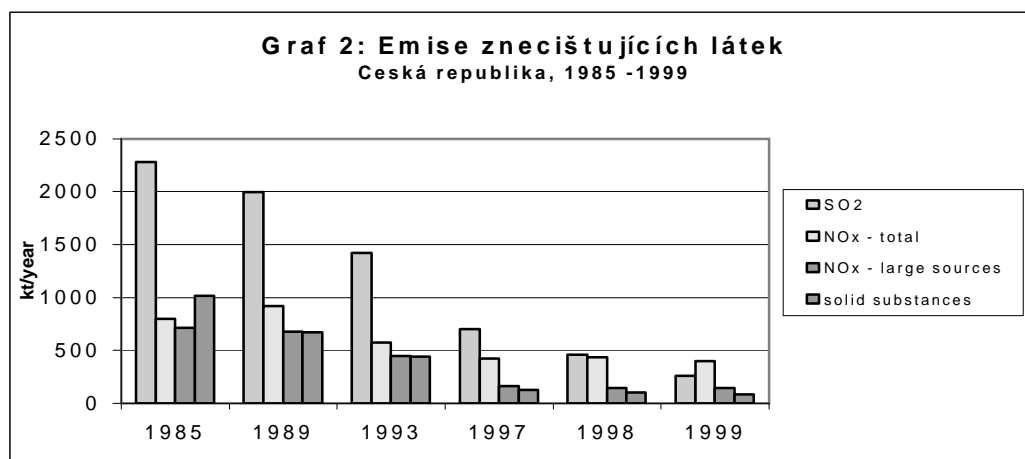


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Reductions in the emissions of nitrogen oxide

Emissions from large stationary sources have been reduced, while emissions from mobile sources have been increasing. From 1989 to 1998 nitrogen oxide emissions from large sources fell by nearly 79 percent and their share in total NO_x emissions declined from 90 percent in 1989 to 34.8 percent in 1998. In 1998 mobile energy sources accounted for 71 percent of nitrogen oxide emissions in Prague and 61.2 percent nationwide.



Water Pollution

Between 1990 and 1998, the level of biological oxygen demand (BOD₅) fell by about 85 percent, suspended solids by 78 percent, soluble inorganic salts by 40 percent, oil substances by 90 percent and apparent acidity and alkalinity by 87 percent.

The Czech Republic has not been as successful in improving other environmental indicators as it has been in curbing emissions of SO₂, particulate matter and NO_x from large sources. Energy intensity, for instance, has remained rather high although some improvement has been achieved (as witnessed by the decrease in the economy's greenhouse gas intensity from 1.3t CO₂/USD 1,000 to 1.1t CO₂/USD 1,000 in 1997). Greenhouse gas intensity, however, is still much higher than the OECD average (0.65t CO₂/USD 1,000) and that of the EU (0.5t CO₂/USD 1,000). The country's high energy intensity is partly caused by economic recession: GDP is still below the 1989 level.

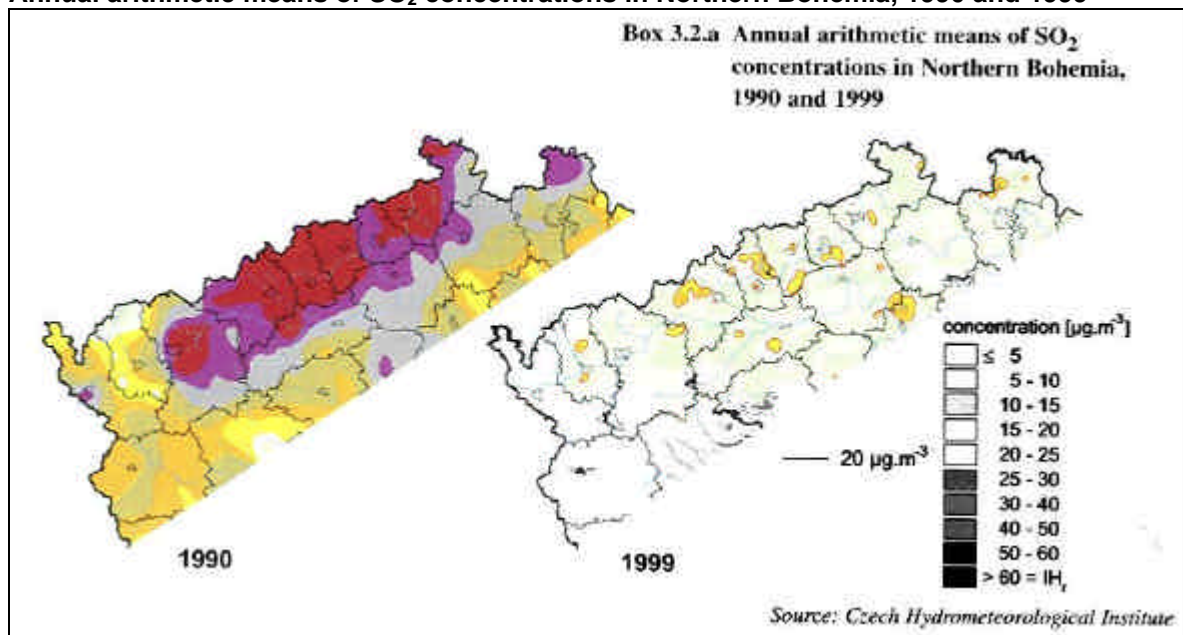
Ten years ago the pollution and resource intensities of the Czech economy, in common with other member states of the former COMECON,⁹ were many times higher than in OECD countries. Implementation of the Clean Air Act (no. 309/1991), the reduced output of pollution-intensive heavy industries and the gradual introduction of environmental management systems have all contributed to a dramatic fall in pollution. For SO₂ this reduction has brought both per capita and per unit GDP emissions down to the average level of EU member states in 1999.

Conclusions

The environmental performance of the Czech Republic over the last decade has been much better than could have been expected in 1989. This improvement is seen not only in the decrease in emissions of the main atmospheric pollutants but also in the dramatic improvements in air quality. As the figure illustrates, there is no Black Triangle any more—or at least its Czech element has disappeared.

⁹ Council for Mutual Economic Assistance

Annual arithmetic means of SO₂ concentrations in Northern Bohemia, 1990 and 1999



However, many environmental problems remain to be addressed and we see full implementation of the EU environmental *acquis* as a key tool in tackling these issues.

Environmental taxes and charges

The current system of economic instruments in environmental policy in the Czech Republic was introduced in the early 1990s during the process of establishing state environmental policy and legislation.

Charges

The current system of environmental charges includes:

- air emission charges;
- sewage charges;
- water pollution charges;
- user charges on municipal waste;
- charges on solid waste disposal;
- water extraction charges for the withdrawal of water from surface and ground water;
- charges for dispossession of agricultural and forest land;
- mining charges.

Tax Instruments

Value added tax

In the Czech Republic the VAT system is comparable to that used in the European Union. A social approach was taken in selecting goods with a reduced tax rate (5%). Consequently, such items as food, solid fuels and heat energy have a lower rate of VAT. With regard to environmental protection the following goods were included on the list:

- coatings and lacquers (including enamel and fine lacquers) based on synthetic polymers or chemically-modified natural polymers, dispersed or dissolved in an aqueous medium;
- bio-gas;
- polyvinyl alcohol polymer;
- sawdust, residues and waste, also agglomerates in the form of blocks, briquettes, pellets and similar shapes;
- paper, carton, cardboard and products manufactured from them in the Czech Republic, on the condition that the certificate indicating production from more than 70% recycled paper is issued by a Branch Certificate Center;
- water and wind turbines with respective outputs up to 100kW and 75kVA;
- heat pumps;
- solar facilities;
- household appliances for water purification and small waste treatment plants for family houses, and any parts and components for them, fillings for the appliances and plants;
- machinery and instruments for air filtering and purifying;
- automobile catalytic converters;
- passenger cars and other primarily passenger motor vehicles with electric motors;
- economical light sources (fluorescent and discharge tubes and their components);
- thermostat valves;
- flow meters;
- heat consumption meters and hydrometers for households.

As a result of approximation to EC legislation, it has been proposed to remove most of the environmentally friendly products from the list. The reason for this is EC Directive 77/388/EC, which allows only certain services connected to waste management to be included in the reduced tax rate.

Income tax allowances

The following areas are exempt from income tax in the first calendar year of operation and for the following five years: income from the operations of small hydro-electric power plants with an output up to 1mW; wind-powered electricity generating stations; heating pumps; solar-powered facilities; bio-gas producing plants; facilities producing bio-degradable substances, which are determined in generally binding legislative provisions; and facilities utilising geothermal energy.

The environmental aspect is also reflected in the possibility of decreasing the tax base by 15% from the price of equipment for water treatment (used in buildings) and sorting and other equipment for renewable sources, if the payer is the first owner of such equipment.

Other tax measures in the Czech Republic include:

- Road tax.
- Highway toll.
- Airplane noise pollution tax.
 - The charge is non-profit in character, and the revenues are used for monitoring (approximately USD 0.64 million each year). The rates are related to potential damages to the environment. There are four categories of noise, and the tax rate varies from USD 0 to USD 1/ton of airplane mass.
- Excise taxes.
 - The excise tax on gasoline and diesel is relevant from the environmental point of view, although the revenue goes to the state budget and thus is not marked.

Technology subsidies

The act on integrated prevention and pollution control (IPPC)

The aim of the future law on integrated prevention and pollution control and integrated pollution register is to achieve the best possible prevention of industrial pollution in all parts of the environment, and thus ensure full compatibility of Czech law in this area with the legislature of the European Communities, in particular with Directive 96/61/EC, subsequent Commission decisions and with the C(96)41/Final Recommendation of the Organisation for Economic Cooperation and Development.

The above stated goals should be accomplished by the means of the following tools:

- Integrated evaluation of all kinds of environmental influences of the operation of particular equipment. Based on this evaluation, one so-called integrated permission for operation will be issued for this equipment instead of several individual permissions (expert opinions, views, decisions).
- Mutual communication of an applicant and a licensing body resulting in determination of measures and conditions for operation of the equipment that are appropriate for the environment and the applicant.
- Taking advantage of exchange of information on the best available techniques within the EU member states
- Publishing of polluting materials listed in the integrated pollution register.

These tools will be reflected in the system of licensing of equipment according to valid legislature. The proposed regulation should specify the kinds of equipment that will be obliged to satisfy the new system. Licensing of other equipment will be voluntary for the operator. The new legislature is expected to become operative on January 1, 2003, providing that the obligation will be postponed for some institutes for up to four years.

The law on integrated prevention and pollution control (IPPC) will have a significant impact on more than 1,100 pieces of domestic equipment and 570 plants.

Other sector policies with an impact on EM (e.g. industry, transport, energy)

In the spirit of the Sixth Action Programme (“lets work together,” and industry “must be not only a part of the problem but also a part of the solution”), the development of shared responsibility of the government, industry and the public, and voluntary activities within Czech industry started in the mid-1990s:

- Cooperation of the Confederation of Industry (CI), the Czech government and Parliament in the field of sustainable development is oriented around the Ministry of the Environment (ME) and the parliamentary committee for regional development, public administration and the environment. Cooperation is constantly improving. An agreement on cooperation between ME, CI and CzBCSD was signed in 1999, followed by the Action Plan of Cooperation in 2000.
- Significant progress was achieved in informing the industrial sector on the strategy of sustainable development.
- There was an improved level of acceptance in the industrial sector of the notion of publishing data on environmental impact. A number of industrial companies met the requirements of the act on the right to know in the area of the environment, even prior to the adoption of the law, and they now publish environmental reports on a regular basis.
- Industry prefers voluntary agreements.
- Implementation of environmental management systems (ISO 14000, EMAS) is becoming a more and more important condition for staying competitive in the market of developed countries; an increasing number of Czech companies are certified according to ISO 14001.
- Czech chemical industry has shown—through a voluntary restriction of dangerous activities—that a non-regulated approach to health and environmental protection is effective, e.g. the programme of “Responsible Care in Chemistry.” The “Responsible Care in Chemistry” logo had been awarded to 18 enterprises in the Czech chemical industry by the end of 1999.
- The national programme for product labelling using the registered mark “Environmentally Sound Product” has been in place in the Czech Republic since 1994. By the end of 1998 more than 190 various products had been awarded this label.
- The area of research was one of the weakest points in the system and had been seriously eroded over a ten-year period.
- Financial resources from structural funds and the Cohesion Fund of the European Union are not significantly accessible for Czech industry. PHARE resources are used mainly to finance projects realised by foreign consulting companies and their benefit has not been evaluated.

A radical decrease in polluting emissions was stressed in the 1990s when the only solution was the use of expensive end-of-pipe technologies. This caused a delay in technological innovations and the competitiveness of Czech industry was increased just slightly. This imbalance has to be carefully considered in strategy making in the years ahead.

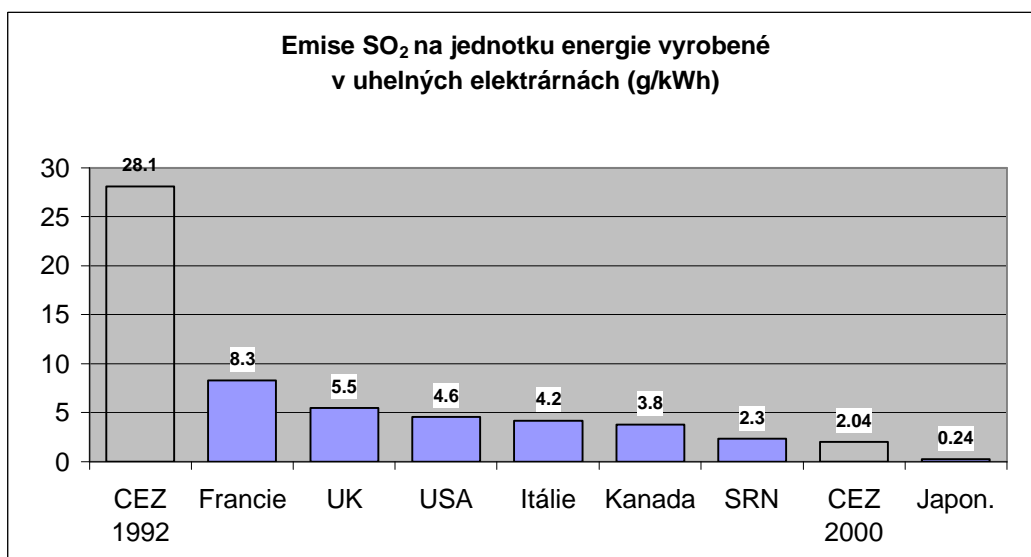
From the point of view of the Fifth Action Plan and European Union policy, Czech environmental policy in the 1990s had the following shortcomings:

- The need to preserve close connections between protecting the environment and increasing industrial competitiveness was not respected.
- There were practically no stimulating or motivating tools.
- The research background was eroded.
- Public investments in environmental protection were significantly decreased. EU resources were used ineffectively from the point of view of industry.

Successful fulfillment of the requirements of the environmental *acquis* is a crucial condition for the future prosperity of Czech industry. Czech industry is getting ready to play a decisive part in this field, since neither the administration nor Parliament can manage this highly important and extensive task, especially concerning the technical details of individual sectors.¹⁰

Energy Supply

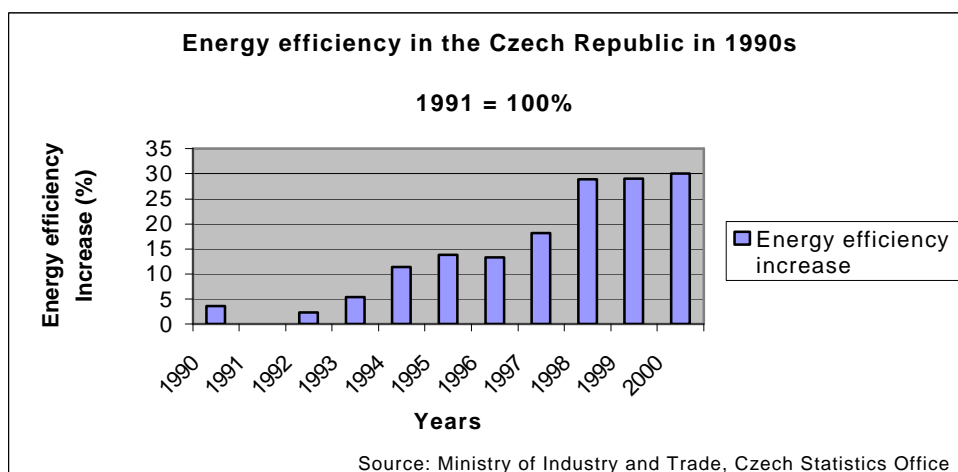
Under the State programme for energy savings, efforts are made to support the utilisation of environmentally sound fuels and clear coal technologies, and to support the utilisation of renewable and secondary energy resources. The goal is to increase the contribution of renewable energy resources to cover at least 8% of total energy consumption by 2010. Other goals of the Czech environmental policy are the implementation of modern power technologies of a high efficiency; support of activities leading to a decrease in energy demands of the economy; implementation of expert consulting; education in the field of the effective use of power; and initiation of changes in final consumer behaviour patterns towards the effective use of power. Connected to the principle of preliminary care is the intention not to promote the construction of nuclear power plants.



Source: OECD Environmental Data Compendium 1999, Energy Balances of OECD Countries 1997- 1998,

Japan: Survey by the Federation of Electric Power Companies; Czech Energy Utilities (CEZ) data 2000

¹⁰ Horacek, P: *Sustainable Industry Development*



Energy consumption per unit in the Czech Republic was 68% higher than the EU average in 1997. Consequently, the consumption of primary energy sources per person (PES) in 1997 was 171.1GJ while the EU average reached 161.1GJ per person, or only 6.2% higher. The main contributor to high consumption is the low GDP production. The average electricity consumption of households per person was 14.4% lower than the EU figure.

Table 11: Total energy consumption per unit — Czech Republic

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
GJ/000s. CZK GDP	1,598	1,682	1,608	1,564	1,466	1,432	1,436	1,361	1,18	1,12
Index	100	105.3	100.6	97.9	91.7	89.6	89.9	85.4	73.8	70.1

Source: Trend of Fuel-energy Management in the Czech Republic from 1990, Czech Statistics Office

The Czech Republic's total energy consumption per GDP rose at the start of the 1990s. From 1992 consumption started to decline, with stagnation in 1995 and 1996. In 1998 consumption was 26.2% lower than in 1990.

Transport

Pollution associated with vehicles has been reduced in relative terms as a result of improved vehicle technology, including increased use of cars equipped with catalytic converters (from 19,000 in 1990 to 981,000 in 1999), lower noise levels, lower fuel consumption and emissions. However, the overall trend in terms of absolute environmental impact continues to be negative. Total emissions of CO₂ and NO_x from road transport rose between 1990 and 1999, with NO_x particularly eroding the quality of life in cities. The development in modal split is also unfavourable. In the period from 1990 to 1999 car use increased by 50 percent at the expense of public transport, and there was a 13 percent decrease in the use of urban public transport. Since 1990 there has also been a decrease of about 35 percent in passenger rail transport.

The density of roads in the Czech Republic is lower than the EU average: 0.7km/km² in 1998, versus the corresponding EU average of 1.0 km/km². (The EU figure ranges from 0.2km/km² in Finland to 4.6km/km² in Belgium). The number of passenger cars and vans in the Czech Republic rose from 2.4 million in 1990 to 3.7 million in 1999 — an increase of 50 percent.

The most important goal of transport policy will be the stabilisation and a gradual decrease of the negative impacts of transport infrastructure and traffic on the state of the environment. The system of evaluation of these influences (EIA, SEA) will be further improved and supplemented with estimates of the cross-border influences (Espoo Convention).

Agriculture

There are several environmental demands on agricultural, forestry and water policy. These are, primarily, to determine and keep the optimum ratios of arable land, meadows, pasture land, forests and water areas, in accord with the principles of sustainable development and the limiting capacity of environmental space. Other important demands are to secure food safety using the principle of minimising the levels of foreign substances in the food chain, to create conditions for development of multifunctional agriculture, to decrease area water pollution, and to support environmentally friendly methods of agriculture.

Public monitoring and pressure from civil society

Dialogue with the general public on accession preparation must be more intensive so that it is clear to everyone that the level of environmental protection will be significantly improved in the period prior to accession. The Czech Republic accepted the Aarhus Convention on Access to Information. This Convention represents a significant reinforcement of democratic institutions in the sense of the development of the Copenhagen criteria. The Czech Parliament will ratify the Convention and its proper implementation will be ensured. A new law on evaluating environmental influences, that should reflect the Convention, is currently being prepared to replace Act No. 244/92 of the Czech Republic on EIA. Regarding public access to environmental information, the new Act No. 123/98 of the Czech Republic is fully harmonised with Directive No. 90/313/EEC. Some data and information are not accessible though due to legal and administrative deficiencies. Such barriers could impair the ability of the Czech Republic to give information on the implementation of the environmental *acquis* in the future. The above stated problems are closely connected to the state of institutions dealing with environmental protection, and their solution is closely connected to the prepared reform of public administration.

There is no legislative framework for reporting to the EU on the state of environmental transposition so far. Directive 91/692/EEC doesn't have to be transposed but its implementation will have to be ensured using sector legislature (water, air, waste, etc.).

Submitting information on the state of the environment is now regulated by Act No. 123/98 on Public Access to Environmental Information. This act is based on Directive 90/313/EEC and is fully coordinated with it.

The act on the right to information on the environment was adopted in 1998. The general act on free access to information became effective in 2000. The ministry issues an annual report on the state of the environment in the Czech Republic. The report is approved by the Government and discussed by Parliament. These changes have significantly influenced the possibilities for the public to take part in the decision-making process. Practical enforcement of these rights remains a serious problem. Generally it can be said that the public learns about most of the controversial projects and intentions too late, when the chance of changing or influencing matters is very limited.

Various civic associations operate in the Czech Republic. These associations take part in administrative procedures and defend citizen rights. Shortcomings and mistakes in these procedures are often disclosed by non-governmental organisations.

Discussion forums

In tandem with the spread of the Internet in recent years, the significance of an ideas exchange has increased in Czech society. High computer literacy — especially among the younger generations — promotes this process. The website of Econnet, a civil association established in 1991 to enable easy communication of non-profit organisations and also to aid communications with the public, serves as an example of space reserved for a broad discussion on environmental and other topics.

Econnet runs a news-service oriented towards the non-profit sector. The service gives information about the activity of non-profit organisations, follows their long-term projects and helps them to provide information about their activity that would otherwise not reach the public.

Note: Applications for the “European Computer Driving License” (ECDL) suggest that computer literacy in the Czech Republic is still in a very early stage of development. In the first half of this year there were only 1,000 applications for the ECDL. In EU countries this number varies between 10,000 and 100,000 index applications.

Other discussion forums have been established on specialised portals. The potential number of these forums is theoretically unlimited, and they have been changing dynamically.

Discussion forums are also organised by business bodies and their interest associations with the aim of ensuring public access to information about the environment. CEMC and CzBCSD hold discussions in the form of round tables, with topics covering business and sustainable development.

Information, Education, Training and Capacity Building

Environmental information and education policies

Information

The Czech Environment Institute was delegated to elaborate and provide information related to the environment according to Act No. 123/1998. The institute was founded as an expert institution of the Ministry of the Environment. The primary goals of the institute are to serve as a communication workplace in the field of environmental information and natural resources, to practice research in the field of environmental care and, based on this, to grant technical and informational help to state administration with regard to the environment.

Act No. 106/1999 on free access to information and Act No. 123/1998 on the right to information on the environment govern the activity of the institute. Both of these acts bear direct importance for work of the institute. According to Act No. 123/1998, the institute is responsible for the creation and presentation of information on the state and development of the environment in the Czech Republic. The international status of the Czech Environment Institute has been strengthened since it became the central national institution for cooperation with the European Environmental Agency in Copenhagen.

A significant quantity of environmental information was passed on to the public using the internet in 2000. This process followed the long-term work of basic specialist teams (environmental economics, environmental informatics,

centre of public informative services, environmental hazards, the Information Centre on Waste, environmental education, education and cultural activities, EIA). In this way one of the fundamental human rights was satisfied — timely and complete information about the state of the environment and natural resources. Informative databases on the internet have been created and managed by experts from the Czech Environment Institute as independent modules of a unified informative system on the environment. Most of the databases are offered in a graphic environment of geographical informative systems, which makes access to required information easier for the public.

The state informative system in the field of the environment is run by the following organisations that are managed directly by the Ministry of the Environment:

- Czech Environment Institute;
- Agency for Nature Conservation;
- Czech Environmental Inspection;
- Czech Institute of Geology;
- Czech Institute of Hydrometeorology;
- Geofund of the Czech Republic;
- Administration of Protected Landscape Areas of the Czech Republic;
- Krkonose National Park Administration;
- Ceske Svycarsko National Park Administration;
- Bohemian Forest National Park and Protected Landscape Area Administration;
- Podyji National Park Administration;
- State Environmental Fund of the Czech Republic;
- Water Research Institute;
- Silva Tarouca Research Institute for Landscape and Ornamental Gardening;
- T.G. Masaryk Water Research Institute.

Apart from state administration, autonomous administrations — particularly voluntary associations and commercial entities — provide information for the public. In addition to the institutions listed above, which are directly managed by the Ministry of the Environment, table 11 shows other sources of environmental information (June 24, 1999).

Table 11: Sources of environmental information

Organisation type	Number of information sources
State administration	23
Non-profit organisations	21
Commercial activities	5

Source: Institute of Ecopolitics (Czech Republic)

The state programme for environmental education, training and learning in the Czech Republic

In autumn 2000, the Czech government approved a programme for environmental education, training and learning. The fundamental goal of this programme was to raise the environmental knowledge and awareness of the public. The term “environmental education” means not only professional preparation (within individual fields of study and expertise), but also the incorporation of environmental issues into general elementary education.

The programme on environmental education is guaranteed by the Ministry of the Environment. At the central level, responsibility for particular tasks within the programme lies with the relevant ministries (Ministry of the Environment, Ministry of Agriculture, Ministry of Finance, Ministry of Regional Development, Ministry of Industry and Commerce, etc.). At a lower level the responsibility is assumed by relevant parts of the administration.

It is assumed that the administration will employ the capacities of expert institutes and NGOs (especially the latter's network of centers for environmental education, consultancy and activities of cultural and educational organisations, including mass media). Education is one of the three main priorities of the current government in the budget preparation process. The government gains from such expenditures in the form of investments necessary for the rejuvenation of the damaged environment and the health of the population. The investments should also have an impact on GNP growth.

The Czech Republic is engaged in the international UNESCO programme "Education for the Third Millennium," in which environmental education plays a significant role.

The Czech Republic's environmental education programme stems from international commitments as well as several EU regulations.

These include:

- Agenda 21;
- Directive No. 90/313/EC;
- Aarhus Convention, June 1998;
- Agenda 2000;
- the implementation of EU regulations and other commitments of the Czech Republic, including environmental adult education.

Education system

The requirement of environmental education is presently included in the majority of elementary pedagogical documents, which influences the creation of textbooks for some subjects, especially natural history, geography, civics, natural science and national history.

NGOs and their specialised branches (i.e. centres of ecological education) are an important element of asserting environmental education at all levels in schools.

The key obstacle to environmental education is the insufficient preparation of teachers. This is not the case in most EU countries.

Environmental education in the business sphere

The mutual cooperation of the Ministry of the Environment and the Ministry of Industry and Commerce has contributed significantly to the environmental education process in the business sphere. Some credit also goes to commercial educational activities and the informative activities of consultants and suppliers of environmental technologies, who see environmental protection as a business opportunity. Various associations oriented towards the relationship between business and the environment also play a positive role: they facilitate the implementation of new standards, aid companies in environmental matters and publish the results of pilot projects. International programmes (especially PHARE and USAID) have helped to raise awareness about positive potential environmental ties between industry and society.

At present the media does not pay sufficient attention to environmental education.

Universities, technical and business schools, and vocational training curricula

According to the Czech Statistics Office there were a total of 23 universities with 110 faculties employing 26,000 university teachers in the Czech Republic in 2000. Of the total 179,000 students, 830 students studied ecology and environmental protection as the main area of study, representing 0.46% of the total (26,000 students graduated in 2000, including 144 graduates of ecology). A total of 80 study programmes on ecology and environmental protection are carried out at Czech universities. The above-mentioned statistics does not give a full description of student awareness of environmental questions, because environmental education is also included in other study programmes at all universities.

Environmental educational projects (which are part of university education) are supported by university development funds. The Czech Republic has utilised EU programmes such as SOKRATES, LEONARDO and others in previous years.

Some universities cooperate directly with the Centre for Cleaner Production, and assume the function of training centres for cleaner production:

- University of Chemical Technology;
- Polytechnic Institute in Brno;
- Polytechnic Institute in Zlin;
- School of Mining - Technological University in Ostrava.

The Polytechnic Institute in Brno organises Envibrno, an international environmental exhibition, on an annual basis. Envibrno is a competition for the best masters thesis in the field of the environment. This year the 48th round was held. The event is sponsored by the Envioptimum ecological foundation, which was established for this purpose by the Polytechnic Institute.

Projects on environmental education, performed by NGOs, are supported by the Ministry of Education through its grants to civic associations (mainly under "free-time activity" and "associations" programmes), by the Ministry of the Environment (about CZK 18 million annually to all sectors, of which CZK 6 million goes to environmental education and training projects), and by the State Environmental Fund.

There are several dozen environmental education centres in the Czech Republic founded by non-governmental organisations. Information and education centres have been set up by Administrations of Protected Areas. The Information Centre for Environmental Education was established by the Czech Environment Institute and financed by the Ministry of the Environment. There are several other centres for environmental education in the Czech Republic established by schools, municipalities, towns (e.g. Prague and Olomouc) and other organisations (e.g. the "House of Children and Youth," zoos and botanical gardens, planetariums). Private companies have also set up some centres.

Financial sources are miscellaneous. Significant support comes from the PHARE programme and other foreign sources and funds (e.g. USAID, DEMNET, TACIS).

Resolution No. 232/1992 deals with the implementation of environmental education programmes within a media structure.

Activities of business networks

Informative and voluntary instruments are in common use in business activities in the Czech Republic:

- annual business reports, reports on environmental influences of business activities, etc.;
- voluntary agreements, voluntary activities (environmental audits and programmes, environmentally sound products, responsible care programmes, etc.);
- charters, codices (e.g. codex of correct agricultural practice).

Information is distributed in the form of printed texts and on websites, including the websites of State administration and self-governments.

Organisations are united in interest associations and unions, in which businessmen and managers take part. The principle of sustainability is laid down in most of their statutes, including the distribution of information, education and business ethics. Most associations are part of, or connected to, the Confederation of Industry, in which a total of 31 sector unions and 1.500 organisations are represented.

Environmental aspects are incorporated in the policies of the following confederations:

- Confederation of Industry and Transport
The confederation has signed an agreement on cooperation with the Czech business council for sustainable development and the Ministry of the Environment. This is followed up by the action plan on specific goals resulting from the agreement.
- Confederation of Paper Industry and Cellulose
The confederation has adopted an environmental policy that serves as a basis for activities in the area of environmental protection and ecological policies of individual companies within the confederation.
- Confederation of Chemical Industry
The confederation implements “responsible care” in business in the form of a voluntary commitment

Specialised institutions are engaged in environmental management:

- Czech Environmental Management Centre;
- Czech Centre for Cleaner Production;
- Association of Ecological Systems Producers.

A range of professional associations is active in the area of waste management:

- Czech Association for Waste Management
The association groups significant private business entities that are involved in collection, recycling, use and disposal of waste and related activities. It provides extensive, quality service to towns, municipalities, companies and citizens and guarantees compliance with law, performance, price and observance of environmental protection agreements for its customers. The association establishes think-tanks and commissions. Its legislative commission has been very active recently. There are also commissions for waste sites, waste collection, containers and packaging, plastic waste processing, car wrecks and incinerators.
- Association for Water and Rock Environment Protection (1998)
Collaborates on law amendments and gives presentations on expert undertakings and to administration bodies.
- Association for Promoting the Recycling of Construction Materials (1995)
This is a civil association that groups together corporations and small businesses involved in construction

materials recycling and in production and sales of equipment in this business segment.

Its main activities are:

- organising the Recycling Conference (1999 and 2000);
- organising expert seminars and conferences, courses for state administration employees, publishing and educational activity. The association is a regular member of the Federation Internationale du Recyclage.
- Association of Waste Producers and Waste Treatment Subjects (2000)
Involved in the creation of a functioning system for collection, treatment and recycling of waste.
- CZ BIOM (1994)
The Czech association for biomass. It is involved in the development of phyto-energetics and composting.
- Czech Association of Waste Management (1997)
Represents and supports the common interests of Czech private companies involved in waste management in their dealings with administrative bodies, public and private institutions, organisations, cities and municipalities.
- Czech Association of Remedial Biotechnologists (1998)
Formulates effective biotechnology methods for bedrock remedies, for environmental protection, use and recycling of waste.
- Czech Industrial Association for Packing and Environment (1993)
Involved in the creation of alternative legal and sub-legal standards concerning production, labeling, packaging use and collection.
- Czech Association of Local Public Services (1991)
Specialises in the field of waste collection and disposal, maintenance and cleaning of local roads and public spaces and other public service activities.
- Association of Operators of Ecological Waste-Use Technologies (1998)
Helps individual members in the field of economics, legal, financial and business activities.
- Confederation of Waste Industry (1998)
Organised FOR EKO Prague, an environmental exhibition, in collaboration with ABF and Waste 1999, an expert conference Prague. In cooperation with EKO-KOM Ltd, the confederation organized Waste Prague 2000, an international congress on the strategy of the Czech Republic on waste management and EU accession.
- Confederation of Secondary Materials Industry (1996)
Focuses solely on secondary recyclable materials. Comments on and participates in the creation of legislative measures in the fields of waste management and secondary materials.
- SYBA (1990)

A packaging association that organised the Leipzig 2000 packaging seminar and the First International Conference on Labeling. Supports exports.

Activities of expert and other networks and consultation capacity

Individual experts involved in environmental management are mostly organised in the above-mentioned associations and operate as a business entity. Detailed statistics of their engagements are not registered or monitored.

A large number of environmental activities are represented by non-industrial, non-profit organisations. The Econnect website hosts a presentation covering around 80 such associations. A voluntary platform is presently being created — an association of centres for environmental education, including Pavucina and the Centre for Children and Youth, under auspices of the Czech Union of Environmentalists. A total of 17 environmental NGOs are registered at the Ministry of the Environment.

Institutional Arrangements

Cleaner Production / Pollution Prevention Centres

Pollution Prevention Centre

The centre was established in 1995 under the Czech Environmental Management Center (CEMC), with financial support from the World Environment Centre's Waste Minimisation Programme and USAID. Its goal is to contribute to a lower level of solid, liquid and gaseous environmental contaminants from industrial production through the adoption of various preventive measures.

The primary services of the centre include:

- implementation of ecological projects on waste minimisation;
- provision of technical information via a library;
- accumulation of international information, mediation of consultation and contacts with foreign experts and organizations;
- organising seminars for top managers of industrial companies, concentrating on the implementation of economically effective programmes in the environmental protection field;
- analysis of the realisation of ecological projects;
- preparation of methodical guide-lines;
- distribution of results to the general public;
- technical aid to companies and education of personnel.

Czech Cleaner Production Centre

The Czech Cleaner Production Centre is a non-governmental, non-profit and independent organisation, serving as a source of know-how on preventive procedures (i.e. cleaner production) in the Czech Republic.

The center was founded by the CEMC in 1992 with support from the Norwegian Cleaner Production Project, which was financed by the Norwegian government. The centre joined the UNIDO/UNEP "National Cleaner Production Centre" programme. The Czech Cleaner Production Centre is part of a national network of cleaner production centres. The network works under UNIDO in cooperation with UNEP.

The goal of the centre is primarily to help industrial companies, non-production companies and the state administration of the Czech Republic. At the same time it focuses on industrial associations, local administration and autonomous bodies, schools, regional cleaner production centres and consultant companies, financial organisations and, last but not least, the public. The centre focuses mainly on domestic activities but also offers its services abroad.

In 1996 the centre officially established its Brno regional office, which is assigned to perform cleaner production activities in the southern Moravia region. Close cooperation with the Decin region has worked well for a long period. In the future it is planned to establish other independent regional centres for coordinating cleaner production projects in individual regions.

The centre's activity (consultancy and tutorials) is ensured through cooperation with external co-workers and independent consultants, often members of the Managers' Association for Cleaner Production. The latter association was founded in 1993 and unites graduates of the long-term interactive cleaner production course.

The training centres of cleaner production (established by several Czech universities) also support the centre's activities.

Business associations working in the environmental field

- Czech Environmental Management Centre (CEMC).
- The Czech Business Council for Sustainable Development (CzBCSD) is a prestigious organisation uniting individuals from industry and the banking sector. It deals with strategic issues of sustainable development policy implementation under the conditions of Czech industry. The goal of this lobby organisation is to influence the preparation of environmental legislature. CzBCSD participated in the formation of the environmental policy of the Confederation of Industry. It is one of the partners of the agreement on cooperation of the Ministry of the Environment and the Confederation of Industry.
- The main goal of the Association of Ecological Systems Producers is the enforcement of common interests and the support of production and services development in the field of the environment, including:
 - the creation and support of mutual communication to promote the development of Czech ecological industry;
 - providing mutual expert consultations for problems related to support for development of ecological industry;
 - cooperation on legislature preparation in the field of environmental protection and impact assessment of implementation of the existing and proposed legislative, economic and organisational measures;
 - cooperation on the evaluation of existing and proposed manufacturing technologies and equipment designed for environmental protection, of their use in specific conditions and determination of conditions for their eventual import;
 - cooperation on harmonisation of regulations and standards concerning the environment with European Union standards;
 - support for the set-up of an IPPC information exchange system.

Environmental Management Systems and other voluntary approaches

The Environmental Management System (EMAS) programme was adopted under government regulation no. 466 on July 7, 1998. The Ministry of the Environment published the *Rules of the National EMAS Programme* in the Czech Republic, based on valid legislature of the Czech Republic and on the application of council regulation no. 1836/93. The ministry also founded the Council for EMAS Programmes. The council is the resident, directive and control body of the EMAS, working on the same basis as similar bodies in EU countries in accord with council regulation no. 1836/93. The Czech Institute for Certification (CIC) was established as an EMAS accreditation body. The institute acts on the basis of Act No. 22/1997, which covers technical requirements for products and for changes and amendment of some acts, and on the consequent announcement of the Ministry of Industry and Trade no. 238/1997 on commissioning the CIC to perform certifications.

The EMAS Agency was commissioned by the Ministry of the Environment to monitor the state of EMAS implementation in the Czech Republic. The agency was established under the Czech Ecological Institute. It serves as the secretariat of the EMAS Programme Council in the Czech Republic and safeguards expert and managerial activities related to the programme. It is in charge of a database of Czech companies registered according to EMAS. The agency cooperates with the Accreditation Institute in the field of notification and verification of foreign accredited verifiers that operate in the Czech Republic. European Parliament's Regulation No. 761/2001 undertook a revision known as EMAS II. This revision came into effect on January 1, 2002.

The number of ISO 14000 or EMAS certified organizations is growing. There are presently 178 organisations certified according to ISO 14000 in the Czech Republic; ten of these organisations are also EMAS registered. Two organisations have EMAS registration only.

The Confederation of Chemical Industry volunteered for sustainable development under the Responsible Care Programme. Within this programme there is a detailed system of certification and awarding of the Responsible Care logo to individual organisations. Organisations have to defend the award every two years.

Twining arrangements

The so-called “twining programme” started on May 1998 as an elementary mechanism of the institution-building process. The programme should help EU candidate countries to build modern and effective administrations with structures, personnel and management able to implement the *acquis communautaire* to the level of EU member states.

Twining offers a framework for cooperation between state administration and semi-public organisations in the candidate countries and their partners in the member states. Projects within this cooperation aim to introduce, support and implement certain parts of the *acquis*. It is characteristic of twining to serve the mediation of reliable experiences. It is not designed to promote a general cooperation. It is intended to transfer specific processes — negotiated by both parties — in order to implement high priority parts of the *acquis* as defined in the Partnership for Accession. Contrary to short-term consultations aimed at solving a specific problem, the twining objective is a long-term assistance of EU experts in the candidate countries. Each twining programme has at least one accession consultant, delegated by the government of a member state or another official body, designated to help the realisation of a specific project for at least twelve months at a given ministry of the candidate country.

The European Union reinforces institutional structures and the regulation capacity of the Czech administration with the use of twining programmes in the Czech Republic. These programmes have been initiated at most of the ministries.

One of the first programmes in the environmental area was realised at the Czech Environmental Inspectorate (CEI) from October 12, 1999 to July 11, 2001. The programme lasted 21 months. Germany was the main participant of this twining project (no. CZ 98F-01). Other partners were Sweden and Denmark. The main objective of the project was the “reinforcement of the performance capacity of the state administration — especially the Czech Environmental Inspectorate (CEI) — in the area of environmental protection in the Czech Republic.” The goals of the project were the improvement of administration execution with regard to the future requirements of the European Union, particularly in terms of controls and inspections; and sanctioning CEI practice as the main office for environmental protection. (CEI employs approximately 600 personnel.)

After this project, the CEI should be able to perform these tasks independently and efficiently when the *acquis* is implemented.

The following activities within project no. CZ 98F-01 should have guaranteed its success:

- Improvement of the further education of personnel (e.g. 15 English courses and six German courses with approximately 135 participants).
- Preparation of programmes for further education and elaboration of administrative and executive tools such as manuals and guidelines.
- Help with implementation of individual EU directives, such as IPPC and FFH Directives, the Directive on Information, etc.
- Organising of workshops, expert panels (13 in total, 11 have already taken place) and assistance/evaluations (5). More than 40 actions in support of information and experience exchanges took place, with more than 25 experts taking part (14 from Bavaria).
- Networking among various environmental administrative bodies in other regions, such as Saxony, Bavaria, Denmark, Sweden and Ireland, and mutual exchange of information.
- Excursions to various environmental administrative bodies, consisting of six multiple-day visits and four one-day visits.

- Strengthening of Bavaria/Saxony and the Czech Republic's relations on the local level.
- Draft of the legislative framework of CEI organization.

Even though the programme has already ended, the results will be visible in the future, as tasks connected to the accession process are realised.

Product and service chain requirements

Requirements of supplier chains in the area of the environment do not vary significantly from the requirements of Czech producers. Adherence to the Czech legislature, guidelines and limits is the main priority

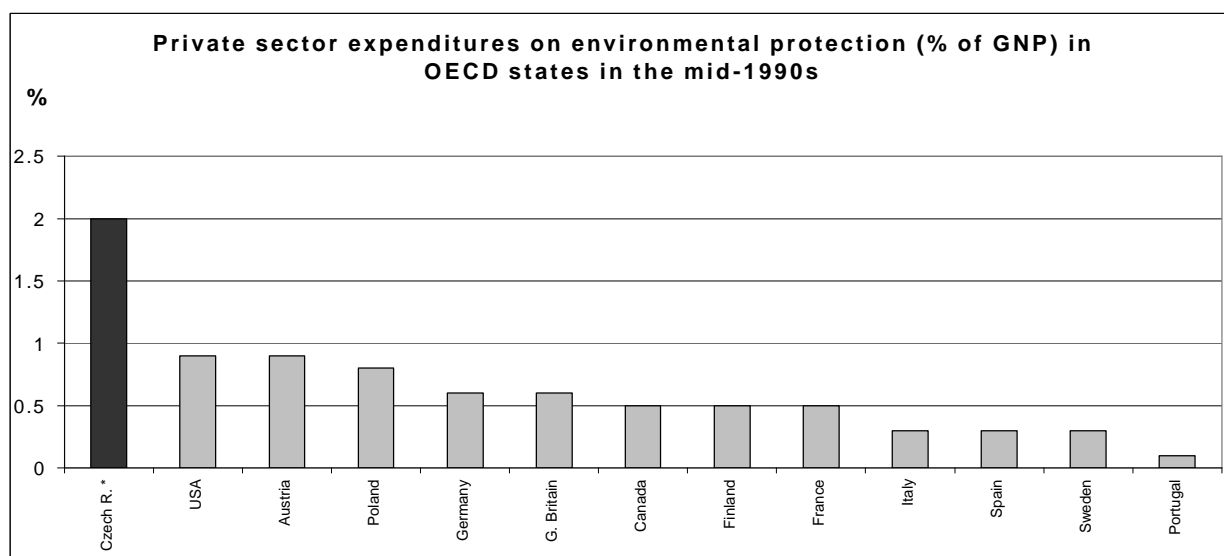
Unified corporate cultures

Unified corporate culture, or the culture of multinational organizations, has been absorbed by Czech society with no significant problems. There are no significant problems or complaints from the personnel of these organisations. One of the reasons might be the markedly higher salary of these employees compared to the common standard within domestic organisations.

Financial Mechanisms to Support EM and Other Preventive Measures

Self-financing by enterprises

The private sector has contributed significantly to environmental renewal during the period of transformation. The following chart shows the engagement of this sector in the Czech Republic compared to the other OECD countries.



Source: OECD Environmental Indicators 1998, Czech Statistics Office

Survey of existing credit lines and their failure/successes

Public financial resources for environmental protection

The State budget is the largest financial source for funding of environmental projects. It provides grants, repayable financial assistance and guarantees to commercial loans. Total budget expenditures reached a peak in 1992 (USD 353 million) and decreased to USD 157 million in 1998. Only 12 percent of all environmental investments came from the State budget this year.

The second public source is the National Property Fund (NPF), established by the Act on Privatisation to collect payments from the sales of State property. The NPF provides subsidies to new owners to rectify environmental damages. NPF expenditures have been increasing since the fund's creation in 1993 (USD 300,000) and in 1998 reached USD 72 million.

The Ministry of Agriculture created the Supportive and Guarantee Agricultural and Forestry Fund, which offers financial assistance for environmental protection measures. Assistance takes the form of guarantees, loans or soft-loans.

In accordance with government resolution no. 505/2000 of November 22, 2000, the Ministry of Agriculture prepared supportive programmes to promote non-productive functions of agriculture and activities that help landscape preservation. Programmes were also implemented to support less favourable areas. Criteria were outlined for the assessment of these programmes.

The Ministry of Industry and Commerce created a programme to support power savings and the use of renewable energy sources. Sub-programmes are operated by the Czech Energy Agency. State subsidies are granted in the form of non-returnable financial support or zero-interest loans.

Table 12: Environmental protection expenditures from the State budget and national funds
Expenditures on the environment and drinking water from central sources, 1991-1997

Source of expenditures	1991	1992	1993	1994	1995	1996	1997 ₂₎
State budget (CZK bn)	7.5	10.7	9.1	10.0	9.2	8.3	4.4
SEF (CZK bn)	1.5 ₁₎	1.5	2.9	3.6	4.9	4.6	3.3
NPF (CZK bn)	0.0	0.0	0.0	0.1	0.8	0.9	1.4
Total (CZK bn)	9.0	12.2	12.0	13.7	14.9	13.8	9.1

1) The State Environmental Fund was established on September 10, 1991. Information for 1991 was provided by the State Water Management Fund, The State Air Protection Fund and the State Land Improvement Fund.

2) In 1997 budget expenditures on drinking water preparation were excluded from environmental protection expenditures.

Commercial finance

The Bohemian and Moravian Guarantee and Development Bank

Programmes of the Bohemian and Moravian Guarantee and Development Bank (BMGDB) support small and medium-sized enterprises. The bank runs two programmes connected to environmental protection:

- The Market Programme: aims to increase competitiveness by helping enterprises to obtain ISO 14000 or the EMAS certificate. The programme covers up to 50% of the costs of certification as well as counselling services for the enterprise.

- The Credit Programme: enterprises can receive a soft-loan of up to CZK 4 million for environmentally sound activities.

Financial means are provided from the State budget. Subsidies are granted on the basis of mutual contract if the basic conditions set out in the programmes are met. The nature of the business project must fall into one of the following categories: industrial; construction or craftsmanship production; services (including medical and pharmaceutical); trade and public transportation at the regional level (excluding taxi-service).

Fund for air quality in the German border regions

The aim of this project is to support technical measures that contribute to improving air quality in the regions of the Czech Republic that are close to the German border. The subsidy can be granted only towards investments that contribute to decreasing air pollution, such as:

- Re-construction of furnaces with heat capacity greater than 50MW to ecological energy sources such as natural gas, liquefied gas, bio-gas, light heating oil (preferably natural gas), natural wood or other bio-mass.
- Construction of new furnaces with heat capacity less than 50MW, powered by alternative sources of energy, together with replacement of old furnaces.
- Construction of new furnaces using solar collector facilities with appropriate containers and system tools, together with replacement of old furnaces. Installations may serve for heat production or simultaneous production of heat and electric energy.

Environmental Funds

The State Environmental Fund of the Czech Republic represents the second largest public financial source. The fund's financial means come from wastewater charges, air pollution charges, waste charges and from budget subsidies. Fund expenditures reached a peak of USD 185 million in 1995 and decreased to USD 73 million in 1999. At present, the share of loans, combined subsidies and loans, and guarantees for commercial loans in the expenditures of the fund is increasing, while the share of subsidies is decreasing. Preparation for EU accession and commitments resulting from international agreements are taken into consideration through the defining of priority areas within the granting process. Therefore the subsidy is directed primarily into the areas of air and water pollution control, waste disposal, nature protection and landscape management, in accord with the national programme for the preparation of the Czech Republic for EU accession. The direction and form of subsidies are determined according to outer and inner ecological and economic conditions. No subsidy can be granted for actions already completed.

Six calls have been published for proposals in the area of water pollution control, seven calls for air pollution control, two calls for nature conservation, and three calls for waste management. Other subsidy programmes focus on alternative energy sources, new technologies implementation (BAT) and the implementation of management systems (EMAS).

International Financial Instruments

PHARE

The European Union provides financial support for environmental protection projects through individual programmes. Financing is realised through individual funds.

The Energy Savings Fund (ESF) concentrates on supporting energy savings in small and medium-sized companies. Projects that require investment of CZK 2 million to CZK 50 million are financed by loans from the Czech Bank of Commerce (CSOB). To receive a loan, projects have to satisfy common commercial conditions determined by the

bank, and conditions given by the European Union. Loans can be repaid over a maximum 10 years. The bank provides 50% of the resources, the rest comes from the ESF. Each project has to demonstrate savings in energy costs, operation, maintenance, charges, etc. At least 40% of the savings have to come from decreased energy consumption. ESF support will continue until March 2007.

The Bank Ecological Programme (BEP) is open to projects that are expected to have a positive impact on the environment. It provides credit for small and medium-sized companies for ecologically based projects by covering part of the administrative charges related to the realisation of the loan, and by providing a lower interest rate and a prolonged term of credit maturity. BEP loans cover the areas in which companies have to comply with EU standards and directives (i.e. water and air conservation).

Revolving PHARE Fund

Fund is earmarked for municipalities, municipalities' associations, etc. The programme focuses on water and air protection and waste management. In the programme's framework the loans (from CZK 5 million to CZK 10 million) are provided for up to five years with a fixed interest rate of 0.5 percent per annum. Up to 50 percent of investment costs can be financed through this programme.

SAPARD

SAPARD focuses on the modernisation of stables, stock areas of agricultural products, reservoir construction, modernisation of grocery manufacturing process capacities, implementation of hygienic quality grocery standards, and land adaptations. The programme covers individuals and micro-regions. Subsidies are provided for up to 50% of costs for non-profit projects, or up to 100% of costs for projects with profit. For non-profit projects the contribution is repaid after the completion of the project.

The European Community's ISPA Programme is based on EU Council Regulation No. 1267/1999 of June 21, 1999, and establishes the programme of pre-accession help for EU candidate countries. The programme contributes to the preparation of candidate countries for EU accession in the areas of economic and social solidarity in relation to environmental policy. The programme is operated by the State Environmental Fund. Supported measures have to be one of the following:

- an independent investment project;
- financially and technically independent part of an investment project;
- a group of related investment projects;
- a general investment project.

Subsidies can also be granted for preparatory studies related to one of the above investment projects, or to aid application elaboration, project management or public information.

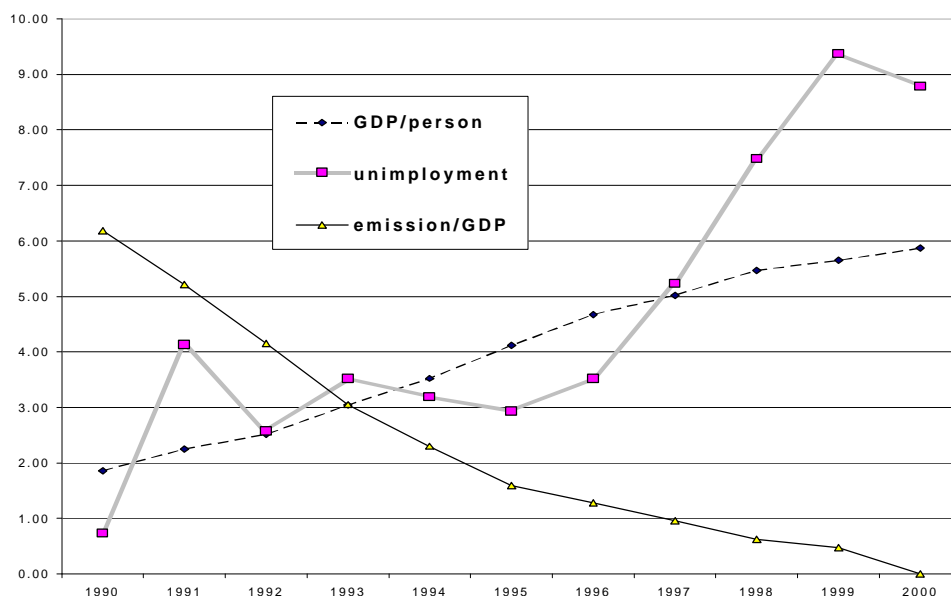
Subsidies within the ISPA programme may be given in the form of returnable (soft loans are a possibility) or non-returnable financial support. Financial support received from ISPA sources cannot exceed 75 percent of investment costs (with a direct impact on environmental improvement). Except in the case of returnable subsidies, the amount of financial support is reduced by the sum of money obtained from other sources.

Sustainable Development Indicators

We would like to take into account three types of indicators: economic, social and environmental. You can find the basic choice of these indicators in Appendix A — Czech Republic. The description of all indicators in one chart would not be practical, as it would be difficult to survey the data. For this reason we have made a basic selection of these types of indicators. Indicators from each subsequent area are shown separately in star graphs, which have a high predictable performance. For the same reason we have chosen to show only two years (1990 and 2000).

Comparison of representative indicators

For a comparison of representative indicators we have chosen efficiency of the economy (GDP per person), unemployment and emission stress for the environment. It is of course desirable that the economy is strong while emission stress is low and there is no pressure from high unemployment.

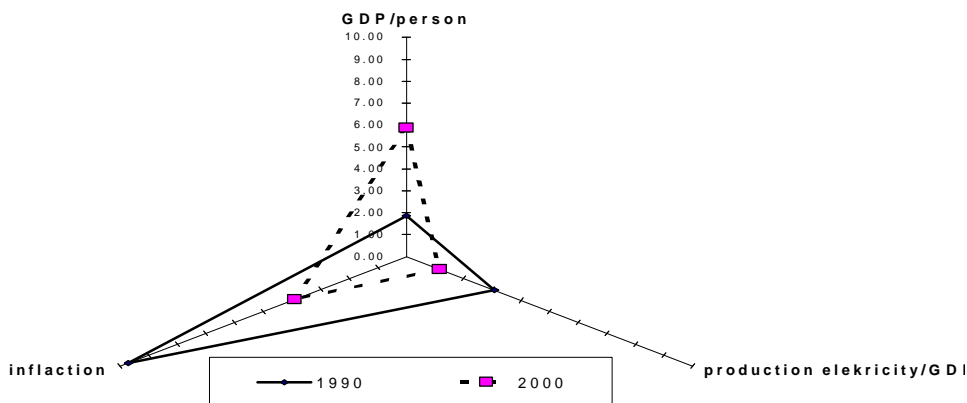


In the graph above we can see two positive trends: Czech economic performance and decreasing emission stress on the environment. (These trends are due to the reconstruction of industry and huge expenditure in the private and state sectors in end-of-pipe technology from the early 1990s.) The graph also shows a negative trend: growing unemployment.

Evaluation of economy indicators

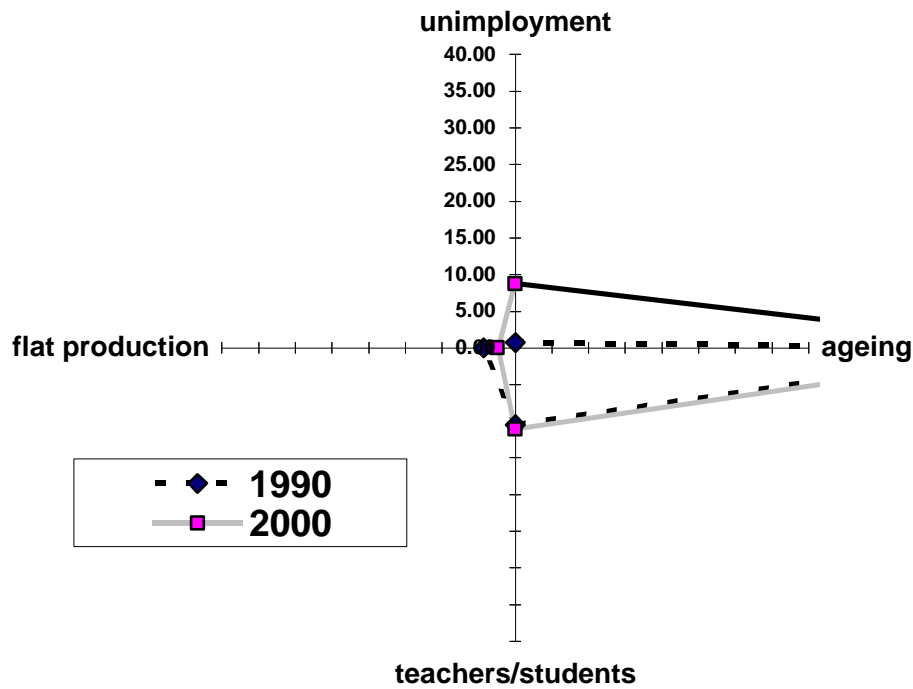
We have selected indicators of GDP per person, inflation, and production of electricity per GDP. These indicators can help to explain economic efficiency, possible devaluation due to inflation and energy efficiency benchmarked by the production of electricity. The figures are compared in 1990 and 2000.

In the next graph we see that the economic efficiency of the Czech Republic is higher in 2000 versus 1990. At the same time inflation and energy efficiency are lower. These trends are very positive.



Social array evaluation

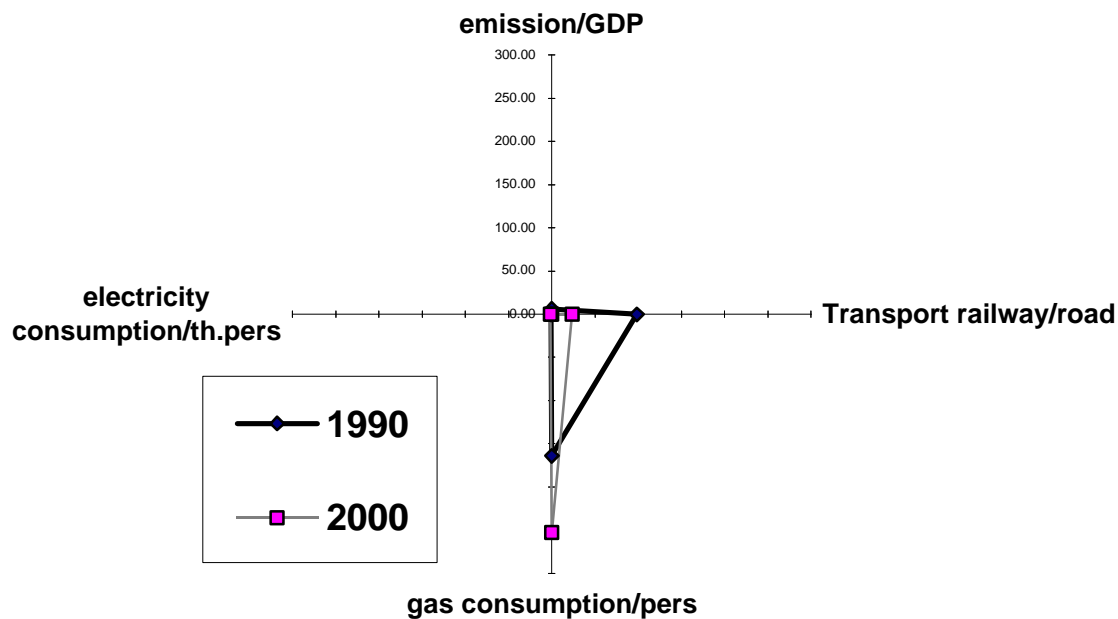
To evaluate social array, we selected the following indicators: unemployment, age, construction of flats and the student/teacher ratio. (In order to show these indicators in one graph, we used inverse values for the student/teacher ratio.) These indicators express the main social problem within Czech society: an ageing of population and a shortage of flats for younger generations. The shortage of teachers results *inter alia* from the low level of salaries and the low social ranking of this occupation. These factors have an adverse affect on the younger generation: unemployment lowers self-esteem and increases costs to the community.



In the years described only unemployment has changed, with an increase. As the other indicators are static in the period, the overall picture is a negative trend, which could bring social problems in the future.

Environmental indicators

For this array we have chosen indicators that can impact the environment through economic activity and road traffic.



The graph above shows that only two indicators have changed in the period. Road traffic and the consumption of natural gas had an increased environmental impact, which can be perceived as positive.

Appendix A — Czech Republic

Indicator	Unit	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Mid-year population	thousand persons	10,363	10,309	10,318	10,331	10,336	10,331	10,315	10,304	10,295	10,283	10,273
Gross domestic product	CZK bn, current prices ²⁾	626.2	753.8	842.6	1,020.3	1,182.8	1,381.0	1,567.0	1,679.9	1,829.4	1,887.3	1,959.5
Inflation rate	% increase	9.7	56.6	11.1	20.8	10.0	9.1	8.8	8.5	10.7	2.1	3.9
Unemployment rate (Dec. 31)	%	0.73	4.13	2.57	3.52	3.19	2.93	3.52	5.23	7.48	9.37	8.78
External debt	CZK bn	.	.	.	287.7	342.5	457.3	578.9	748.7	726.9	822.5	808.7
Industry												
Industrial output	%	100.0	78.2	72.1	68.3	69.7	75.8	80.7	.	.	.	.
Industrial production	%	.	.	.	.	.	100.0	102.0	106.5	108.2	104.8	110.4
Employees of industrial enterprises (excl. apprentices)	thousand persons	2,093	1,707	1,506	1,412	1,342	1,192	1,145	1,323	1,297	1,236	1,190
Construction												
Construction work carried out by own employees of construction enterprises	%	100.0	72.5	86.5	80.1	86.1	93.4	98.3	94.3	87.7	82.0	86.3
Average number of employees in construction enterprises	thousand persons	284	231	212	219	223	224	217	217	205	181	165
Agriculture												
Gross agricultural output	CZK mn, constant prices 1989	106,143	96,683	85,008	83,059	78,090	82,031	80,916	76,803	77,351	77,798	74,269
Transport												
Tonnage of goods carried by rail and roads	thousand tonnes	343,459	215,742	204,530	194,264	184,996	189,890	185,866	632,861	581,168	539,035	513,018
Health												
Inhabitants per physician	persons	286	291	293	279	273	269	269	259	265	262	261
Beds in health establishments per 1,000 inhabitants	unit	13.1	12.9	12.6	12.3	12.1	11.4	11.1	10.9	10.8	10.7	10.6
Education												
Pupils and students at schools	persons	1,201,241	1,136,064	1,148,375	1,201,224	1,246,128	1,205,233	1,111,487	1,098,746	1,122,709	1,128,819	1,199,954
Teachers at schools	persons	125,748	123,996	128,640	128,223	130,178	128,804	132,424	123,198	127,754	129,958	132,913
Expenditures on education	CZK mn	.	.	.	.	.	.	.	79,840	78,644	84,449	84,900

Eco-efficiency Country Review: Estonia

Prepared by: Dr. Ljubov Gornaja, M.Sc. Reigo Lehtla

Eco-Efficiency

Introduction

In its broadest sense the term “environmental management” covers energy efficiency, waste minimisation, cleaner production and eco-efficiency. These concepts partly overlap and share a common emphasis on:

- the simultaneous achievement of economic and environmental benefits, integration of environmental management into mainstream management practices;
- the application of an integrated, preventive environmental strategy to production processes, and to products through their life-cycle;
- minimisation of risks to human health, and the sustainable use of natural resources.

The term “eco-efficiency” encompasses ecology and economic efficiency. A growing number of companies recognise that eco-efficient practices not only avoid problems with environmental issues but can also feed the bottom-line. If resources are released into the environment as emissions then they are lost as product. This ideology enables industry to lend a hand in environmental conservation. Other terms such as cleaner production, integrated pollution prevention and control, and environmental management are also linked to the eco-efficiency concept.

Overall Political and Economic Framework

General Economic Context

In Estonia, the transition from a planned economy to a market economy started at the beginning of the 1990s. Reforms carried out after monetary reform in 1992 were comprehensive and systematic.

Table 1: Main economic indicators of Estonia

Indicators	1995	1996	1997	1998	1999	2000
GDP (EEK billion)	40.7	52.4	64.0	73.5	76.3	85.4
GDP real growth (% c.p.y.)	4.3	4.0	10.4	5.0	-0.7	6.9
Current account deficit/GDP (%)	4.4	9.2	12.1	9.2	4.7	6.4
Industrial product sales, real growth (% c.p.y.)	2.0	3.5	15.2	3.2	-1.7	9.1
Changes in consumer price index (% c.p.y.)	29	23.1	11.2	8.2	3.3	4.0
Changes in producer price index (% c.p.y.)	25.6	14.8	8.8	4.2	-1.2	4.9
Changes in export price index (% c.p.y.)	15.2	11.4	7.5	2.1	-0.4	7.4
Exports (EEK billion)	19	21.3	29.6	35.2	35.4	53.9
Imports (EEK billion)	27.4	34.9	48.9	55.2	50.5	72.2
Balance (EEK billion)	-8.4	-13.6	-19.4	-20.0	-15.1	-18.3
Average monthly gross wages (EEK) ¹	2,375	2,985	3,573	4,125 (4,021)	4,440	4,907
Changes in average monthly gross wages (% c.p.y.)	37.0	25.7	19.7	15.4	10.4	10.5
Unemployment (%)	9.7	10.0	9.7	9.9	12.3	13.6

Sources: Statistical Yearbook of Estonia 1999, 2001. Statistical Office of Estonia; Main Social and Economic Indicators of Estonia 6/2001, Statistical Office of Estonia.

Notes: c.p.y.: compared to previous year;

1) Until 1998, health insurance benefits were considered a part of gross wages. In brackets, the recalculated average monthly wages are given without health insurance benefits. The change in the average monthly gross wages for 1999 has been presented in comparison with

the recalculated data for 1998, which do not include health insurance benefits.

When Estonia regained its independence on August 20, 1991, the structure of the local economy did not correspond to the requirements of a market economy. For example, the produce of many enterprises proved unnecessary under the new conditions, as the possibility of selling to the Russian market had disappeared. Due to the lack of business relations, entry to western markets was also restricted. Thus, the economy had to undergo some restructuring.

In June 1992 the Estonian national currency — the kroon (EEK) — came into circulation and became the legal currency of Estonia. As part of the currency board system, the Estonian kroon was pegged to the Deutschmark (DEM 1 = EEK 8) and this fixed rate has been maintained. Monetary stability was one of the most important preconditions for carrying out reforms in other areas.

In order to restructure the business sector, an appropriate legal framework was established and property reform was carried out. Estonian privatisation has followed the German Treuhand model, which gives vast authority and independence to the State Privatisation Agency. The main privatisation methods are:

- tender with preliminary negotiations;
- public auction;
- public offering of shares.

The main characteristics of privatisation included the sale of enterprises to strategic investors and the important role of foreign capital. During 1991-1995 almost all small businesses (approximately 1,200 companies) held by the state were auctioned off. Large-scale privatisation started in 1991 as so-called pilot privatisation. It continued on a wider scale in November 1992.

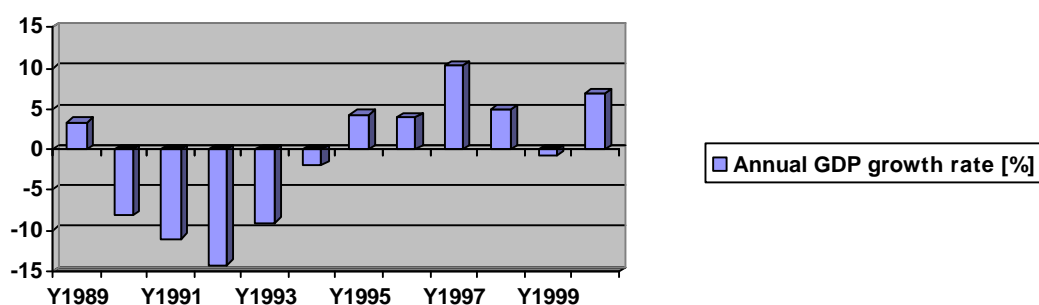
From 1991 to 2000 1,350 enterprises were sold at auction for a total purchase price of EEK 906,551,214. In 2001 four companies, including the Estonian Railway, were sold for a total EEK 1,020,550,211.

By the end of 2001, practically all large enterprises had been sold, with the exception of those in transport (ports) and energy sectors.

As a result of the transition to a new economic system, Estonia's gross domestic product (GDP) decreased sharply in the years 1991-1994. By 1995, the recession phase was over. Economic growth was fastest in 1997. Due to a crisis in the financial sector, foreign demand began to decline in 1998. The same year saw a crisis in the Russian market, and as a result, Estonia's GDP decreased by 0.7% in 1999. In 2000, the growth rate of Estonia's economy increased due to rising import demand from the European Union. GDP real growth was 6.9% in 2000 (table 2).

Table 2: Trends in changes of GDP value, calculated at constant 1995 prices (% over previous year)

Unit	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
% growth	3.3	-8.1	-11.0	-14.2	-9.0	-2.0	4.3	4.0	10.4	5.0	-0.7	6.9



Sources: *Statistical Yearbook of Estonia* (1990, 1994, 1999, 2000, 2001), Statistical Office of Estonia; World Bank (1993).

Sales volumes also increased in several branches of industry that focus on foreign markets, such as the textile and timber industry. Primary trade export volumes increased by 40 percent, which also boosted the profits of local enterprises.

Most prices were liberalised by 1992. Remaining price controls affect land and forestry, oil shale, energy, and public services. The prices of a limited number of services (e.g. rents, water supply and sewerage, and public transport) are controlled on the municipal level. Administrative price regulations apply to companies with monopoly power in such areas as energy supply, water and sewage services. As result of price liberalization, inflation reached a peak of over 1,000 percent in 1992. However, after the initial shock the Estonian economy began to recover rapidly. According to data from the Statistical Office of Estonia, in 1997 the change in the consumer price index in comparison with previous years was 11.2 percent in 1998, 8.2 percent in 1999, and 3.3 percent in 2000. Data of changes in price indices are shown in table 3.

Table 3: Price indices, change over previous year, 1992-2000 (%)

Year	Consumer price index	Producer price index of industrial output	Construction price index	Export price index	Import price index
1992	1,076.0	...	...	...	...
1993	89.8	75.2	...	...	...
1994	47.7	36.3	...	...	...
1995	29.0	25.6	36.1	15.2	...
1996	23.1	14.8	18.7	11.4	...
1997	11.2	8.8	10.1	7.5	...
1998	8.2	4.2	7.7	2.1	...
1999	3.3	-1.2	2.0	-0.4	0.4
2000	4.0	4.9	2.5	7.8	6.1

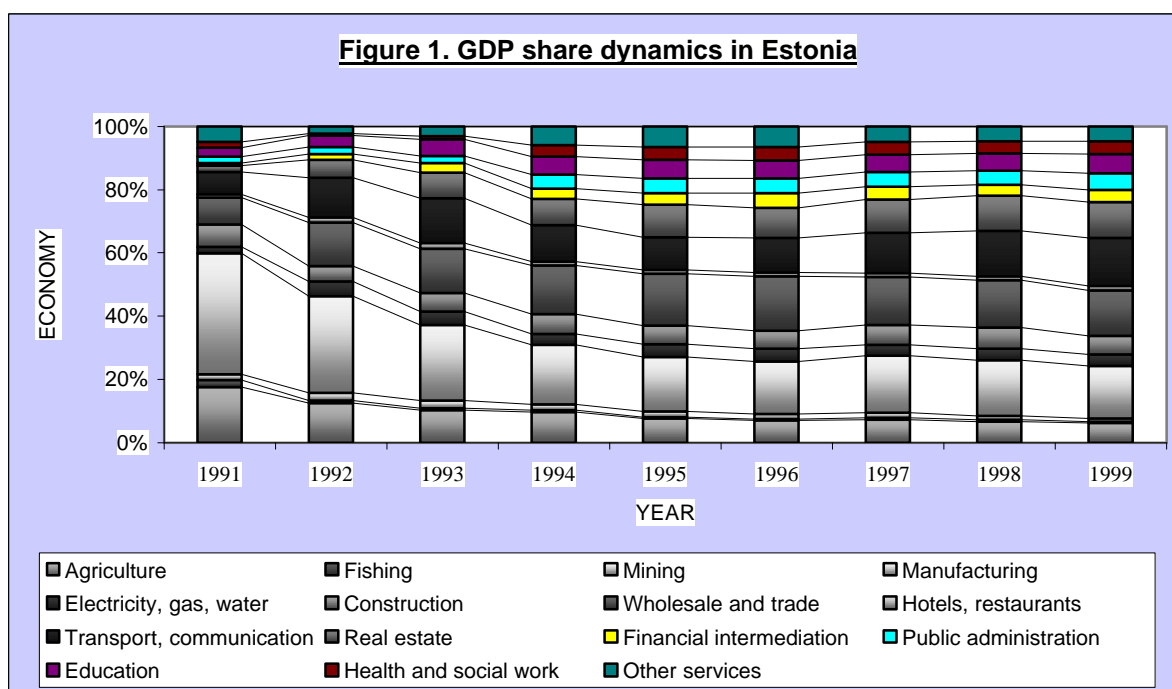
Source: Statistical Yearbook of Estonia 2001

The restructuring process: influence towards the environment

Similar to other transition countries, the Estonian economy has acquired a new structure in the course of the last decade. Liberal commercial policy, strict budgetary policy, the use of the currency board system in monetary policy, and also free trade agreements with the European Union, EFTA and CEE countries, serve as the cornerstones of the Estonian economy (see table 4 and figure 1). Changes in the macroeconomic environment have laid the basis for the emergence of a new industrial structure in Estonia. There was a sharp decline in the share of the secondary sector in GDP at the beginning of the 1990s, but the trend towards a moderate decline has been characteristic of the entire period. As a consequence, the total share of manufacturing industry accounted for 13.7 percent of GDP in 1998. In the years 1994-1998, the share of manufacturing has remained at the level of 13-15 percent of GDP.

Table 4: Gross domestic product by economic activity, 1991-1999 (%)

Economic activity	1991	1992	1993	1994	1995	1996	1997	1998	1999
Agriculture, hunting and forestry	17.5	12.4	10.3	9.7	7.6	7.1	7.3	6.7	6.3
Fishing	2.2	0.8	0.6	0.6	0.5	0.4	0.6	0.5	0.3
Mining and quarrying	1.9	2.6	2.3	1.8	1.7	1.6	1.5	1.2	1.1
Manufacturing	38.2	30.4	24.0	19.0	17.3	16.6	18.0	17.7	16.5
Electricity, gas and water supply	2.0	4.6	4.3	3.3	4.0	4.0	3.5	3.6	3.6
Construction	7.1	4.9	5.8	6.4	5.8	5.8	6.3	6.7	6.0
Wholesale and retail trade	8.5	13.8	13.9	15.4	16.5	17.1	15.1	14.9	14.4
Hotels and restaurants	0.9	1.5	1.8	1.2	1.2	1.3	1.3	1.3	1.4
Transport, storage and communication	7.2	12.6	14.2	11.6	10.4	10.8	12.8	14.3	15.2
Real estate, renting and business services	1.9	5.7	8.0	8.4	10.2	9.6	10.4	11.1	11.2
Financial intermediation	0.9	1.8	3.1	3.2	3.6	4.7	4.2	3.6	4.0
Public administration	1.9	2.2	2.3	4.5	4.7	4.7	4.6	4.4	5.1
Education	2.8	3.7	5.2	5.7	6.0	5.6	5.5	5.5	6.1
Health and social work	1.8	0.5	1.0	3.6	4.0	4.2	3.9	3.7	4.0
Other services activities	5.0	2.3	3.1	5.9	6.5	6.6	5.0	4.8	4.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0



From the standpoint of environmental protection, the decreasing role of production (particularly the decrease in the importance of industry) in the structure of GDP could be considered as a positive trend because many sectors of industry (e.g. mining, energy supply, chemical industry, cement production, etc.) cause pollution and pose a threat to the environment and are also the biggest users of natural resources.

Most of Estonian industry is based on local natural resources. The more important fields of business include production of food and beverages, wood, paper and furniture industry, metal and machinery industry, textile industry, chemical industry and energy supply.

Energy supply has an environmental impact. Over 80 percent of mined oil shale in Estonia is used for energy production; around 90 percent of water consumed is used in cooling systems. In addition, high amounts of air pollutants and waste are disposed of in the environment. Oil shale mining covers an area of 10,000 hectares in north-east Estonia. For each tonne of oil shale mined, 20 cubic metres of groundwater is pumped out, which contains a lot of suspended solids, sulphates, carbonates and chlorides. Most mining water requiring treatment is mechanically treated before discharge into rivers, but there is still no efficient technology for the treatment of such mining water. The chemical industry also discharges hazardous substances into the environment. In the oil shale chemical industry in Kohtla-Järve, half a tonne of solid waste is produced per one tonne of used oil shale. In this region ash hills tens of metres high cover an area of 250 hectares. Seepage water from ash hills, rich in phenols, is polluting the Kohtla and Purtse rivers. The chemical-metallurgy factory Silmet was in operation from 1948 to 1989. The Silmet Group has been reformed and is now producing rare earth metals. Silmet's main problem is waste deposit, from which nitrogen compounds are leaching into the sea.

According to data from the Estonian Statistical Office, a heavy decrease in agricultural production was noted at the start of the 1990s, due to the collapse of collective agriculture. The waste and mismanagement of the Soviet era put rivers, lakes and groundwater in a poor condition, which first and foremost affected the weakly protected or unprotected groundwater regions of north and middle Estonia. In 1994-1996 agriculture stabilized, while the overall decline continued in 1998. Meat and dairy production decreased after the bankruptcy of several meat factories, the reform of the dairy industry and a decrease in the number of cattle. The Russian economic crisis affected production in 1998. Gross agricultural production was EEK 4.8 billion in 1999 (using 1995 prices), or eight percent lower than in 1998.

Water pollution is caused by poor (or incorrect) handling and storage of manure and its use as a fertiliser, especially in large farms. From 1990 to 1999 the number of animals decreased by almost two thirds. The number of cows halved. The decrease in the number of cows did not significantly affect dairy production, as the average milk production of cows increased. In 1980 the average milk production per cow was 3,700kg; in 1990 4,210kg; and in 1999 4,171kg. This reflects the increase of efficiency in production, which at the same time has a beneficial effect on the environment. Total milk production in 1998 was 729,600 tonnes. Milk processing companies bought 531,800 tons of milk. The level of self-supply for milk and dairy products amounts to 150 percent, which means that a remarkable percentage of dairy products (25.7 percent of food export) is exported. In 1999 milk production was 14 percent less than in 1998. The decrease took place due to the fall in productivity as well as the decrease in the number of cows.

In Estonia arable land accounts for 25 percent of the total area. In 1991 arable land covered 1,131,947 hectares, of which 1,114,316 hectares was under field crops. In 1998 the growing area of field crops was 861,087 hectares, or 23 percent less than in 1991. Production per person in 1991 was 600kg of grain and vegetables and 378kg of potato; in 1999 the numbers were 291kg and 280kg respectively. The use of fertilisers has decreased remarkably. The use of mineral fertilisers was highest in 1960-1988. Since 1990 the use of mineral fertilisers has decreased sharply, which has dramatically reduced the leaching of plant nutrients, nitrogen and phosphorus into water bodies. In 1998 26.9 million tonnes of mineral fertilisers were used on crops, of which the majority was nitrogen fertiliser and 2.3 million tonnes organic fertiliser. In 1999 351,308 hectares of arable land were fertilised with mineral fertilisers, which is 42 percent of the total sown area. One hectare received an average of 77kg of mineral fertiliser and 33 tonnes of organic fertiliser, which is more than half the amount in 1992. Many agricultural producers have no resources for the purchase of fertilizers. Also, most agricultural equipment is outmoded. In order to increase productivity without essentially endangering the environment, it is necessary to improve the technology of grain growing, standardise the use of fertilisers and pesticides, and replace or upgrade agricultural equipment.

Despite the relatively moderate changes in the sectoral structure of industry (see table 5), the internal changes within certain industrial sectors have been considerable. For instance, in the food industry, wood industry and light industry considerable concentration has occurred. In the course of this process, larger industrial enterprises undertook important participation in several other enterprises in order to raise efficiency through improved cost management, increase their share of the domestic market, and, in a strategic sense, improve their competitiveness with regard to foreign companies. Due to the need to raise efficiency, a similar trend will probably be seen in the next few years.

Table 5: Industrial production by economic activity, 1992-1999 (%)

Economic activity	1992	1993	1994	1995	1996	1997	1998	1999
Energy supply	11.0	12.7	14.7	13.5	13.3	11.5	11.0	12.2
Mining	4.3	4.7	4.6	4.5	4.9	4.4	3.8	4.0
Manufacturing	84.7	82.6	80.7	82.0	81.8	84.1	85.2	83.8
Manufacture of food products, beverages and tobacco products	31.6	37.7	32.7	28.9	27.2	27.0	24.5	20.2
Manufacture of textiles	11.8	4.6	4.6	5.9	6.9	6.4	6.3	6.0
Manufacture of clothing apparel	3.2	3.8	3.2	3.5	3.5	3.4	3.5	4.0
Tanning and dressing from leather and manufacture of footwear	2.1	1.5	1.4	1.2	1.1	1.1	1.2	1.4
Manufacture of wood	3.7	3.5	4.7	6.7	6.5	8.3	9.1	11.2
Manufacture of paper and paper products	1.1	0.3	0.6	1.0	1.3	1.6	1.7	1.8
Publishing, printing and reproduction of recorded media	1.6	3.0	2.5	3.6	3.7	3.5	4.5	5.0
Manufacture of chemicals and chemical products	7.6	6.7	7.6	8.1	7.2	6.1	5.2	4.2
Manufacture of rubber and plastic products	1.2	0.9	1.0	1.2	1.3	2.2	1.9	2.0
Manufacture of other non-metallic mineral products	3.9	3.7	4.7	3.8	3.8	3.9	4.6	4.4
Manufacture of fabricated metal products	2.2	2.7	3.1	3.8	4.5	4.8	5.9	4.9
Manufacture of machinery and equipment	2.2	2.3	2.5	2.0	2.2	1.9	2.1	2.2
Manufacture of electrical machinery and apparatus	2.6	1.5	1.8	2.1	2.0	2.0	2.2	2.3
Manufacture of radio, TV and communication equipment and apparatus	0.5	0.5	0.3	0.4	1.0	1.1	1.2	1.5
Manufacture of medical, precision and optical instruments, watches and clocks	0.8	0.8	0.7	0.6	0.6	1.0	1.7	1.7
Manufacture of motor vehicles and other transport equipment	3.5	4.0	4.1	3.6	3.3	3.2	2.9	3.3
Manufacture of furniture and other manufactured goods	4.9	5.0	5.0	5.3	5.4	6.4	6.5	6.8
Other manufacturing n.e.c.	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

The development of the manufacturing sector and consequently of the entire economy of such a small country as Estonia is very much dependent on exports. The situation on the export markets is an important factor influencing the welfare of Estonian industry. While orientation to the eastern market enabled a lot of industrial enterprises to attain unusually high profit margins in 1997, there was no pressure to invest in the development of new products and technologies or to find new markets. Changes in the situation of export markets in 1998 led to the next stage in the restructuring of industry. In the course of this stage the enterprises whose sales volume was mainly oriented to the eastern markets have started to adjust their marketing strategy to competition on the global market.

This process requires additional investments in product development, the updating of production technologies, the introduction of quality systems, further training of employees, etc. These developments are impeded on the one hand by the lack of free resources for investments in enterprises and on the other hand by the insufficient choice of financial instruments to support technological development and innovation.

The development of competitiveness in Estonia is characterised by increasing investments in the updating of production technologies and by an active search for foreign investments. The volume of investments made in manufacturing in the last three years is as follows: 1996, EEK 2,405.2 million; 1997, EEK 2,637.3 million; 1998, EEK 2,448 million. Investments in machinery, equipment or vehicles account for 60-65 percent of the total investments. The largest investments have been made in the food and beverages industry, primarily for the purpose of bringing the production into line with the sanitary and hygiene requirements of the EU. Other industries with a large volume of investments are forestry and wood industry, in which investments have mainly been made for the acquisition of up-to-date production machinery, and the textile industry, with its investments in new technologies. It is important that investments in product development and for the introduction of up-to-date technologies in industry continue.

The competitiveness of the Estonian economy is to a considerable extent related to foreign investments. Success in attracting the latter primarily depends on the quality of labour and on the level of development of infrastructure. In 1998, foreign direct investments (FDI) in Estonia more than doubled versus 1997, to reach EEK 7.9 billion. The record-breaking volume of FDI reflects the faith of long-term capital in the Estonian economic environment. The amount of FDI arriving in Estonia per inhabitant has grown from EEK 733 in 1992 to roughly EEK 5,495 in 1998, which puts Estonia ahead of most other CEE countries.

Strengths and weaknesses of the industrial sector

The main strengths of the industrial sector may be described as follows:

- Successfully conducted structural reforms.
- Estonia has a simple tax system and comparatively low tax rates. The simple tax system together with the exemption of investments from income tax creates opportunities for securing the viability of business activities and allows the increase of productivity in economic sectors.
- Legislation has been relatively well harmonised with the EU.
- Comparatively free access to foreign markets.
- Active participation in international cooperation programmes and cooperation initiatives, e.g. EU cooperation programmes in the field of research and technology development and innovation. This participation contributes to the internationalisation of enterprises. Due to the low cost base (capital, energy, human resources, land, forestry) with development capability, many foreign companies have located their supply base in Estonia.
- The high educational level of the Estonian population and its receptivity to innovation.

The main weaknesses of the industrial sector are the following:

- The small domestic market is a constraint to the development of industry.
- Estonian goods and trademarks are not well known in foreign markets.
- In Estonia the share of higher value-added production in total industrial production is low because of the orientation to industries with low and medium-low technology. Until now Estonian economic success has partly relied on cost-based advantages.
- Outdated equipment and production technologies result in insufficient competitiveness of domestic industry in the global market.
- Entrepreneurs have insufficient awareness of the key role of technology development and innovation. R&D investments are low. The cooperation network between enterprises, research institutions and government agencies is underdeveloped.

- Insufficiently developed mechanisms for technology transfer impede the continuous upgrading of technologies and commercialisation of R&D results.
- Low efficiency of business support institutions, mainly because of the lack of administrative capacity and an insufficiently developed national innovation system.
- Shortcomings in general management skills (including marketing, cost estimation and communication skills).
- Lack of financial instruments for starting businesses and for innovative projects with a high degree of risk

Small and medium-sized enterprises

Small and medium-sized enterprises (SME) actually constitute the majority of enterprises in Estonia. In 1998 there were about 28,000 enterprises operating in Estonia, only 200 of which could be regarded as large enterprises. SME account for approximately one quarter of the total employment of enterprises (i.e. approximately 450,000 employees in 1998).

As SME constitute a majority in Estonia, they represent an important contribution to industrial production, export and import volumes and investments. SME development has stopped the growth of unemployment and created a favourable environment for structural changes in the economy.

Business support infrastructure and measures

Business support can be regarded as one component of the business environment and consequently of the competitiveness of entire economy.

In order to create an environment for the Estonian business communities that is equivalent to that of the EU by the time of accession, the following EU business support models need to be followed:

- support for SMEs;
- support for regional development;
- support for the internationalisation of businesses;
- support for research and development activities;
- support for the rural economy.

For the provision of state business support, seven specialised foundations (legal entities according to private law) have been created in Estonia in the administrative sphere of four ministries. The activities of different foundations are directed to different objectives and provide support to different target groups. While the directions of the state business support activities in Estonia are in conformity with the above-mentioned priorities, they cannot have a considerable effect on economic development due to the low financing volumes.

Support for SMEs

Support to SMEs is based on the State Business Support Act, according to which services are provided only to SMEs. As the availability of bank loans to SMEs is limited because of insufficient collateral, the state has supported SMEs. Three main types of financial services are provided: direct loans, loans through commercial banks, and small loans in target areas of regional policy and loan warranties. Through advisory support, instrument consultation and training costs are partly covered (the rate varies regionally).

The activities of the 16 regional business development centres and business advisory services bureaus are financed through the Estonian Regional Development Agency (ERDA). Various foreign aid programmes also contributed to

their creation. At present the main focus is on the provision of business consultations to those starting their own business. Support to SMEs is provided by the Small Business Credit Fund and ERDA.

Support for regional development

There are special programmes in place to support regional development. Through these programmes state budget funds are assigned to the projects of local governments, county governments and non-profit organisations with the intention of creating better preconditions for regional business development (i.e. supporting human resource development and small infrastructure projects) in target areas of regional policy.

Support for internationalisation

Support for internationalisation aims to promote exports and attract foreign investment. Technology or capital-intensive projects, and projects creating modern jobs and having export potential are preferred. Activities for attracting foreign investments include the search for potential investors, active promotion of investment possibilities and provision of services to perspective and existing investors. Foreign representations have been created to achieve better results.

Export development programmes include participation in international fairs, promotion of Estonian exports and research on foreign markets, training programmes for exporters, internationalisation of business activities, etc. Public funds are also used to give credits to exporting companies. Support is offered through the Estonian Trade and Investment Board and by the Estonian Export Credit and Guarantee Fund.

Support for research and development activities

The effective transfer of research-based technologies, products and know-how into industry and business has often become an indicator of economic success in a society, while the feedback of this process serves to stimulate R&D. The provision of various specific innovation support structures such as science, technology or research parks, technology, innovation or incubation centres, etc., has the general aim of encouraging the technology transfer and commercialising research results. For less developed countries, where the development of infrastructure constitutes a priority, development of the above-mentioned support structures provides an important means for the support of regional development.

Innovation support systems in Estonia obviously cannot be regarded as sufficiently developed yet. The respective units have been set up at different times and for different motives and there is no systematic support mechanism for both the development of the respective structures and for the support of technology transfers and development activities as a whole. With the support of international programmes, 16 Regional Entrepreneurship Centres have been established. These centres concentrate on consulting and advisory services and thus only partially fulfill the role of innovation support structure.

Despite of variability of build-up and functions of the existing innovation support structures, an overwhelming majority of these entities uses a strong university or research centre as their core element. The existing innovation support structures are oriented to fulfilling the following principal tasks:

- to link R&D and business activities by suggesting industrial requirements and abilities to research institutions, and facilitating the transfer of technology and know-how into enterprises;
- to initiate and support small enterprises (including spin-off companies from universities and research bodies) that are developing research and/or technology-based products and services;
- to create an outstanding physical and informational environment and facilities for innovative entrepreneurship to participate in regional and international R&D, technology, investment, marketing, networks and events.

Today's innovation support structures are geographically located in the two biggest towns of Estonia — Tallinn and Tartu — which is a logical development taking into account the allocation of R&D competence and business activities of Estonia.

Consequently, the existing system of business support structures serves as a good basis for the implementation of the development plan of industry and business activities. With several years of experience, these structures can also mediate considerably larger funds than it is currently possible to obtain from the state budget of Estonia. At present the work has started on reorganising the system of foundations in order to make the business support system more economic and efficient.

Main environmental problems in Estonian industry

Inefficient use of water and energy resources due to the leaking of old pipeline systems, the lack of proper insulation and heat exchangers etc., are still quite common problems in the food industry sector. In this industry sector strict hygiene requirements have even caused an increase in water consumption for cleaning and washing. Wastewater containing organic matters, suspended solids, detergents etc., is in most cases discharged into common (municipal) wastewater treatment plants without necessary pre-treatment, thus causing overloading and disturbances of treatment plant operation. Usually no management procedure is applied for solid organic wastes (i.e. disposal at landfills, treatment/incineration, etc.).

Environmental problems of all industry sectors can be roughly divided into two: those from past production sites and those generated today. Although the technological progress has been remarkable during the last ten years of independence, a lot of work still remains to be done to implement EMS as well as BAT (CP).

Environmental policy framework

Executing authorities for environmental policy

The Estonian Ministry of the Environment (MoE) is the higher executive body for environmental protection in Estonia. The MoE is responsible for environmental policy making and planning at the national level. The ministry develops environmental legislation covering the areas of air, marine, surface and ground-water, nature conservation, the use of natural resources (including forest, fish stock, mineral and land resources), and physical planning.

The functions of the Government and Ministry of the Environment:

- Elaboration of general environment management policy and regulatory measures.
- Planning of measures for resources usage and protection, general directions and objects of state importance.
- Organising the elaboration and development of environmental action programmes.
- Conducting environmental data and statistics surveys.
- Elaboration of legislation and general control of implementation.
- International agreements, state-level cooperation projects.
- Coordination of applied research (including monitoring of the environment).
- Organising training systems.
- Issuing different environment-related permits if so determined in legislation.

Administratively, Estonia is divided into 15 counties, all of which have an environmental department, or County Environmental Department (CED), functioning as a structural unit of the MoE.

The main functions of the County Environmental Departments:

- Control of enforcement of environmental legislation.
- Issuing environmental permits.
- Implementation of resources protection and usage policy.
- Planning of usage and protection of resources and implementation of state control according to legislation.
- Keeping a database on resources quantity and quality and usage of water and discharges, of wastewater, air emissions and waste.
- Participation in development programmes for counties.
- Organising monitoring programmes on a county (regional) and municipal (local) level.
- Cooperation with local governments, consulting with them in environment management problems.
- Regulation of relations between local governments in the environmental field.
- Coordination of cooperative projects in the environmental field.
- Release of information about the environmental state of the county.

At the local level Estonia is divided into 207 communities and 47 towns. Virtually none of these has a separate environmental department or unit but a number of municipalities have employed environmental specialists.

Estonian environmental policy

Since signing the Association Agreement with the EU in 1995, Estonia has focused its approximation activities on transposing white paper legislation into Estonian law. This work has now evolved to embrace the whole of the environmental *acquis* with the support of the PHARE-funded DISAE programme. At the same time — closely linked to the development of the environmental approximation strategy — Estonia has been reforming and implementing its national environmental policy, in particular through the preparation of a National Environmental Strategy (NES). The NES was approved by Parliament on March 12, 1997.

The NES set out ten priority goals for environmental policy and identified short-, medium- and long-term objectives/targets to be achieved by 2000, 2005 and 2010 respectively. The ten priority goals are:

- PG1. Stimulation of environmental awareness and environmentally friendly consumption patterns.
- PG2. Promotion of clean technologies.
- PG3. Reduction of the environmental impacts of the energy sector.
- PG4. Improvement of air quality including reduction of transport emissions.
- PG5. Improvement of waste management, reduction of waste generation, stimulation of recycling.
- PG6. Clean-up of past pollution.
- PG7. Sustainable use of ground-water resources.
- PG8. Surface water and coastal sea protection and rational use of water bodies.
- PG9. Preservation of landscape and biodiversity.
- PG10 Modification of built environment, in line with human needs and environmental health requirements

With a view to implementing the NES, a detailed National Environmental Action Plan (NEAP) was developed. It was approved by the Estonian Government on May 26, 1998.

The NEAP has been incorporated into the National Development Plan for 1999-2002 required by the pre-accession EU funding programmes. Table 6 summarises the financial needs for investments foreseen in the National Development Plan. A National Programme for adoption of the *Acquis Communautaire* (NPAA) was adopted by the Estonian Parliament in March 1998 and the official English translation was submitted to the European Commission in April 1998. The NPAA includes a report on environmental approximation, drawing on the preliminary findings

of the DISAE study and the NEAP preparation process. The NPAA states that Estonia expects to complete the process of legal approximation in three years (i.e. by the middle of 2001) and that an action plan for institutional and capacity building for sufficient implementation and enforcement of the environmental *acquis* will be developed shortly.

The strategy behind both NPAA and NDP is therefore the same: while the NPAA focuses primarily on institution building (including preparation or adaptation of public entities to deal with EU matters), harmonisation of legislation and training of Estonian officials (i.e. preparation of the administration as a regulatory body, as a development player and as a counterpart to the EU institutions), the NDP deals with investments promoted or supported by the Government in agriculture, industry, tourism, transport and environment under the same modernisation strategy.

Investments foreseen in the National Development Plan are mainly of two kinds: on the one hand development actions intended to increase the growth rate of the economy and thus reduce the gap with the EU average; on the other hand complementary investments to measures specifically provided for in the NPAA.

The Estonian NEAP is the second key step in the development and implementation of a comprehensive and consensus-based national environmental policy in Estonia following the adoption of the Estonian National Environmental Strategy (NES). The NEAP includes both short-term (for 1998-2000) and long-term (2001-2006) actions.

The Government made the MoE responsible for coordination, implementation and monitoring of the NEAP. The MoE was obliged to monitor the NEAP implementation progress on an annual basis, and update the NEAP every three years. In accordance with the above decision, the MoE has prepared three annual progress reports for 1998, 1999 and 2000. The results of the 1998-2000 NEAP implementation progress evaluation can generally be considered as satisfactory (see table 6).

Table 6. Status of implementation NEAP on January 1, 2001

Policy goal (PG)	Total number of action for 1998-2000	Implemented in 1998	Implemented in 1999	Implemented in 2000	Underway	Cancelled	Postponed
PG 1	33	1	4	8	17	1	2
PG 2	36	4	0	11	7	0	14
PG 3	43	3	5	11	12	5	7
PG 4	48	3	3	10	24	1	7
PG 5	49	1	0	13	21	3	11
PG 6	30	0	0	4	15	2	9
PG 7	47	4	4	11	17	3	8
PG 8	43	2	2	2	21	1	15
PG 9	78	2	1	19	43	4	9
PG 10	23	0	3	8	4	2	6
Total	430	20	22	97	181	22	88
% of total		4.7%	5.1%	22.6%	42%	5.1%	20.5%

In 1998-2000, 139 actions (32.4 percent of the total number of actions planned for 1998-2000) were fully implemented. The highest number of fully implemented actions was in the area of the built environment (PG 10) — 11 actions or 48 percent of the total number of actions planned for 1998-2000. In the area of the reduction of environmental impact in the energy sector (PG 3), 19 actions or 44 percent of the total were fully implemented. On the other hand, only four actions (13 percent) were implemented in the area of cleaning up past pollution (PG 6), and six actions (14 percent) in the area of surface water protection. In three years, 22 actions were cancelled,

accounting for 5 percent of the total number of actions for 1998-2000. The low number of cancelled actions provides evidence that the Estonian NEAP was based on a realistically defined set of actions. However, the number of postponed actions was also high: 88 actions or 20 percent of the total number of NEAP actions planned for 1998-2000. The overall disbursement rate for all actions in 1998-2000 reached 60 percent of the financial needs of the NEAP for 1998-2000. (Financial needs were estimated to be EEK 8.18 billion and disbursement accounted for EEK 4.94 billion).

At the end of 2000/beginning of 2001 the NEAP was revised: the second NEAP for 2001-2003 was approved by the Government on June 5, 2001. The revised NEAP was harmonised with the EU environmental approximation process, and proceeded on the basis of the National Approximation Strategy and the National Plan for the Adoption of Acquis (NPAA). The financial requirements for all actions included in the second NEAP are estimated to be EEK 11.9 billion. Table 7 summarises the estimated financial needs according to funding sources.

Table 7. Financial needs of NEAP for 2001-2003 (EEK million)

Source of finance	2001	2002	2003	2001-2003
State budget, of which	369,706	643,738	535,915	1,549,359
Center for Environmental Investments	146,174	220,086	145,395	511,655
Local budgets	175,542	281,092	281,671	738,305
Enterprises own resources	1,819,903	2,479,038	2,568,802	6,867,743
Foreign loans	69,359	95,215	50,500	215,074
Foreign aid	540,893	1,093,320	886,753	2,520,966
Others	2,890	4,324	4,223	11,437
Total estimated financial needs	2,978,293	4,596,726	4,327,864	11,902,883

Source: Estonian NEAP 2001-2003, Ministry of Environment, 2001

Expenditures on environmental investments and R&D increased substantially in Estonia from 1993 to 2000, eventually reaching 1.9% of GDP in 2000 (see table 8).

Table 8. Environmental investments and R&D expenditures in Estonia, 1993-2000

	1993	1994	1995	1996	1997	1998	1999	2000
Total expenditures (EEK mn, current prices)	249.9	192.2	309.4	752.2	966.6	1020.4	1040.6	1610.1
Total expenditures as % of GDP (current prices)	1.1	0.6	0.8	1.4	1.5	1.4	1.4	1.9

Source: Authors' calculations based on the Estonian Environmental Protection Expenditures Yearbook issues 1993-2000, the statistical Yearbook issues 1994-2001, and the Draft Public Investment Programme for 1998-2000 and 2001-2004.

Harmonisation with EU environmental acquis: implementation plans and estimated costs

Estonia has stated its willingness to become a member of the European Union. For that purpose it is necessary to align national laws in order to give effect to the entire body of EU law contained in the so-called *acquis communautaire*.

In 1997 the *Guide to the Approximation of European Union Environmental Legislation* was published in which an overview of all environmental law of the EU was given and a so-called "road map" to the approximation of environmental legislation offered.

The purpose of the approximation process of environmental legislation is to ensure full alignment of the national environmental law and the administrative system to EU requirements.

The environmental *acquis* consists of the following parts:

- horizontal legislation;
- air quality;
- waste management;
- water quality;
- nature protection;
- industrial pollution control and risk management;
- chemicals and genetically modified organisms;
- noise from vehicles and machinery;
- nuclear safety and radiation protection.

In 1998 four chapters were added to the *acquis*: climate change, civil protection, policy and international cooperation.

In 1998, the MoE started, with financial support from the EU PHARE Programme (DISAE projects), the preparation of materials for screening the environmental *acquis*, working out position papers and preparation for further negotiations.

The environmental legislation consists of more than 300 legal acts, including directives, regulations, decisions and recommendations and other policy documents. Estonia has expressed its readiness to harmonise its legislation with the EU environmental legislation by the day of accession (excluding some transitional periods, see below).

Estonia has proved to be quite successful in the process of transposition of environmental legislation. Several important laws such as the Ambient Air Protection Act, Waste Act, Forest Act, Environmental Monitoring Act, Environmental Supervision Act, Protection and Use of Wild Fauna Act, etc., have been adopted during the last couple of years. Some laws, such as the Water Act, Radiation Protection Act, Sustainable Development Act and Protected Natural Objects Act have been and will be amended in the next few years. The Environmental Code, an act which covers all important environmental laws, is under elaboration.

State of approximation and implementation of the environmental *acquis*

Estonia has adopted almost all framework laws that are generally in line with the EU requirements. Some amendments have been made in the last few years, and some should be made in two or three years' time. The main laws are as follows:

- Water Act (adopted 1994);
- Public Water Supply and Sewerage Act (adopted 1999);
- Waste Act (adopted 1998);
- Packaging Act (adopted 1995);
- Ambient Air Protection Act (adopted 1998);
- Environmental Impact Assessment and Auditing Act (adopted 2000);
- Environmental Monitoring Act (adopted 1999);
- Environmental Supervision Act (adopted 1997);
- Forest Act (adopted 1998);
- Act on Protected Natural Objects (adopted 1994);
- Wild Fauna Protection Act (adopted 1998);
- Act on the Protection of Marine and Freshwater Coasts, Shores and Banks (adopted 1995);
- Act on the Protection of Estonian Nature (adopted 1990);
- Act on Hunting Management (adopted 1994);

- Act on Deliberate Release of Genetically Modified Organisms (adopted 1999);
- Chemicals Act (adopted 1998);
- Radiation Protection Act (adopted 1997);
- Energy Act (adopted 1997);
- Act on Pollution Charges (adopted 1999);
- Public Health Act (adopted 1995).

The structural changes in the MoE and its administrative field have improved the administrative capacity. In 2000, both the MoE and public authorities under its subordination were reorganised. Two inspectorates were merged — the Nature Protection Inspectorate and the Marine Inspectorate. The Forestry Board was reorganised into a Forestry Department of the MoE. New structural units dealing with integrated pollution prevention and control and new technologies, as well as with environmental investments and strategy and planning were established. The management of environmental monitoring is also being reorganised.

At the beginning of 2000, County Environmental Departments (CEDs) were brought under the administrative field of the MoE and reorganised into regional departments. This will facilitate better implementation and enforcement of environmental requirements.

The Association Agreement with the EU was signed on June 12, 1995. The agreement came into force on February 1, 1998. Accession negotiations were started on March 30, 1998. The Environment Chapter was opened on December 7, 1999. The last amendments to the Estonian position were added on February 7, 2001.

On July 1, 2001, the Environment Chapter was closed. Estonia became the first country in the Baltics (and second after Slovenia in whole CEE region) to reach agreements about transition periods concerning EU environmental directives.

During the negotiations nine directives were under discussion. Transition periods were established for four of these. For the rest there was no need for a transition period or it was already set in the text of the directive.

The following transition periods have been agreed between Estonia and EU:

- Volatile Organic Compounds (VOC) Directive (94/63/EEC): transition periods until 2004 and 2007 for the construction of petrol vapour regeneration systems taking into account the turnover of stations and terminals.
- Urban Waste Water Directive (91/27/EEC): transition period until 2010 for renovation/construction of sewerage systems and wastewater treatment facilities.
- Drinking Water Directive (80/778/EEC): transition period until 2013 for renovation/construction of water supply systems and water treatment facilities.
- Landfill Directive (99/13/EC): transition periods until July 16, 2009, when non-conforming dumping of waste must be terminated. The problem is especially acute for oil-shale ash.
- Directive on Discharge of Dangerous Substances into Surface Water (76/464/EEC): in order to accomplish this directive Estonia must fulfill requirements concerning monitoring and permitting, and also compose programmes, targeting the minimisation of releasing dangerous substances into the soil. The minimisation programmes must be carried out during a six-year period after accession.

A cost estimate from early 2000 for environmental approximation called for EEK 24 billion (EUR 1.5 billion) to incorporate EU directives into national legislation and to create a new infrastructure to meet EU standards.

Environmental standards and permitting

Competent Environmental Authorities in Estonia

The main competent authorities in Estonia are:

- The Ministry of the Environment and the Environmental Protection Inspectorate;
- The County Environmental Departments (CEDs);
- Municipal Environmental Authorities.

Under the MoE, the Environmental Information Centre (EIC) is responsible for collecting, reporting and publishing environmental information and data. The Environmental Protection Inspectorate is responsible for coordination and management of the enforcement of natural resources legislation.

At the end of every year EIC sends questionnaires to the County Environmental Departments. The CEDs send these questionnaires to enterprises for completion. The CEDs collect and control the data, and then return the completed questionnaires to the EIC. Enterprises are obliged to monitor themselves by the Environmental Monitoring Act.

Estonian reporting system

There are three main reporting and database systems concerning pollution discharges into the environment from point sources in Estonia. Since 1997 — when the packaging excise tax was applied in Estonia — data about beverage packaging has also been collected.

The water-use database includes data about water abstraction, water consumption and wastewater discharges and pollution load into surface water, marine water and the soil. In 1998, data was collected from 1,293 water users. Relevant report forms collect data from these sources. CEDs gather the forms and the Environmental Information Centre makes the national report.

The air database includes emissions from polluters that have a permit. The air emissions reporting system has its legal background in the Ambient Air Protection Act, enforced on April 22, 1998. The Estonian Air Emission database is compiled by the EIC (with the exception of GHG emissions, which are calculated by the Institute of Ecology according to the IPCC methodology). The important part of the inventory is to test the effectiveness of state environmental policy and to provide national and international bodies with official emission data for the country. The emission data is updated and results are reported annually. Data are based on reports from energy and industrial enterprises which have permits. All the data were linked to a Geographical Information System (GIS) in 1997.

The waste database includes the data on the type, amount and origin of the waste generated and managed, and also general data about landfills. The legal background is the Waste Act enforced on June 10, 1998, amended on February 17, 1999. The Waste Act provides general requirements for the prevention of waste generation and the hazard it presents to health and the environment. The act also covers the organisation of waste management with the aim of reducing the amounts of waste and the level of hazard, as well as defining responsibility in the case of a violation of the established requirements. The system of waste information and data collection has its legal background in Chapter VII of the Waste Act. Data about types and amounts of waste produced and treated in Estonian enterprises are collected by CEDs on the basis of the statistical report “Waste Handling.” This information is stored in the database of the EIC, which includes data about all questioned enterprises as well as counties and the whole country. Through the choice of CEDs and the Statistical Office of Estonia, mostly companies with waste permits are questioned.

Reduction of environmental pollution

Air pollution

On a regional level, Estonian air pollution problems are connected with north-east Estonia, due to industry and energy production based on oil shale. On a global level, Estonian air pollution problems are connected with islands in the south and west of Estonia, where air pollution is carried from central and western Europe through the long-range transportation of air pollution.

Air pollution causes several problems, the most important being:

- climate change (caused by greenhouse gases);
- acidification and eutrophication (substances causing acidification and eutrophication);
- problems caused by trans-boundary pollution of hazardous/toxic compounds (caused by heavy metals and persistent organic compounds).

Emissions of main pollutants in Estonia

The emitted quantities of pollutants more than halved between 1992 and 2000 due to the use of new purification equipment in cement factories and the decreased production of electricity at power stations. In 2000 emissions from stationary sources in Estonia were: 59,500 tonnes of solid particles; 91,500 tonnes of sulphur dioxide (SO₂); 15,300 tonnes of nitrogen dioxide (NO_x); 20,900 tonnes of carbon oxide (CO), and 5,000 tonnes of volatile organic compounds (VOCs).

The main polluters emitting SO₂ and solid particles — 87.9 percent and 94.5 percent respectively — were companies involved in energy supply, heat production and oil shale chemistry in Ida-Virumaa County.

The emission of sulphur dioxide per capita in Estonia is much higher than in Western Europe and in most CEE countries. For example, SO₂ per capita reached an average 69.6kg in 1998 versus 79.8kg in 1996. For other countries, the corresponding figure was 8.8kg in Sweden, 20.5kg in Finland, 18.8kg in Germany, 23.7kg in Latvia, 25.1 in Lithuania. Only the Czech Republic had a figure higher than Estonia: 91.7kg per capita according to 1996 data.

The main sectors in Estonia that pollute the air with volatile organic pollutants are the oil-shale chemistry industry, the furniture and fish industries, and oil terminals.

Most CO is emitted from small boiler houses, which use mainly shale oil, coal, peat, wood and wood waste. The greatest amount of CO is produced from peat and wood.

The transport sector is the main source of nitrogen oxides and volatile organic compounds. Due to the increase in the number of cars, trucks and special vehicles, emissions from mobile sources also increased in 1992-1998: nitrogen oxide from 24,500 to 31,100 tonnes; VOCs from 34,400 to 48,000 tonnes. Only the emission of lead decreased in the mentioned period. The share of leaded gasoline in 1998 was 10 percent. Since 1999 a clear decreasing tendency has also been observed for SO₂ and VOCs.

Climate change

The main social-economic factors of climate change are energy use, agriculture, waste management and industrial activities, in which energy supply is the main factor. Estonian power supply is based 72 percent on local fuel (oil shale, peat, wood); of this figure, oil shale accounts for 52 percent (1998). Oil shale is used in power stations (circa 98 percent of all electricity production is based on oil shale), for the production of shale oil and in the cement

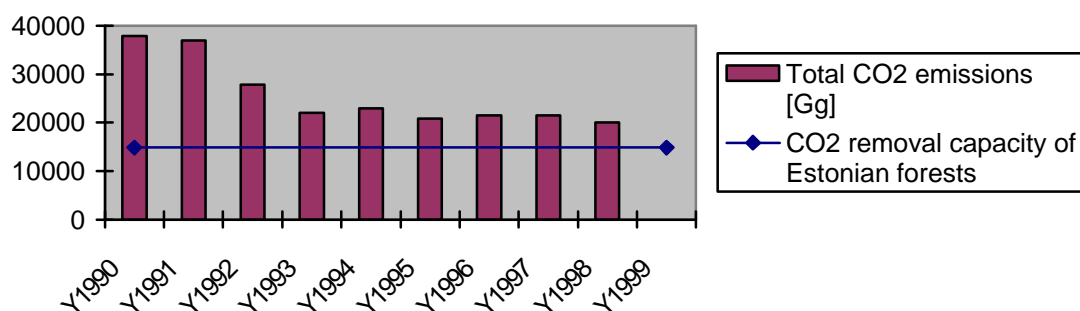
industry. Production capacity has changed according to the demands of power stations and the oil shale processing industry. While the production of oil shale amounted to 22.5 million tonnes in 1990, by 1998 it was only 12.5 million tonnes. One main source of CO₂ is the combustion of fossil fuels. The energy supply sector produces 91.8 percent of total CO₂ emissions, while transport accounts for 6.4 percent and industrial processes only 1.8 percent (mainly cement production).

Estonia ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1994. The Kyoto protocol was signed by Estonia in 1997, and bound the nation to reducing greenhouse gas emissions by eight percent below the 1990 level by the year 2010. The responsibilities of the 1997 Kyoto Protocol of UNFCCC have already been fulfilled in Estonia. In the period 1990-1998 the emission of greenhouse gases (CO₂, CH₄ and N₂O) in CO₂ equivalents decreased by 47 percent. This was the result of the reduced use of fossil fuels, as well as the decrease and reformation of industrial and agricultural production. The trend in CO₂ emissions is shown in table 9. The trend is considered desirable. The biggest decrease occurred at the beginning of the decade: in 1992 (25 percent versus 1991) and 1993 (21 percent versus 1992).

However, the present level of CO₂ emissions still exceeds the target value of the CO₂ removal capacity of Estonian forests, which is 14,873Gg.

Table 9: Trend in CO₂ emissions (energy, transport and industrial processes)

Unit	1990	1991	1992	1993	1994	1995	1996	1997	1998	% change 1990-1998
Gg	37,797	36,957	27,766	21,979	22,883	20,860	21,422	21,511	20,027	-47.01



Data sources: SoE (1993, 1995, 1997, 1999); MoE (1998).

Carbon dioxide emission per capita in Estonia is one of the highest in Europe (13.3 tonnes per capita in 1998). For comparison, the average emission of carbon dioxide in the EU in the same year was 8.8 tonnes per capita.¹¹

Estonia currently has no programme for the reduction of greenhouse gases, but one of the main goals of the “Long-term National Development Programme for the Fuel and Energy Sector” and the “Management and Goal Programme of Energy Saving” is the reduction of environmental impacts. Aims include:

- raising the efficiency of energy production and transport, using more environment-friendly fuels and reducing special consumption of energy in all branches of economy and households;
- establishing new power stations, using the principle of distributed electricity production and combined heat and power production;
- providing higher efficiency in oil shale-based energy production with the concurrent and significant reduction of harmful environmental impacts via the renovation of combustion technology.

¹¹ Source: *Towards Environmental Pressure Indicators for the EU*, European Communities, 2001.

Wood and other biological fuels are renewable sources of energy and emissions of CO₂, emitted into the atmosphere with their combustion, are not included in greenhouse gases, as it does not affect the circulation of carbon in nature. The Long-term National Development Plan for the Fuel and Energy Sector plans to increase the use of renewable sources of energy and peat by more than 60 percent by the year 2010 versus 1996, when the percentage of these sources in primary energy was nine percent; by the year 2010 this figure should increase to 13 percent (table 10).

**Table 10: Expected change in the need for primary energy, %
(Long-term National Development Plan of the Fuel and Energy Sector)**

	1995	2005	2010
Oil shale	62	52-54	47-50
Peat, wood, renewables	8	11	13
Fuel oils	6	5	4-5
Engine fuels	13	14	14
Natural gas	11	16-18	18-22

Acidification

The main reason for acidification is the emission of sulphur and nitrogen compounds (SO₂, NO_x and NH₃) into the atmosphere. These compounds decompose in precipitation and fall back to the earth surface in the form of acid rain. Acid rains damage forests, populations of waterbodies, and cultural heritage. The largest pollution sources of sulphur and nitrogen are energy production and industry, although most nitric oxides are emitted from transport and most ammonium from agriculture.

In 1990-1998 emissions of SO₂ from stationary pollution sources in Estonia decreased by 61.7 percent and emissions of NO_x by 43 percent in 1987-1998. The decrease of emissions of SO₂ took place mainly due to the decrease in the output of large power stations as well as the reduction in the amounts of heavy fuel oil used for combustion in boiler houses.

In 2000 Estonia joined the Convention on Long-Range Transboundary Air Pollution and its three protocols, which concern SO₂, NO_x and VOCs. The requirements of all these protocols have already been fulfilled in Estonia (i.e. to implement reductions of sulphur emissions or their trans-boundary fluxes by at least 30 percent versus 1980, and to stabilise emissions of nitrogen compounds at the 1987 level).

According to the above-mentioned convention and taking into account the EU Directive 88/609/EEC about the limit values of emissions of pollutants from large combustion plants into ambient air, the Ministry of the Environment compiled the State Programme for Reduction of Emissions of Pollutants from Large Combustion Plants into Ambient Air.

This programme identifies measures to be taken for the reduction of emissions of pollutants:

- technological measures, including reconstruction of equipment, implementation of new combustion technology (implementation of new oil-shale combustion technology, based on a circulating boiling layer, in energy block no. 8 of the Estonian Power Station), etc.;
- change of fuel type used, e.g. use of natural gas;
- use of fuel with low sulphur content.

To date emissions of SO₂ and NO_x from large boilerhouses with a capacity of 50MW or above (21 boilerhouses) correspond to 92 percent and 79 percent respectively of summary emissions of SO₂ and NO_x.

According to Regulation No. 15 of the Ministry of Economy (“Quality requirements for liquid fuels”) of June 2, 2000, in Estonia it is permitted to use heavy fuel oil with 3.0 percent sulphur content until January 1, 2003, and with 1.0 percent sulphur content after that term. Limit values of the emissions of sulphur dioxide and nitric oxides are directly regulated by Regulation No. 60 of the Ministry of the Environment (“Limit values of emissions of pollutants per volume unit of gases exiting from combustion equipment”) from October 26, 1998.

Ozone layer protection

The Vienna Convention for the Protection of the Ozone Layer was concluded on March 22, 1985 and the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol) accompanying this convention on September 16, 1987. Estonia joined these international agreements in 1996. The Montreal Protocol has been amended four times —in London in 1990, in Copenhagen in 1992, in Montreal in 1997, and in Beijing in 1999. Estonia ratified the London and Copenhagen amendments of the Montreal Protocol in 1999.

In order to protect human health and the environment from damage arising from the dissipation of the ozone layer, the Government approved the State programme for the gradual elimination of ozone-layer depleting substances on May 4, 1999.

No ozone-layer depleting substances are manufactured in Estonia. The total consumption in 1995 was 159.2 tonnes, which corresponds to 131.2 ozone depletion potential (ODP) tonnes; the corresponding figure in 1996 was 73.9 tonnes or 36.5 ODP tonnes. From 1986 to 1996 the consumption of ozone-layer depleting substances decreased by 81 percent. In 1998 their consumption increased by 23.5 ODP tonnes compared to 1996, which was caused by the use of amortised cooling equipment. The Ministry of Environment’s consumption forecast shows that consumption of ozone-layer depleting substances in Estonia should come to a halt in 2002, when Estonia should have reached the level achieved by EU member states on January 1, 1996.

Heavy metals and persistent organic pollutants

In recent years special attention has been paid, within the framework of the United Nations/European Economic Committee (UN/EEC), to persistent organic pollutants and heavy metals.

Two protocols have been adopted within the framework of the Convention of Long-Range Transportation of Air Pollution, which aim to prohibit or restrict the production and use of several persistent compounds. (Executive body decisions: 1998/2 — persistent organic compounds; 1998/1 — heavy metals). Estonia plans to join these protocols in 2003 or 2004.

For heavy metals, the main attention of UN/EEC focuses on three metals: cadmium, lead and mercury. The burning of oil shale at large power stations produces the majority of heavy metals in Estonia. Another large pollution source is burning of wood and wood waste in small boiler houses. In 1990-1998 emissions were halved as a result of the decrease in the amount of burnt fuel. The largest amounts of lead are emitted from fuel combustion and transport. In 1990 the emission of lead from transport was twice as large as from oil shale combustion. In 1998 this relation has changed. Lead emitted from transport was reduced by two thirds versus oil shale combustion. This was the result of the remarkable decrease in the use of gasoline with lead content (only 10% in 1998).

Water

Water extraction and consumption

Water consumption started to decrease at the beginning of the 1990s, when many industries ground to a halt in the new economic conditions (see table 11). The high price of water services led to lower water consumption. Economic

interests replaced restrictions and orders for water protection. Companies became interested in reduction water expenses and applying water-saving technology. The general public also reacted to the sharp increase in water prices with a reduction in water use. In the last six to seven years many water meters have been installed in apartments, thus bringing water-saving awareness to the home.

Table 11: Water extraction and consumption (million cubic metres per year)

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total extraction, of which:	2,709	2,082	1,989	1,850	1,700	1,698	1,670	1,533	1,490
Surface water	2,221	1,654	1,568	1,430	1,373	1,306	1,284	1,228	1,200
Groundwater, of which:	409	352	343	350	257	322	316	299	255
From aquifers	142	113	110	103	94	85	73	65	57
Mine drainage water	268	239	233	247	163	237	243	234	198
Seawater	79	76	77	70	70	70	70	5.6	16
Total water consumption	2,440	1,814	1,725	1,567	1,504	1,434	1,403	1,274	1,271
By type:									
Domestic	104	99	92	88	87	76	61	53	49
Industry	125	75	69	62	61	63	57	52	49
Cooling	1,985	1,441	1,372	1,237	1,221	1,187	1,176	1,124	1,119
Agriculture	30	13	10	8	7	6	5	5	4
Fish-rearing	151	156	149	154	115	90	92	33	43
Other	45	30	33	18	13	12	11	7	7

The reduction of the pollution load in the early 1990s was caused by a decrease in industrial production (see tables 12 and 13). The production of pulp, superphosphate, nitrogen fertilisers, etc., came to a halt in this period. Production in the food industry also eased. Many industries recovered in later years, but stoppages still occurred. A further decrease of pollution was achieved through the implementation and/or renovation of treatment plants. Companies played an essential role as they sought to reduce pollution charges by limiting water use and implementing cleaner technology.

Table 12: Wastewater discharge (million cubic metres per year)

	1992	1993	1994	1995	1996	1997	1998	1999
Total wastewater discharge, of which	2,692	2,063	1,962	1,849	1,692	1,686	1,671	1,532
No treatment needed	2,239	1,667	1,582	1,452	1,375	1,337	1,343	1,219
Treatment required	449	393	378	396	316	349	327	312
Untreated	21	23	19	18	15	10	8	6.8
Treated, of which	427	370	359	378	301	339	318	305
Mechanically	203	188	186	203	138	184	172	171
Biologically	111	86	87	89	85	82	73	64

Physical-chemically	113	82	1	1	1	1	1	0.7
Biological-chemically	13	84	85	77	72	73	69	

Table 13: Pollution load (tonnes per year)

	1992	1993	1994	1995	1996	1997	1998	1999	2000
BOD ₇	18,080	11,250	5,710	4,480	4,174	3,838	3,122	2,308	2,051
P _{tot}	673	445	353	321	304	303	279	256	230
N _{tot}	5,640	4,240	3,610	3,500	3,200	3,173	2,976	2,739	2,810

Removing nitrogen during the wastewater treatment process is expensive and still not widespread. New treatment plants are designed to undertake the removal of nitrogen.

Silmet, one of the biggest rare metal and rare earth metal producers in Europe, used to use a lot of nitrogen in its technical processes. There were no direct outlets but a considerable amount of nitrogen leaked from the waste storage. For example, in 1995 the nitrogen load of the plant calculated indirectly was equal to the load produced by Tallinn. In the last few years some improvements have been made to the technology used. Instead of ammonium bicarbonate, sodium carbonate is now used. The amount of the used reagent has decreased. Since 1998 the amount of nitrogen leaked from waste deposits has been added to the total sum of nitrogen load from Estonia. There was no overall increase in nitrogen because the additional amount was compensated for by the improved removal of nitrogen in other places in Estonia.

Waste

Generation of waste

Among the sources of waste, the dominant types are oil shale mining (underground and quarries), oil shale-based energy production and chemical industry. In Estonia oil shale ash, slag and semi-coke and oil shale mining waste account for an average 90 percent of the total amount of waste. In other branches of Estonian industry construction, wood processing and food industry are generate the most waste. Municipal waste forms around 4 percent of the total amount of waste.

Municipal waste

Municipal waste refers to any waste generated in households, and similar waste (in composition and characteristics) generated in trade, provision of services or elsewhere. Municipal waste may contain components of both non-hazardous and hazardous waste.

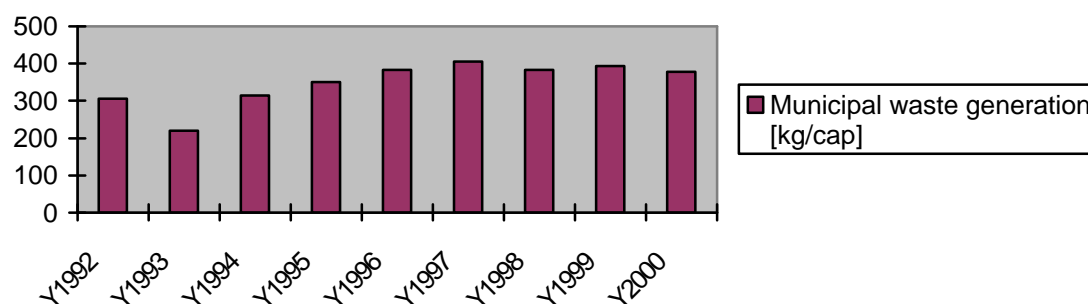
In the period 1993-1997 the amount of municipal waste increased by around 40 percent (from 337,000 tonnes to 593,000 tonnes). This development is explained by the emergence of new consumption habits, as well as the arrival of several new package types and materials on the Estonian market (tables 14 and 15). The Estonian National Environmental Strategy specifies the stabilisation of municipal waste generation at an annual level of 250-300kg per person by the year 2010. The main goals include the reduction of packaging waste, the promotion of recycling and the re-use of packaging and packaging materials.

Table 14: Collection and disposal of municipal waste in 1993-2000 (thousand tonnes)

	1993	1994	1995	1996	1997	1998	1999	2000
Collection	337.1	472.6	522.1	564.7	593.3	557.2	568.7	544.2
Disposal	317.0	468.9	518.5	563.7	592.0	556.0	568.6	543.9

Table 15: Trends in the volume of municipal waste generation (kg per capita)

Unit	1992	1993	1994	1995	1996	1997	1998	1999	2000	% change 1992-2000
Kg/cap	306	220	314	350	383	406	383	393	378	+23.5



Data sources: SoE (1993, 1995, 1997, 1999, 2000, 2001)

Municipal waste generation in Estonia, with some fluctuations, has followed a general uptrend, particularly in the years 1993-1997. Estonia generates more municipal waste than other transition countries. (In 1997 the Czech Republic figure was 310kg/capita, while Latvia recorded 270kg/capita. Source: SoE, 2000, p. 28.) On the other hand, Estonia generates less municipal waste than the developed EU countries. (For example, the value for Denmark in 1997 was around 555kg/capita.¹² Source: SoE, 2000, p. 28.)

Almost all municipal waste (around 99 percent) is disposed of, without sorting, in landfills. In most cases these sites do not fully comply with environmental requirements. Also, hazardous waste is often disposed of in landfills, as the national hazardous waste management system is underdevelopment and not fully implemented. Landfills in Estonia therefore represent a great environmental risk.

Generation of hazardous waste

The main waste generators in Estonia are oil shale mining, oil shale chemistry and energy production. Therefore, oil shale ashes and semi-coke dominate in terms of hazardous waste. Most waste generated during the production of oil shale energy and in the chemical industry is considered hazardous due to its high alkalinity.

In the period 1993-1999 the amounts of hazardous waste generated fell by 24 percent (from 7.73 million tonnes to 5.86 million tonnes), mainly due to the decrease in the production of oil shale energy and shale oil. The restructuring of the economy also aided the reduction of hazardous waste.

Waste treatment

¹² It should be borne in mind that the definition of municipal waste varies from country to country; hence the data are not fully comparable.

Reducing the production of waste and organising waste treatment is elaborated in the Estonian Environmental Strategy. According to this, the selection of practical measures should take place on the basis of the following sequential factors:

- prevention of waste generation;
- reduction of generated waste volumes, and a decrease in the hazard level;
- increase in the quantity and scale of recovered wastes, including re-use, material recycling, biological processes, energy recovery;
- waste treatment complying with environmental requirements;
- environmentally safe disposal of waste.

The Estonian Environmental Strategy specifies that by the year 2010 recycling of waste should be increased to 50 percent. The main waste treatment method is still waste disposal in landfills.

Of the 350 existing landfill sites spread across Estonia, many were constructed without sufficient consideration of the environmental impacts and therefore cause groundwater contamination.

Environmental taxes and charges

Fixed polluter pays and avoiding principles have been established by the Estonian environmental protection policy. At the moment the most important economic instruments for practical environmental protection in Estonia are pollution charges, water abstraction fees, and mineral resources extraction fees, which were introduced on January 1, 1991. Estonia already has ten years of experience using economic instruments. During this period these instruments have become an essential part of environmental policy accepted by producers and consumers. Imposed levies were collected even at the time of the lowest depression of the economy. At present they obviously have an influence on the economic and environmental performance of all enterprises in economic sectors that use natural resources and cause pollution.

The aim of using economic instruments for environmental management is to influence both producers and consumers to use natural resources in a rational way; to prevent pollution and waste generation as much as possible; to promote environment-friendly industrial equipment and to support its implementation; to promote water- and heat-saving technologies and the improvement of fuel combustion; to promote cost-effective methods of pollution reduction; and to raise revenues for environmental financing.

Characteristic of economic instruments is their flexibility. When first implemented the rates of charges and fees were very low because the purpose was not to sink existing, outdated technical-based production, but to change attitudes and to promote the concept that pollution is economically inefficient for society and businesses alike, and has to be considered seriously when planning any actions.

Pollution charges also have the important role of directing environmental users to follow the demands of law. The difference between the compulsory “command-and-control” and the “market-based” approaches to environmental improvement is often overestimated. Pollution can be sufficiently reduced when one has comprehensive information and these two approaches are combined, both being useful tools. The nature of the immediate problem determines which one of these tools should be used and what results are achieved. In Estonia a system of pollution charges complements the system of administrative regulations. These regulations include pollution permits, maximum permissible limits, environmental quality standards, effluent/emission standards, supervisory systems, enforcement and punishment procedures.

In 1991 pollution charges, water abstraction and mineral extraction fees were established in Estonia by a governmental regulation. Major changes in Estonian pollution control policy took place in 1993-1994, when the basic framework laws and several regulations were revised and adopted. The basic framework act on pollution

control is the Act on Pollution Charges. Water abstraction fees are applied by the Water Act and mineral resource extraction fees by the Earth's Crust Act.

While the details vary somewhat depending on the nature of the pollutant (air, waste-water, solid waste), the basic characteristics of the pollution control policy can be summarised as follows:

- In general, County Environmental Departments (CEDs) are responsible for implementing and enforcing the pollution policy
- The polluters are responsible for requesting from the CED a permit for specific amounts of different pollutants.
- Based on this requested amount, a pollution permit may be granted to the enterprise for a fixed period of time (usually one to five years).
- In the permit, threshold levels of pollutants (tonnes per year or quarter) are defined.
- Polluters shall pay a constant unit pollution charge (the base charge rate) for each unit of pollutants up to the permitted level in tonnes per period.
- The pollution charge for the release of pollutants or waste in larger quantities than permitted or for the release of pollutants or waste into environment without a permit shall be calculated according to an increased rate.
- Polluters are required to calculate the volume of pollutants or waste released into the environment and pollution charge according to such volume quarterly.
- Polluters shall pay the pollution charge by the twenty-fifth day of the month following the quarter.
- If the pollution charge is not paid during the term for payment, the polluter is required to pay a fine for delay at the amount of 0.2 percent of the payable amount per twenty-four hour period.
- The pollution charge shall be paid into the state budget.
- The financing of activities shall substituted for the pollution charge, if the polluter: a) implements, at the polluter's expense, environmental protection measures which ensure the reduction of pollutants or waste over the course of three years by not less than 25 percent versus the last accounting year prior to the implementation of such measures; b) participates in the financing of national or regional environmental programmes or projects approved by the Minister of Environment.
- Payment of the pollution charge does not exempt the person who released pollutants or waste into the environment from payment of compensation for damages caused to the third parties due to the pollution.

The Act on Pollution Charges passed by Parliament on February 10, 1999, is currently in operation. This act specifies the pollution charge rates for the release of pollutants into ambient air, water bodies, groundwater or soil, and for the release of waste into the environment. For reference, figures 4, 5 and 6 report these pollution charge rates for 1999-2001.

Moreover, coefficients have been established, which are used for adjusting pollution charge rates to take into account the local level of pollution, the sensitivity of the local environment and the potentially higher danger to the environment and human beings.

For example, pollution charge rates for the release of pollutants into ambient air are increased by a factor of:

- 1.2 in the case of stationary sources of pollution located within the boundaries of local governments bordering on the Narva River, if the height of release of pollutants is more than 100 metres above ground level;
- 1.5 in the case of stationary sources of pollution located in Jõhvi, Kiviõli, Kohtla-Järve, Narva, Sillamäe or Tartu;
- 2 in the case of stationary sources of pollution located in Tallinn;
- 2.5 in the case of stationary sources of pollution located in Haapsalu, Kuressaare, Narva-Jõesuu or Pärnu;

The pollution charge rates for release of pollutants into water bodies, groundwater or soil are increased by a factor of:

- 1.2 if the receiving water body is located in an area with unprotected groundwater;

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- 1.5 if the receiving water body is located within the boundaries of a city, town or beach, or nearer than 500 metres to a beach specified by the resolution of a local government;
- 1.5 if the receiving water body is a sea or trans-boundary water body or a water body of importance to the fisheries;
- 1.2 if waste water is directed into the sea through a deep-sea outlet;
- 1.5 if pollutants are released as a result of leakage from a deep-sea outlet.

The pollution charge rates for release of pollutants into water bodies, groundwater or soil are decreased by a factor of:

- 2 if the receiving water body is located in an area with moderately protected groundwater;
- 3 if the receiving water body is located in an area with well-protected groundwater.

In addition, if a payer of the pollution charge complies with the requirements established by the Government concerning waste-water directed into water bodies before the prescribed time, or if the indicators which characterise the treatment of waste-water or the indicators which characterise waste-water are better than the indicators established by the Government, the pollution charge rates are reduced by a factor of 2.

The pollution charge rates for release of waste into the environment are increased by a factor of:

- 3 if the landfill is located within the boundaries or within three kilometers of the boundaries of a city, town or recreation area;
- 2 if the landfill does not conform to sanitary or environmental requirements.

When the requirements established under a pollution permit are violated or the requirement of having a pollution permit is disregarded, the pollution charge is paid according to the increased rate. Pollution charge rates have dramatically increased since 1993. The proposal for the period 2002-2005 follows this tendency (see figures 4 to 7 and tables 16, 17 and 18).

Figure 4. Air pollution charges in Estonia
(Estonian kroons per tonne)

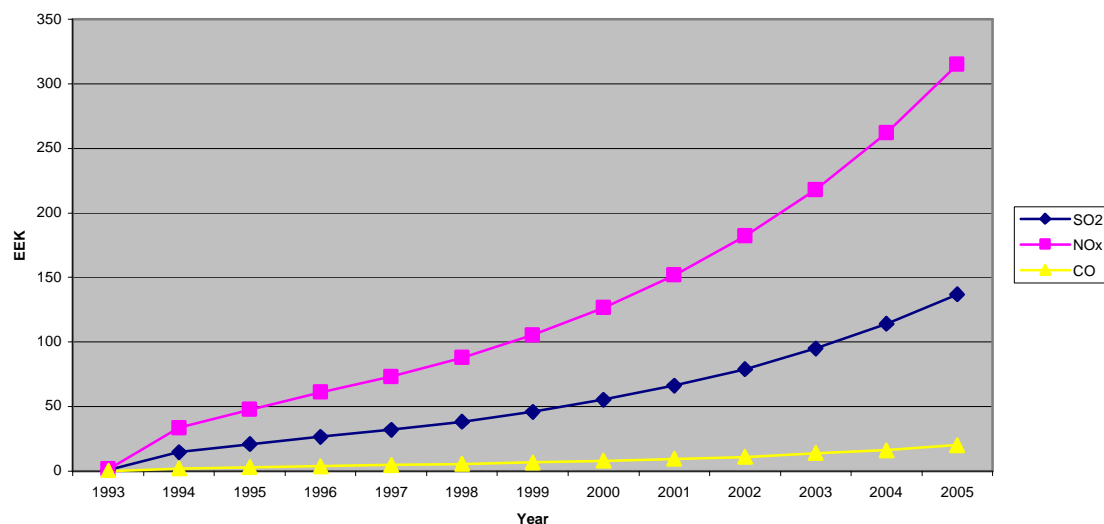


Figure 5. Water pollution charges
(in Estonian kroons per tonne)

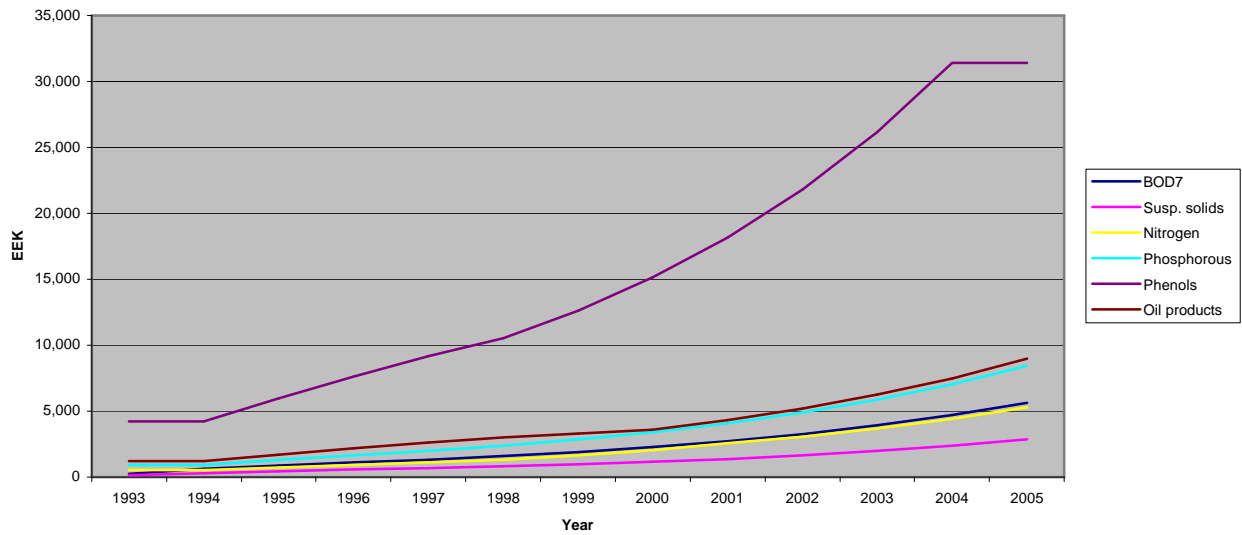


Figure 6. Waste pollution charges in Estonia
(Estonian kroons per tonne)

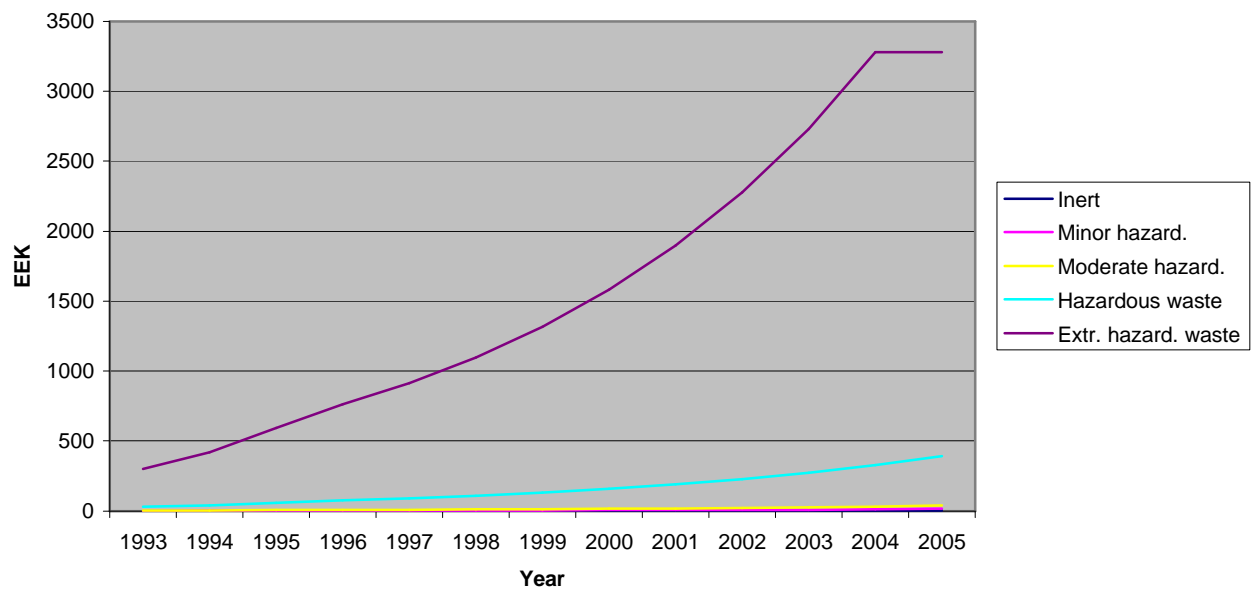


Figure 7. Waste pollution charges in Estonia (except hazardous waste)
Estonian kroons per tonne

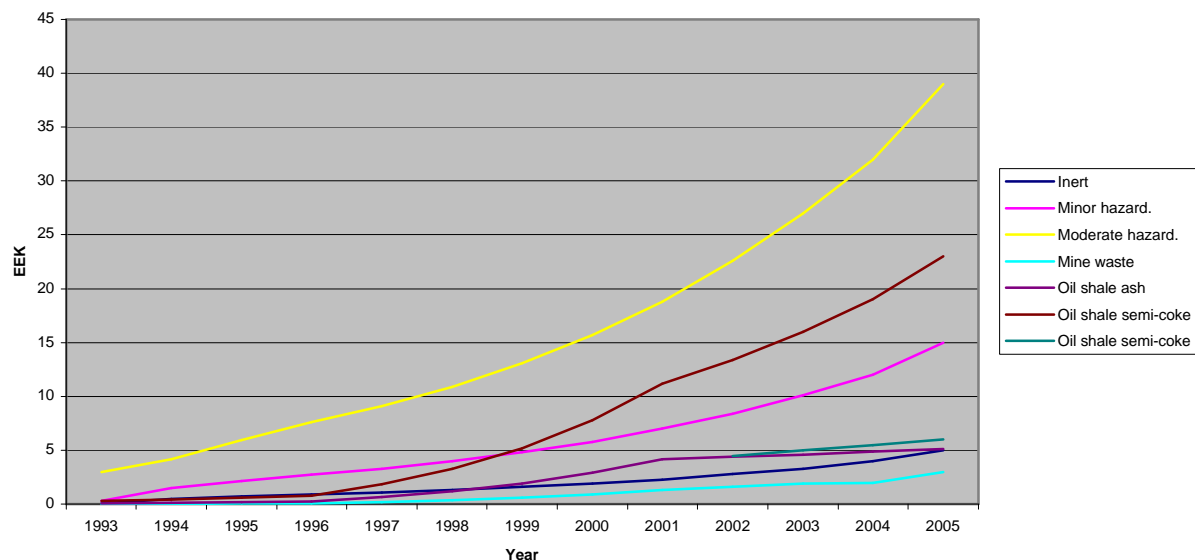


Table 16: Pollution charge rate for release of pollutants into ambient air (in EUR per tonne)

Pollutant	1999	2000	2001	2002	2003	2004	2005
	EUR	EUR	EUR	EUR	EUR	EUR	EUR
SO ₂	2.94	3.53	4.23	5.05	6.07	7.28	8.75
NO _x	6.73	8.08	9.69	11.63	13.93	16.74	20.13
CO	0.42	0.5	0.61	0.7	0.89	1.02	1.28
Particulates, except heavy metals and HM compounds	2.94	3.53	4.23	5.05	6.07	7.28	8.75
VOC, except mercaptants	2.73	3.29	3.96	11.63	13.93	16.74	20.13
Mercaptants	7,274.3	8,688.69	10,507.22	11,557.96	12,713.74	15,383.64	16,921.98
Heavy metals and HM compounds	106.71	127.51	154.23	185.05	222.11	266.52	319.81
CO ₂		0.32	0.48	0.48	0.48	0.48	0.72

Table 17: Pollution charge rate for release of pollutants into water bodies (in EUR per tonne)

Pollutant	1999	2000	2001	2002	2003	2004	2005
	EUR	EUR	EUR	EUR	EUR	EUR	EUR
BOD7	104.54	130.67	163.39	196.04	235.27	282.30	338.79
Ptot	60.83	72.97	87.54	105.05	126.07	151.25	181.53
Ntot	1.41	1.66	1.98	2.11	2.17	2.43	2.56
Suspended solids	806.52	967.80	1,161.34	1,393.61	1,672.33	2,006.77	2,006.77
Sulphates	211.25	230.42	276.49	331.76	398.15	477.76	573.29
Monophenols and diphenols	0.02	0.02	0.02	0.03	0.03	0.04	0.05
Oil products	0.00	0.00	0.00	0.00	0.00	0.00	0.00
pH	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 18: Pollution charge rate for release of waste into environment (in EUR per tonne)

Pollutant	1999	2000	2001	2002	2003	2004	2005
	EUR	EUR	EUR	EUR	EUR	EUR	EUR
Non-hazardous waste	0.10	0.12	0.15	0.18	0.21	0.26	0.32
Mine waste, including waste from mineral dressing, discharged into open dumps	0.04	0.06	0.08	0.1	0.12	0.13	0.19
Hazardous waste	0.31	0.37	0.45	0.54	0.65	0.77	0.96
Waste which contains oil, oil products, mineral oil or liquid products obtained from the thermal treatment of solid fuel or other organic matter, organic solvents, heavy metals (except mercury, cadmium, lead and arsenic), organic halogen compounds, colourants or pigments, and paint or varnish waste, infectious hospital waste or healthcare waste, and medicinal waste	0.84	1	1.2	1.44	1.73	2.04	2.49
Waste which contains wood preservatives, tar formed by the pyrolysis of solid fuels or other organic matter, pitch, asphalt, inorganic pesticides, asbestos, arsenic or lead, and waste pitch from the processing of oil shale	8.42	10.11	12.13	14.56	17.46	20.96	25.18
Waste which contains mercury, cadmium, cyanides, polychlorinated biphenyls or polychlorinated terphenyls (PCBs, PCTs) or organic pesticides	84.18	101.02	121.22	145.5	174.57	209.46	209.46
Oil shale fly ash and oil shale bottom ash	0.12	0.19	0.27	0.28	0.29	0.31	0.33
Oil shale semi-coke	0.33	0.5	0.72	0.86	1.02	1.21	1.47

Packaging Excise Tax

The excise tax on packaging is a relatively new revenue source. The relevant act of Parliament came into effect on March 1, 1997, for alcohol packaging and on December 1, 1998, for soft drinks. Excise is levied on packaging manufactured in Estonia and imported to Estonia.

Excise on imported packaging is paid according to a procedure established by the Act on Customs. Excise on packaging manufactured in Estonia is paid to the account of the local authority of the Tax Board. Collected revenue is split between the Environmental Fund (50 percent) and the general budget (50 percent). The tax must be paid quarterly. An excise declaration must be presented to the local authority of the Tax Board by the 15th day of the month following the taxation period.

Total revenue to the Environmental Fund in 1997 from packaging excise was planned to be EEK 5 million. Due to exemptions allowed under the law for packaging re-use/recycling, the actual amount received by the fund was EEK 3.6 million.

The possibility of exemption is intended to provide an incentive for packaging re-use and recycling. The exemption provisions state that: until December 31, 1998, excise tax shall not be levied on packaging of which at least 40 percent will be re-used; and, as of January 1, 1999, the tax shall not be levied on packaging of which at least 60 percent will be re-used. The exemption is granted through a certificate issued by the MoE. The certificate is issued, and the exemption it provides for is valid, on the condition that the taxpayer arranges re-use/recycling of the packaging at least to the extent stipulated by the act.

Public monitoring and pressure from civil society

Aarhus Convention

On July 6, 2001, the Estonian Parliament unanimously approved the act ratifying the Aarhus Convention. Free access to information is ensured by the Act on Public Information. For example, all action plans, general plans and other documents which may have a direct impact on the general public must be freely accessible via the internet.

Information, education, training and capacity building

Environmental education in Estonia

Tallinn Technical University

The Faculty of Construction at the Tallinn Technical University (TTU) has a programme on environmental techniques. This is quite close to a civil engineer's qualification, with an emphasis on treatment facilities. The programme includes majors on water engineering and heat/ventilation. Study includes classes on waste-water treatment, waste management, environmental protection, heat and energy management, etc. Knowledge of ecology, strategies of environmental protection and legislation, environmental impact assessment and audit are disseminated, and a brief introductory course on environmental management principles and ISO 14001 is offered.

The programme started in 1996. In 1997, 60 students were enrolled in B.S. degree studies (four years); 50 of these were financed by the state budget. At present four M.S. students are enrolled; M.S. degree studies take two years. The Faculty of Chemistry and Material Technology offers a major in chemistry and environmental protection technology. This major includes methods of cleaner technology, environmental analyses and methods, waste minimisation and management techniques, etc.

There are also additional training courses for waste-water treatment taught by the TTU Environmental Technology Center, which enrolls about 30 people annually.

Tartu University

Tartu University has an interdisciplinary B.S. environmental technology programme (three years), based at the Faculty of Physics and Chemistry. Besides traditional courses on physics and chemistry, the programme includes:

- ecology;
- environmental basics;
- geology;
- hydrogeology;
- meteorology;
- air monitoring;
- waste management;
- ecotoxicology, etc.

The M.S. on environmental technology takes two years. The interdisciplinary M.S. programme on environmental health at the Faculty of Medicine started in 2001, including disciplines such as toxicology, epidemiology, public health, environmental health, exposure assessment, risk assessment, occupational health, etc.

Turi College, part of Tartu University and located in Central Estonia, offers a programme on the basics of environmental protection. The college has been operating since 1996, and the first students were enrolled in 1997. The full course takes four years and provides a university diploma and the qualification of environmental advisor. Every year, 30 students are enrolled, financed by the State budget. The programme includes courses on environmental physics, environmental chemistry, ecology, nature geography, as well as public management, psychology, rhetoric, foreign languages, computer use, etc. The study process is designed in cycles, which ensures the continuous intense participation of students.

Turi College also offers additional training courses for environmental advisors, which have a flexible design consisting of five modules:

- I. Ecology and nature protection
- II. Living environment and its quality
- III. Environmental management in Estonia
- IV. Sustainable development
- V. Environmental policy of the European Union

Target groups for additional training are:

- Officials from municipalities and Regional Environmental Departments;
- Environmentally curious people who want to improve their knowledge.

The goals of the course are:

- to provide interdisciplinary education, enabling individuals to perform as environmental advisors or environmental managers;
- to give a systematic overview of the dynamic processes in the environment and their sources;
- to give officials and leaders the necessary knowledge to cope with environmental management and planning.

The second class graduated from Turi College in 2001. Alumnae are employed by County Environmental Departments, the Ministry of the Environment and the Environment Information Centre.

The Estonian Agricultural University, located in Tartu, has designed a programme on environmental economy, which includes classes on global ecology, waste-water treatment, waste management, environmental legislation, natural resources and nature protection.

The Tallinn Pedagogical University hosts a B.S. degree programme on environmental management at the Faculty of Mathematics and Natural Sciences.

The programme includes (among others) the following disciplines:

- Environmental Impact Assessment and environmental auditing;
- life-cycle assessment and environmental labelling;
- regional environmental management;
- principles of the environmental management of organisations;
- environmental ethics;
- waste management and waste-water treatment;
- principles of environmental legislation;
- modelling of atmospheric pollution dynamics;
- ecotoxicology and health protection;
- environmental policy of Estonia and the European Union;
- integrated pollution prevention and control;
- environmental standards;
- environmental economics;
- remediation of contaminated soil and groundwater;
- basics of environmental monitoring;
- environmental chemistry;
- European integration; etc.

The environmental management programme was started in 1999. The first class will graduate in 2002 (10 students). In 2001, 19 students were enrolled, 15 of them financed by the State budget.

Euro University, a small private university located in Tallinn, has designed a programme on environmental management. B.S. degree studies take three years. The purpose of the programme is to offer wide-range knowledge about nature protection, economy, international relations and legislation. There are classes on meteorology, environmental legislation, marine ecology, ecology, forestry, geology, mineral resources, hydrology and limnology.

Activities of business networks

Main industry associations

The basic structure of industry associations in Estonia is as follows:

- A strong Chamber of Commerce and Industry, which has a high reputation in the business society, and provides assistance in establishing foreign contacts, training and consultancy, participation in international fairs, etc.
- Separate associations and unions of different industry and business sectors, of various classes and levels.

Today, the Estonian Chamber of Commerce and Industry (ECCI) is the largest business organisation in Estonia. The ECCI's membership of over 3 000 companies includes the majority of large enterprises, which account for over 80% of Estonia's total exports (predominantly textile, metal, timber, construction and food industries).

The Estonian Confederation of Employers and Industry (ECEI) is the most representative employers' organisation in Estonia, uniting 29 branch unions and associations. Today ECEI assembles the main branch unions of industry and the service sectors, and represents Estonian employers in domestic and international relations. ECEI branch associations include the Estonian Federation of Chemical Industry, Estonian Association of Food Industry, Estonian Ship Owners Association, Estonian Federation of Engineering Industry, Estonian Woodwork Federation, Estonian Clothing and Textile Association, Estonian Business Association, Estonian Agricultural Producers' Central Union and Estonian Association of Small and Medium Enterprises. At the present time 600 companies with 200,000 employees are members of the ECEI.

The main Estonian industry associations support the introduction of EMS in their member industries. However, their main interest has been more in the promotion of environmental technologies and quality management rather than environmental management. Interest in environmental management issues is expected to rise substantially in the near future due to the constantly increasing environmental charges and fees, the setting up of different limitations and stricter regulations.

Industry associations will play an important role in the introduction and implementation of EMS in industrial society, and thus should be regarded as key partners in EMS projects.

At present there are no national business/industry associations or any other NGOs in Estonia with a key position in environmental management promotion.

Consultation capacities

Environmental consulting services in Estonia are growing rapidly. Today a number of international and local consultancy companies offer training and consulting services on the introduction and implementation of EMS and environmental auditing. There is clear competition between consultancies, although only a few have any real practical experience in the implementation of standardised management schemes.

The main consultancies in Estonia offering services related to EMS and environmental auditing issues:

- SEI-Tallinn, research institute located in Tallinn, capacity six consultants;
- E-Konsult Ltd, located in Tallinn, capacity seven consultants;
- Kobras Ltd, located in Tartu, capacity one or two consultants;
- Hendrikson & Co Ltd, located in Tartu, capacity three or four consultants;
- Maves Ltd, located in Tallinn, capacity two or three consultants;
- Det Norske Veritas, Estonian office in Tallinn;
- GR-Skoop Ltd, located in Tallinn, capacity two consultants;
- EMI-ECO, centre of development programmes, located in Tallinn, capacity two or three consultants;

- ENTEC Ltd, located in Tallinn, capacity three consultants;
- Tallmac Ltd, located in Tallinn, capacity one consultant;
- Christiansen Consulting;
- Business Grain;
- TJO Consulting;
- KPMG Estonia

There are also a number of freelance consultants offering environmental auditing, EIA or EMS-related services. Consultants capable of performing environmental audits are registered at the Technology Department of the Ministry of the Environment. There are currently about 20 trained environmental auditors in Estonia. The Board of Environmental Auditors was established in 1998.

The Ministry of the Environment licenses environmental experts capable of performing Environmental Impact Assessment. The list of EIA-licensed experts is available at the MoE website.

Institutional Arrangements

Cleaner Production/Pollution Prevention

The concept of cleaner production was introduced by UNEP Industry and Environment in 1989. Cleaner production is the continuous application of an integrated preventive environmental strategy applied to processes, products and services to increase eco-efficiency and reduce risks for humans and the environment. It applies to:

- Production processes: conserving raw materials and energy eliminating toxic raw materials, and reducing the quantity and toxicity of all emissions and wastes.
- Products: reducing negative impacts in the lifecycle of a product from raw materials extraction to ultimate disposal.
- Services: incorporating environmental concerns into design and delivery services.

Cleaner production requires changing attitudes towards environmental management, and aims to create conducive national policy environments and evaluate the technology options.

In 1994 the Cleaner Production Information Center (CPIC) was established in Estonia as a result of cooperation between the MoE and the World Environmental Center (WEC, USA). The goal of CPIC was to support the implementation of sustainable development principles by offering consultation and training services to Estonian enterprises and institutions. The project was supported by USAID. The main task was to disseminate know-how about simple and inexpensive but effective methods of sustainable resource consumption and pollution prevention.

In 1993-1995 cleaner production pilot projects were conducted in several Estonian industrial enterprises, among them:

- Norma Ltd (optimisation of galvanic process, replacing of materials);
- Nitrofert Ltd (improving fertiliser production, effective use of resources);
- Kiviter Ltd (effective use of resources);
- Rakvere Meat Processing Plant (improvement of management process, assortment of production);
- Parnu Meat Processing Plant (improvement of management process);
- Tartu Dairy (effective use of resources in milk processing);
- Nakro Ltd (effective use of resources in tannery, replacing of materials, assortment of production).

In all cases remarkable improvements were achieved:

- amounts and costs of raw materials diminished;
- income increased;
- pollution fees and penalties decreased;
- the public image of enterprises improved remarkably.

The main sources of savings were the introduction of cleaner technologies, as well as precise bookkeeping, better maintenance, elimination of leakages and a more fastidious approach to management.

Table 19 outlines the effects of the application of cleaner production principles in seven Estonian enterprises.

Table 19. Summary of cleaner production projects in Estonian enterprises

Project	Investments USD	Annual savings USD
<u>Oil-shale industry:</u> Re-use of phenol-contaminated process water saved water; need for waste-water treatment diminished	2,500	65,000
<u>Fertiliser industry:</u> Locating and eliminating leakages saved water	6,000	51,000
<u>Dairy:</u> Applying high-pressure cleansing saved water	6,200	10,300
<u>Meat industry:</u> Educating employees, applying dry-cleaning and new equipment resulted in savings in water and waste-water treatment	8,000	114,000
<u>Bensoe-acid plant:</u> Control system over vapour pressure saved energy	8,700	81,000
<u>Bensoe-acid plant:</u> Control system over vapour pressure saved energy	10,000	26,000
<u>Oil-shale industry:</u> Updated automatics increased mineral oil production	22,650	24,600

More than 20 cleaner production projects were started in Estonia by CPIC. The cost of investments was about USD 100,000, whereas annual savings resulting from these investments amounted to more than USD 500,000. In most cases the project investments were paid off in three to six months.

IPPC

On October 10, 2001, Estonian Parliament approved the Act on Integrated Pollution Prevention and Control. The act came into force on May 1, 2002, and determines activities that pose environmental risks and creates a legislative basis for integrated pollution prevention and control in order to ensure minimal environmental damages resulting from human activities. The act defines basic demands and economic spheres where IPPC permits are obligatory. Applications, issuance, alteration, enforcement and responsibility issues are also addressed.

The ministerial regulation on the operation, threshold levels and deadlines for application for IPPC permits is in full accordance with the EU IPPC Directive 96/61/EU and came into force with the IPPC act. Spheres of operation are divided into the following groups:

- production of electricity, heat and fuel;
- production and treatment of metals;
- treatment of mineral materials;

- chemical industry;
- waste management;
- cellulose, paper, textile industry and tanning;
- food industry;
- pig and poultry farms;
- other.

The introduction of IPPC in Estonia started in 1997. The Danish DEPA aid project was performed by Carl Bro International a/s with the purpose of preparing Estonia for the EU IPPC Directive between January 1998 and December 1999.

Objectives of the project were to:

- compose a draft of the IPPC Act;
- design an action plan for implementation of IPPC in Estonia;
- train officials;
- raise awareness of industry on environmental matters;
- design guidelines for issuing IPPC permits.
- Seven pilot enterprises participated in the project; county environmental departments also cooperated.

The main results of the Estonian IPPC project were the following:

- draft of the Estonian IPPC Act;
- draft of the governmental regulation on the list of IPPC enterprises and timeline of introduction for IPPC permits;
- draft of ministerial regulation, specifying IPPC permit's requirements and the application procedure;
- training of regional environmental officials about IPPC permits;
- two sample permits were composed (for galvanic enterprise Norma Ltd and furniture manufacturer Tarmeko Ltd);
- list of Estonian IPPC enterprises was compiled;
- all Estonian IPPC enterprises were informed about the coming changes;
- the IPPC implementation plan was composed with a timeline for IPPC enterprises;
- guidelines were composed for application and composition of the IPPC permits;
- three BAT descriptions were composed — for galvanic, furniture and fish processing industries;
- preliminary assessment of the investments required;
- financing opportunities were revealed;
- a website with all relevant information was constructed.

Implementation of IPPC

At present there are 141 IPPC enterprises in Estonia. The majority are located in Tallinn and Harjumaa county (30 enterprises) and in Ida-Viru county (18 enterprises). Of all IPPC enterprises, there are 35 industrial plants, 21 large combustion plants, 18 municipal landfills, 11 industrial landfills, seven hazardous waste facilities, six poultry farms and 43 pig farms. These numbers could fluctuate as facilities open or close.

By October 31, 2007, all of these firms must have an IPPC permit. Facilities which are unable to fulfill BAT requirements must submit a detailed action plan with a timeline and financing, otherwise the facility will be closed.

Cost estimate

It is estimated that the introduction of BAT in all IPPC enterprises will cost around EEK 20 billion. According to the calculations of industrial enterprises (two thirds of all IPPC enterprises), investments of around EEK 5.5 billion are required without counting waste management facilities.

Within the Ministry of the Environment two additional officials have been hired for environmental management and technology in order to cope with the upcoming workload.

Table 20: List of IPPC enterprises in Estonia by counties, as of January 23, 2000

CED	Industrial enterprises	Combust. plants	Hazardous waste	Landfills	Farms
Tallinn	8	5	3	0	0
Harju	1	1	2	1	+7
Ida Virumaa	9	4 + 3	2	15	+8
Narva	2	1		1	+1
Pärnu	3	3		1	+3
Tartu	2	4		2	
Lääne Viru	3	0		2	+3
Põlva	1	0		0	+6
Rapla	2	0		1	+2
Lääne	0	0		0	+2
Viljandi	1	0		1	
Hiiu	0	0		1	+2
Saare	1	0		1	
Jõgeva	0	0		2	
Järva	0	0		1	+2
Valga	2	0		1	+2
Võru	0	0		1	
Total	35	18 +3	7	31	38
					64 + 7

Table 21 shows the distribution of IPPC sectors in Estonia:

Table 21: Industrial enterprises requiring IPPC permit, by sector

Industrial enterprises:	35
Chemical	13
Metal	4
Paper	1
Glass	1
Cement/lime	2
Ceramics	2
Surface treatment (furniture)	4
Textile	1
Tannery	1
Food (3 fish, 2 milk, 1 meat)	6
Combustion plants	18 + 3
Boiler houses as secondary activity with a capacity of >50MW	1 at Silmet, 2 at Viru Keemia Grupp
Hazardous waste treatment	7
Landfills	31
Farms	64 pig farms (according to the Statistics Office) + 7 poultry farms (farms given with + denote poultry farms) 49 pig farms according to the Ministry of Agriculture

Remarks: Landfills: There are 69 different landfills in Estonia now under IPPC demands. A rough estimate is that about half of these will be closed before 2007.

Farms: Data about farms differ. According to the data given by the Statistics Office there are 64 pig farms with over 2,000 pigs and over 750 sows. According to the Ministry of Agriculture there are 42 such pig farms and seven poultry farms.

Environmental management systems and other voluntary approaches

Current status of environmental management

In Estonia the State Standardisation Agency is responsible for standardisation, certification and accreditation of Environmental Management Systems (EMS). However, there are no local bodies in Estonia accredited for EMS certification, so until now ISO 14001 certificates have been issued by international certification institutions. Most ISO certificates are issued by two international certification institutions: Bureau Veritas Quality International (BVQI) and Det Norske Veritas (DNV). Other companies active in this field are TUV-CERT, Lloyd's Register Quality Assurance (LRQA) and the Finnish Certification Association (SFS). BVQI, DNV and SFS have issued most of the ISO 14001 certificates in Estonia. There are local certified auditors in Estonia who already participate in the certification audits as auditors or legal experts. Through various programmes, the MoE coordinates and promotes the implementation of EMS. The MoE is also responsible for the implementation of the EU EMAS Regulation. However, the ministry has only recently started to develop a strategy for fulfilling the requirements of the EMAS Regulation. The industry department of the Ministry of Economic Affairs develops and implements industry policy, monitors industry branches and organises cooperation in innovation and technology. This department also coordinates standardisation, attestation of conformity, accreditation and metrology, and directs the operation of the National Standards Board of Estonia.

Quality management systems are rather familiar to Estonian companies — especially ISO 9001, which covered 154 enterprises in Estonia by July 2001 — but environmental management systems are not yet so widespread. As a rule of thumb, foreign companies that already have ISO 14001 EMS standards also demand that their subsidiary companies in Estonia apply for the standard. Also, the possession of the ISO 14001 certificate can be quickly turned into a marketing argument. Certificate owners usually want their suppliers to have the certificate too. The EU Eco-Management and Audit Scheme (EMAS) is less known in Estonia. The National Standards Board has translated and adopted the main standards of ISO 9000 series and ISO 14001, 14004, 14010, 14011, 14012 standards.

Several surveys indicate that stricter legislation requirements for occupational safety and chemicals safety management, together with market forces, are currently the main drivers of standardised EMS in Estonian industry. It has also been noted that while the large-scale enterprises consider environmental legislation more important than small and medium-sized enterprises, environmental authorities pay far more attention to large enterprises. General knowledge about EMS is lower among SMEs.

Industry interest in EMS is steadily growing. This trend is caused by growing demands from different areas: the market, business partners and legislation. Recently, enterprises from sectors like waste management, construction and services have shown their increased interest and started the implementation of ISO 14001 because of specific EMS requirements of public sector tenders. These companies, however, operating only on the local market, consider the EMS certificate as an advantage over competitors. Other sectors, such as chemical, electronics, furniture and forest industries, have significant potential in future development. Since they also have the highest export potential, they certainly need to meet EU standards. According to a recent survey of 27 enterprises in the Estonian food industry, six were already working on implementing EMS and 16 planned to start in the near future.

ISO 14001 certified enterprises in Estonia**As of December 10, 2001, there were 27 ISO 14001 certified enterprises in Estonia:**

Enterprise	Certification body	Year of certification	Main activity
ABB AS	BVQI	2001	Ventilation, automation, electric equipment
ABB Elekter AS	BVQI	2001	Low voltage distribution and automated switchgears
AS Baltic Color Group Tallinn	SFS	1998	Colour and varnish production
AS FKSM	BVQI	2001	Construction
AS Keskkonnaehitus	BVQI	2001	Construction
AS KOGER & PARTNERID	BVQI	2001	Construction
AS KROONPRESS	BVQI	2001	Printing services
AS KUNDA NORDIC TSEMENT	DNV	2000	Cement production
AS MERKO EHITUS	BVQI	2001	Construction
AS Rannila Profiil	DNV	2000	Steel construction materials
AS Remet	LRQA	2001	Construction
AS Teede REV-2	BVQI	2000	Road construction
AS VIA PONT	BVQI	2000	Road construction
AS VILMA	DNV	2000	Bakery and pastry
Dagöplast AS	AS Metrosert	2001	Plastic packages
Elqotec Tallinn AS	DNV	1999	Electronics manufacturing
EPEKS Tootmise AS	DNV	2000	Juice products
Eurodek Kopli Services AS	TUV	2001	Acceptance, storage and shipment of oil products
JOT Eesti OÜ	SFS	2000	Automation equipment for electronics industry
Keila Kaabel AS	LRQA	2001	Manufacture of wires & cables
Kesto AS	DNV	2000	Hazardous waste handling
Neste Eesti AS Tallinna terminal	SFS	1998	Domestic road transportation services
Optiroc AS	BVQI	2000	Production and marketing of dry mix products
Skanska EMV AS	BVQI	2001	Construction
TNT Express Worldwide Eesti AS	LRQA	2000	Parcel service
Wecan Cables Eesti OÜ	SFS	2000	Manufacture of electronic
Weinerberger AS	BVQI	2000	Production of clay bricks

Introductory projects to EMS in Estonia

Together with international certification and consulting companies (DNV, Colder Associates, Carl Bro a/s), the Estonian Ministry of the Environment has organised several seminars and conferences on the principles of environmental management. These were carried out for officials, industry and representatives of credit banks and insurance institutions. During the seminars the principles of EMS were introduced, stressing the importance and advantages to be derived from EMS and environmental audits.

One of the first projects was carried out 1998-2000 in the food industry sector. The project was initiated by the EU Integration Unit of the Ministry of Economy (IPSO) and the Danish Agency for Trade and Industry (DATI), who also financed the project. The project was performed by the Danish consultancy firm Carl Bro a/s and Estonian partner SEI-Tallinn. The project introduced elements of environmental management in seven pilot companies, two of them (EPEKS Tootmise AS and AS Wilma) chose to implement (successfully) full EMS by ISO 14001 standards.

Later similar projects were launched for other industry sectors:

- electronics industry 2000-2001 by Danish consultants in cooperation with Estonian EMI-ECO;
- wood and furniture industry 2001-2002 by Danish Carl Bro a/s and Estonian SEI-Tallinn;
- building material industry 2001-2002 by NIRAS and Estonian counterpart AS Maves;
- chemicals industry 2001-2002 KEMI and Christiansen Consulting.

All listed projects are initiated and financed by DATI.

The building materials industry has also received assistance from the Finnish government. The “Development of Environmental Management Systems of AS Kunda Nordic Cement and Optiroc Eesti AS” was carried out by Finnish consultancy firm Enemi Ltd and Estonian EMI-ECO.

The Baltic Environmental Forum (BEF) is currently carrying out the Baltic States Regional Project on Chemicals Control (BACCON), which addresses the key requisites for chemicals management in the private sector. The Estonian IPPC project also provided assistance and training on environmental management for seven pilot companies.

Overall there is an acute need for environmental management specialists (EMS managers) to implement standardised EMS in industry. Due to the lack of information and practical experience, enterprises often need external assistance and advice in implementing EMS. Therefore there is a need for local consultants and experts. One of the reasons for this lack is the high cost of foreign certification and consultancy companies, which are too expensive for most Estonian companies. Many enterprises also need financial support to implement EMS.

In the coming years Estonian industries will develop under increased legal pressure from Estonian environmental legislation, which will force enterprises to change their practices.

Estonian environmental legislation does not contain requirements that would directly force EMS implementation on industry. The Estonian National Environmental Strategy (NES, 1998) and National Environmental Plan (NEAP, 2001) specify the trends and priority goals of environmental management and working out the legal framework, which will provide guidelines for industry environmental performance in the future. However, the full harmonisation of the EU environmental legislation and particularly the implementation of the EU Integrated Pollution Prevention and Control (IPPC) Directive will increasingly become an important driving force in the business environment. The implementation of IPPC will bring the incorporation of integrated permit requirements in the fields of environmental improvement and management measures. IPPC ideology includes Best Available Techniques (BAT), self-monitoring of emissions and a significant increase in environmental data, which should be measured, collected and reported. Therefore, EMS can be considered as an unavoidable tool for industrial enterprises to manage the environmental implications of their performance.

Twining arrangements/voluntary agreements

The Estonian Ministry of the Environment has signed voluntary environmental agreements with the following industrial enterprises:

- AS Norma (galvanic);
- AS Kunda Nordic Tsement (cement producer);
- AS Nitrofert (fertiliser producer);
- AS Elcoteq (electronic manufacturer).

These voluntary agreements represent a pivotally new approach in environmental protection. This is a trial of applying win-win solutions. Agreements do not include direct financial duties either for industry or the MoE. The MoE has promised to inform industry about upcoming changes in environmental legislation, and include industry representatives in the design of new normatives and regulations. For its part, industry has voluntarily undertaken some environmental tasks which would remarkably improve the state of environment but which are not directly required by existing environmental legislation.

For instance AS Nitrofert promised to cut its nitrogen emissions by 84.7%, sulphate emissions by 40% and decrease waste from the use of lime by 43.3%.

Many enterprises are about to start the implementation of EMS according to ISO 14000 and they are trying to determine their environmental goals via EU environmental legislation in order to ensure compatibility of their production for the EU market. This is why many industries consider it a good idea to maintain warm relations with the Ministry of the Environment.

On January 5, 2000, the minister of the environment and the executive director of Norma Ltd signed a voluntary agreement. In accordance with this agreement, Norma Ltd took responsibility for reducing emissions into the environment in the period 2000-2002. In return for contributing to the improvement of environmental quality, Norma Ltd received the right to participate in the development of legal acts that concern or influence the enterprise, receive information concerning environmental cooperation and assistance programmes as well as training activities, and receive assistance at the application for and implementation of its integrated environmental permit. Norma Ltd produces seat belts for vehicles, and has a galvanisation department which discharges emissions into both the air and water, and uses a carcinogenic compound —trichloroethene — for cleaning metal surfaces. In accordance with the agreement the use of this compound must be terminated by December 31, 2002, and the enterprise takes the responsibility to use water-based cleaning technology instead. The emission of trichloroethene into atmospheric air was already terminated in 2000. Within three years Norma will construct a pumping station for the storage of liquid chemicals and will reduce the amount of water used during the treatment of surfaces.

On May 26, 2000, a voluntary agreement was signed between AS Elcoteq and the Ministry of the Environment. Elcoteq AS promised to:

- develop EMS ISO 14001;
- disseminate their experience about the implementation of EMS to other enterprises;
- decrease the volume of dumped waste by 10 percent during 2000;
- plan and apply means to decrease atmospheric emissions;
- use resources more efficiently;
- use modern equipment.

For its part the Ministry of the Environment promised to:

- inform Elcoteq about upcoming environmental regulations and include representatives of Elcoteq in the design process if applicable;

- inform Elcoteq about possible amendments in existing environmental legislation;
- inform Elcoteq about environmental aid programmes, seminars and training programmes;
- to help Elcoteq understand environmental regulations and help in the case of environmentally-bound legal problems;
- cut pollution compensation charges according to the environmental investments undertaken by Elcoteq;
- to consult during the application process for funding of environmental improvements projects.

The Ministry of the Environment undertook no financial role in this agreement, which is valid until April 30, 2003, and can be extended.

A similar agreement was made with Kunda Nordic Cement, and included promises to decrease air emissions and purchase new cleansing equipment, while the MoE promised to invite industry representatives to training and help find funding opportunities.

Product and service chain requirements: Ecolabels

Estonian ‘Clean Environment’ eco-label



The Estonian “Clean Environment” eco-label was established through a governmental regulation from December 1997. The eco-label can be issued for products that cause less harm to the environment during their whole lifecycle than other similar products. The label cannot be given to foodstuffs and medicines, although these packagings can be labelled.

Products must meet certain target values, which are established by ministerial regulation for groups of products. The legislative basis for establishing such target values derives from the Act on Sustainable Development (1995).

Besides the “Clean Environment” eco-label there are some other environmental labels in use:s

Green Energy

The “Green Energy” environmental label indicates alternative energy, and is issued by Estonian Energy in order to develop, propagate and support non-fossil fuel energy. Environmentally aware clients may purchase “Green Energy” certificates. Energy from environment-friendly sources (in Estonia this is mainly wind and hydro-energy) is more expensive, but enables the certificate owners to use the “Green Energy” label on their products.

Öko

The “Öko” trademark was patented by the Estonian Society of Biodynamics in 1990 and is used for agricultural products. Only those products that used no artificial fertilisers, pesticides or insecticides for the last two years can

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receive the label. Only natural means are permitted for growth stimulation and pest control. At present there are about 70 registered users of 'Öko' labels in Estonia.

Eco-label “EHE”

(EHE stands for “Ehtne ja huvitav Eesti,” or “authentic and exciting Estonia.”)

The “EHE” eco-label is used to label products of eco-tourism. Tourist organisations may apply for EHE label, therefore improving their position in a rapidly developing market niche in Estonia.

Hiiumaa Green Label

The Hiiumaa Green Label (HGL) marks environmentally friendly services (e.g. dining and accommodation services) on the island of Hiiumaa. Companies applying for the HGL agree to perform according to the principles of sustainable development and propagate environmentally friendly behaviour. HGL enterprises must:

- compost food residues or send them to secondary use in farms;
- avoid unnecessary waste generation, avoid plastic and internal packages;
- save water and advertise about ways to save water;
- save electricity and advise about methods of electricity saving;
- use environmentally friendly cleansing agents and chemicals;
- prefer products made in Hiiumaa or in Estonia;
- advise about local natural monuments.

Organic farming label

More and more attention is being given to ecological farming. Out of 120 ecological farms (July 1, 1996), 56 farms have achieved certification with the “eco” label that Swedish and Finnish specialists have used in the certification and advising of ecofarms. At the present moment Estonia enjoys very good conditions for advancing ecological agriculture, as in recent years the loss of farmers’ purchasing power has brought about a decrease in agrochemical application. This trend has enhanced the natural renewal processes of the soil. Other natural and favourable preconditions are the diversity of landscapes and the mosaic structure of arable lands.

The organic farming label is issued on the basis of the Act on Organic Farming (1998) by the Ministry of Agriculture to distinguish ecologically produced food from ordinary agricultural production. The label acts as a quality guarantee. In 1999, 89 farms, two food-processing enterprises and one purveyor were certified. By area, about 4000 hectares of agricultural land was certified in 1999 (0.4% of the entire agricultural area). In 2000, 238 farmers (around 10,000 hectares) applied for the label. Training of farmers on environmental agriculture is performed mainly by non-governmental organisations (e.g. Estonian Society of Biodynamics, South-East Estonian Bios, Center of Ecological Technology, Rapina Free-educational Center, etc.). This sector has huge potential and it has been estimated that the share of organic products will grow 50-100% annually in the years ahead.

Forest Certificate

The Estonian standard was recently approved for forestry. The voluntary forestry certificate testifies that the owner has managed forest according to standard requirements in an environmentally sound way. The system is rather new for Estonia but is quickly gaining popularity.

Financial mechanisms to support environmental management

Estonian Environmental Fund/Centre for Environmental Investments

The first financial institution for environmental financing in Estonia was established at the end of 1983 by the regulation of the Council of Ministers of the USSR, as the Estonian Fund for Nature Protection and Rational Use of Nature Resources. In 1990 this was reorganised by the Government as the Estonian Environmental Fund. A further step to making the fund legally valid was the Act on the Environmental Fund passed by Parliament on January 12, 1994. The act stipulated that the fund was an extra-budgetary national/state institution operated within the Minister of the Environment. The fund operated in this form until the end of 1998. At that time the legal status of the fund contradicted the core acts of the Republic of Estonia. The scope of activities, structure and responsibilities of governing bodies, and accounting and auditing procedures was not anchored in clear, pre-existing and proven standards. The fund was dissolved in June 1999 by the parliamentary Act on the Use of Funds Received from Exploitation of the Environment (Riigi Teataja, State gazette, January 1999/54/583).

The act stipulated that the funds accruing from exploitation of natural resources, pollution of the environment and compensation of environment damage (i.e. almost all revenue sources of the fund: pollution charges and fines, water abstraction fees, mineral extraction charges, package excise, etc.), should be transferred to the State budget and allocated to a foundation. This foundation would be established under the Ministry of Finance, and the funds would be used for regenerating natural resources, preserving the state of the environment and restoration of damaged environment.

A new foundation — the Centre for Environmental Investments (CEI) — was established mid-2000. The CEI is the legal successor of the Estonian Environmental Fund. The CEI is a legal entity in private law, established under the Ministry of Finance pursuant to the Act on Foundation of and Participation in Legal Entities in Private Law.

The governing bodies of the CEI are a supervisory board and a management board. According to the articles of association, the supervisory board should have nine members: four members appointed by a resolution of Parliament, two members appointed by the Ministry of Finance and two members appointed by the Ministry of the Environment. The supervisory board members should be appointed for a term of three years. The appointing body is entitled to recall a supervisory board member.

The supervisory board members are: the minister of environment (chairman of the supervisory board), four members of Parliament, two vice-chancellors of the Ministry of Finance, the head of the Ida-Viru County Environmental Department and the director of Vilsandi National Park. The management board currently consists of one person: the managing director. As of summer 2001, there were 13 employees at the foundation: assistant managing director, finance manager, programming manager, programming specialist, three ISPA programme specialists, internal auditor, technical supervisor, lawyer and three bookkeepers.

The objective of the CEI is to finance (through loans and grants) the international, national, regional and local programmes and measures, which are in conformity with the National Environmental Strategy in the field of:

- environmental protection;
- nature conservation;
- environmental monitoring;
- development and provision of environmentally sound technologies, equipment and other technical means;
- environmental education, training and awareness-raising;
- solving other environmental problems of national and regional importance.

To date the CEI has only provided grants for the following programmes:

- water protection programme;
- waste management programme;
- air pollution control programme;

- nature protection programme;
- forestry programme;
- fishery programme;
- technology programme;
- environment education and information programme;
- earth programme;
- hunting programme;
- environmental supervision programme;
- counties programme.

Almost all of the programmes are closely linked to the Estonian Environmental Action Plan (NEAP) adopted by the Government on May 26, 1998. The Estonian NEAP is the second key step in the development and implementation of a comprehensive and consensus-based national environmental policy in Estonia following the adoption of the Estonian National Environmental Strategy (NES) in March 1997. The NEAP has been incorporated into the National Development Plan for 1999-2002 required by the pre-accession EU funding programmes. At the end of 2000/beginning of 2001 NEAP was revised; the second NEAP for 2001-2003 was approved by the Government on June 5, 2001. The revised NEAP was harmonised with the EU environmental approximation process on the basis of the National Approximation Strategy and the National Plans for the Adoption of *Acquis* (NPAA). The financial requirements for all actions included in the second NEAP for 2001-2003 are estimated at EEK 11.9 billion. Table 22 summarises the estimated financial needs according to funding sources. The share of the CEI is 4.3 percent on average for three years.

Table 22: Financial needs of NEAP for 2001-2003 (EEK million)

Source of finance	2001	2002	2003	2001-2003
State budget, of which	369,706	643,738	535,915	1,549,359
- CEI	146,174	220,086	145,395	511,655
Local budgets	175,542	281,092	281,671	738,305
Enterprises own resources	1,819,903	2,479,038	2,568,802	6,867,743
Foreign loans	69,359	95,215	50,500	215,074
Foreign aid	540,893	1,093,320	886,753	2,520,966
Others	2,890	4,324	4,223	11,437
Total estimated financial needs	2,978,293	4,596,726	4,327,864	11,902,883

Source: Estonian NEAP 2001-2003

Expenditures on environmental investments and R&D increased substantially in Estonia from 1993 to 2000, eventually reaching 1.9% of GDP (see table 23).

Table 23: Environmental investments and R&D expenditures in Estonia, 1993-2000

	1993	1994	1995	1996	1997	1998	1999	2000
Total expenditures (EEK mn, current prices)	249.9	192.2	309.4	752.2	966.6	1,020.4	1,040.6	1,610.1
Total expenditures as a % of GDP (current prices)	1.1	0.6	0.8	1.4	1.5	1.4	1.4	1.9

Source: Authors' calculations based on the Estonian Environmental Protection Expenditures Yearbook, issues 1993 to 2000; the Statistical Yearbook issues 1994 to 2001; and the Draft Public Investment Programme for 1998-2000 and 2001-2004.

To date the CEI's only revenue source has been allocations from the State budget, although the State budget receives these funds as pollution charges and fines, natural resource-use fees, package excise, hunting fees, compensation for environmental damage etc. The amount of the allocations is specified in the Act on the Use of Funds Received from the Exploitation of the Environment.

All of the CEI's resources to date have been disbursed in the form of grants. According to the decision of the CEI's supervisory board, the CEI can only provide clients with grants. The client is a person or an organisation that signs an agreement on completion of a project with a contractor, and an agreement on target financing of the project with the CEI. As a rule, the client can be a County Environmental Department, local government, management unit of nature protection area, or the Ministry of the Environment.

The share of the CEI grant extended to support an investment project cannot exceed 90 percent of the total capital cost of the project. The project sponsor is required to cover at least 10 percent of the project's total cost with own resources. Non-investment projects can receive a grant for up to 100 percent of total project costs. The fund commonly co-finances large infrastructure projects with national, municipal, enterprise resources and foreign aid. Table 24 illustrates co-financing of environmental projects included in the Public Investment Programme for 2001-2004.

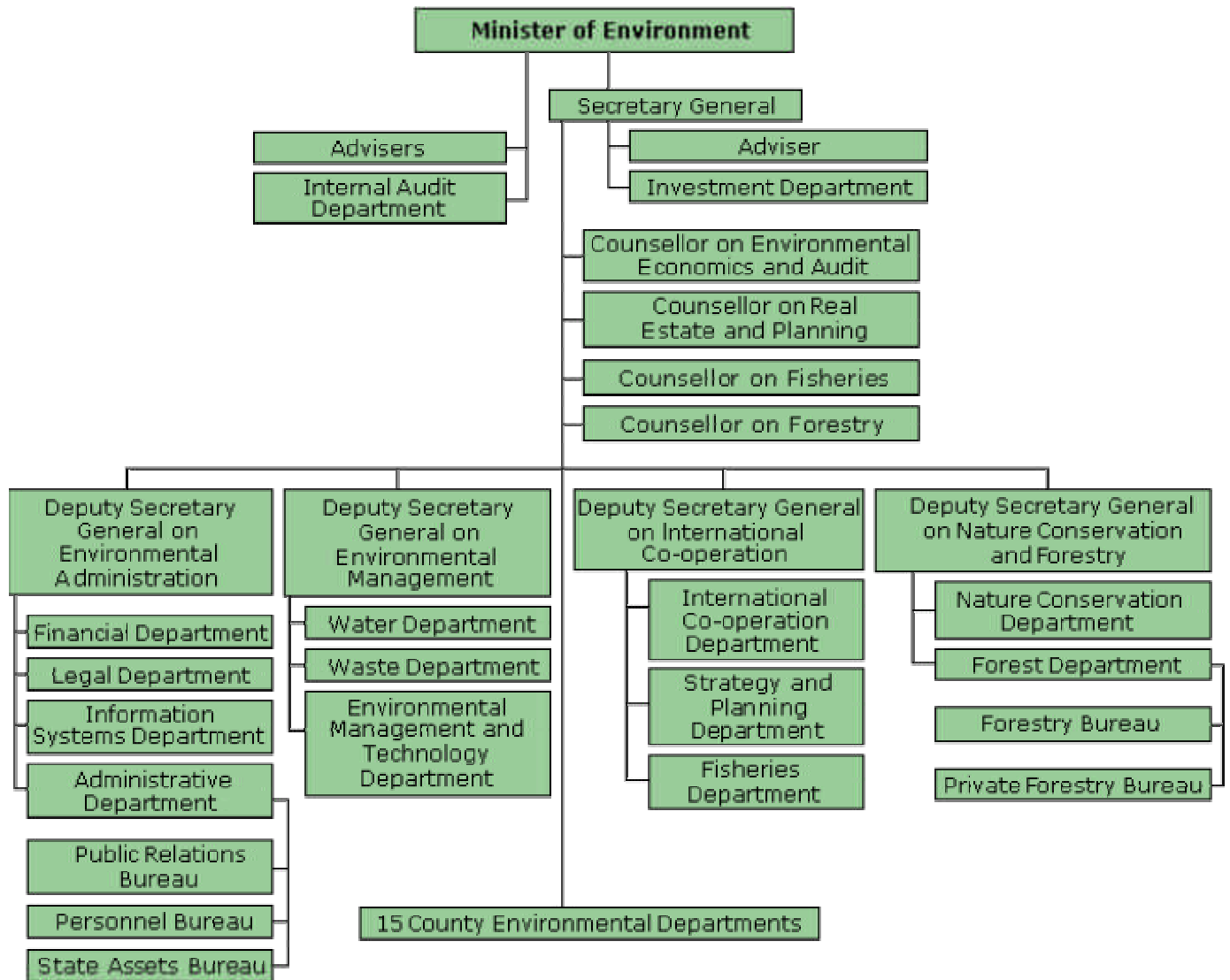
Table 24: Environmental Fund/CEI co-financing of the Public Investment Programme for 2001-2004

Source of finance	Total cost		Financed in 2001		Financed in 2000	
	EEK mn	%	EEK mn	%	EEK mn	%
State budget	987.073	16.6	411.054	25.0	77.174	16.9
Environmental Fund/CEI	442.030	7.4	158.204	9.6	37.836	8.3
Local budgets	923.971	15.6	268.304	16.3	59.782	13.1
Enterprises own resources	4.876	0.1	4.521	0.3	1.300	0.3
Foreign loans (WB, EBRD, NIB, EIB, etc.)	748.703	12.6	216.182	13.1	19.952	4.4
Foreign assistance (PHARE, LSIF, ISPA, Denmark, Finland, Sweden, etc.)	2,660.386	44.8	587.409	35.7	259.796	57.0
Amount sought	169.659	2.9	–	–	–	–
Total (53 projects)	5,936.698	100.0	1,645.674	100.0	455.840	100.0

Source: Authors' calculations based on data presented in the Draft Public Investment Programme for 2001-2004.

The future prospects of CEI are linked to broadening its role. The CEI will soon function as an implementing agency for EU financial assistance, namely ISPA. A delegation agreement between the MoE and the CEI was signed on June 5, 2001. The Government also wants to use the CEI as an intermediary for IFIs in connection with environmental loans. At the moment this possibility is under discussion between the NIB and the Ministry of Finance.

Organisational structure of the Ministry of the Environment



Annex II National Development Plan Financing In 2000-2002 (EUR '000s, 1999 Prices)

Development priorities	Total		Public sector		EU funding		Domestic funding		Private		Foreign aid		Loans	
			Total	Phare	Ispa	Sapard	Total	State	Local	Others				
Agriculture	94,753	48,157	36,411			36,411	11,746	11,650	96		46,596			
Industry and business development	47,484	44,610	16,500	16,500			28,110	28,014	96		2,874			
Tourism	4,128	4,128	2,250	2,250			1,878	881	996					
Employment and training	37,803	35,661	17,250	17,250			18,411	18,315	96		383		1,759	
Transport	190,721	188,906	42,090		42,090		146,815	119,689	7,680	19,446			1,816	57,001
Environment	180,256	137,671	55,964		55,964		81,707	39,356	42,351		9,534		33,050	23,164
Total	555,145	459,132	170,465	36,000	98,054	36,411	288,666	217,905	51,315	19,446	59,388	36,625	80,165	

* including loans (shown in column 13)

** indicates foreign aid sought

Eco-efficiency Country Review: Hungary

Prepared by: Marton Herczeg, Kalman Kosi, Laszlo Valko

Eco-efficiency

Introduction

The Department of Environmental Economics of Budapest University of Technology and Economics (BUTE) was contracted by the Regional Environmental Center for Central and Eastern Europe (REC), as the secretariat of the Aarhus Business and Environment Initiative (ABEI) for CEE, to create a country report for the project “Aarhus Business and Environment Initiative II.”

ABEI aims to achieve the tasks agreed at the conference held in Aarhus, Denmark, in 1999. This conference established a dialogue between European environment ministers and business leaders and has contributed to environmental improvements in CEE and NIS, through the promotion of public-private partnerships designed to achieve common environmental goals and to promote sustainable development.

This country report aims to provide an overview for understanding the economic, political, legal and other backgrounds of eco-efficiency and its initiatives in Hungary.

National debate on eco-efficiency

The first round-table discussion on eco-efficiency was organised in Hungary in November 2000 by the REC in association with KOVET-INEM Hungaria (the Hungarian association for environmentally aware management). The guests were important professionals from the industrial sector, the service sector, governmental and non-governmental bodies. Around 100 people were invited to the event. Unfortunately, the report of the round-table has not yet been published due to technical difficulties.

In the following year another, smaller debate was organised by the REC and BUTE. The discussion tried to focus on the “good examples” in Hungary and the barriers and obstacles to the implementation of eco-efficiency in industrial companies. One of the main barriers happened to be the nomenclature itself.

- What exactly do we mean by eco-efficiency?
- What is the difference between eco-efficiency and efficiency in general?
- How can we sort companies’ processes by the seven eco-efficiency elements defined by WBCSD?

Realising that these gaps were hindering the development of our country report, our team decided to give an overall view of all the environmental aspects in Hungary that might be connected with the concept of eco-efficiency.

Overall Political and Economic Framework

General economic context and the restructuring process

The substantial upheaval that took place in Hungary in 1989-1990 led to significant socio-economic changes. The past decade has been a critical period in terms of the following:

- development of the complex institutional mechanisms needed for a multi-party democratic system;
- formulation and enactment of a multitude of new legal instruments; and

- economic restructuring relating to the transition to a market economy, with an accompanying recession and the dramatic fall of sectors that were once considered the pillars of the Hungarian economy. This transition also includes large-scale changes in ownership in the move toward privatisation.

Some of the critical problems of transition are already over, and the economic situation has improved greatly. The recent growth in annual GDP is merely one indicator of this process. (Figures 1 and 2.) The international political and economic outlook has also changed due to political developments, in particular within Europe. Hungary has become a member of the OECD and is now one of the associated countries of the European Union (EU). Full membership in the EU is a high political priority. There have also been considerable changes in Hungary's international trade: a dramatic decrease in trading relations with other Eastern European countries; a gradual consolidation of trade within the central European region, and a rapid development of trade with the EU member states.

At the same time, the political and economic changes Hungary has experienced have meant serious problems for a large part of the population. One of the most direct and socially painful effects was caused by the gradual elimination of a large percentage of the various subventions, price distortions, and subsidies that had previously been in place. Other factors included the close-down and/or reorganisation of large factories, mines, and many firms; the privatisation process; and the need for a full-scale reorientation of agricultural production due to the above-mentioned changes in international trading relations.

One consequence of this process is that a serious restructuring in social stratification is taking place. In addition to the appearance of a new layer of entrepreneurs, there has been increasing unemployment and impoverishment among large social groups, especially in areas where heavy industry, metallurgy, mining, and other economic activities collapsed. After a brief period of rapid changes, the situation has now stabilised: the unemployment rate has stopped climbing, and the economic efficiency of small- and medium-sized enterprises (SME) is gradually improving.

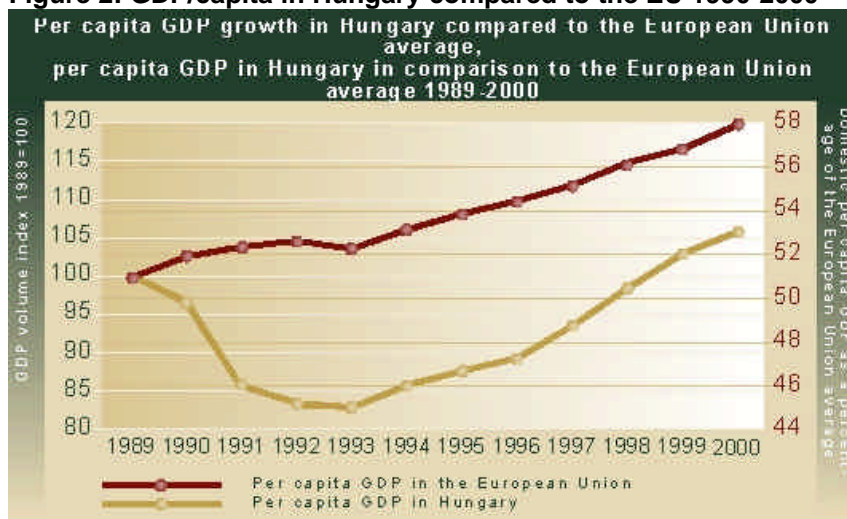
Economic growth driven by an influx of foreign capital

In 1999 the aggregate value of FDI in Hungary amounted to USD 20.4 billion, 28% of the total amount of FDI in Central and Eastern Europe. At the moment the per capita FDI is USD 1,900 in Hungary and USD 1,600 in second-place Czech Republic. This places Hungary ahead of all the other Central and Eastern European countries and brings it closer to the USD 2,500 average per capita FDI of the European Union.

Figure 1: GDP in Hungary 1990-2000



Source: Ministry of Economic Affairs

Figure 2: GDP/capita in Hungary compared to the EU 1990-2000

Source: Ministry of Economic Affairs

Impacts on the environment

These economic and social changes were accompanied by an increasing awareness of the significance of environmental quality. The legal, institutional, and financial conditions needed for environmental protection and nature conservation have improved. In spite of these developments, however, there are still huge problems in the areas of air quality, waste-water, and communal waste management throughout the country, with enormous financial resources needed in order to make the necessary investments in infrastructure and physical change.

Altogether, from the point of view of eco-efficiency the political and economic changes have had a very positive influence. (Ref. 1.)

Environmental Policy Framework in Hungary

Environmental law in Hungary

Hungarian environmental policy and legislation started to evolve in the 1970s and 1980s, when the general character of legislation was the command and control system. The main instruments were administrative prohibitions and permits, and sanctions were fines exclusively, which were generally built into the budget of companies as line items. Economic instruments were not used. Due to the inefficiency of the system, effective environmental management could not develop. The conceptual change began in the early 1990s, when politicians and government officials started to pay more attention to international developments. The main characteristic of Hungarian environmental policy in the late 1990s was the approximation of national environmental legislation and enforcement to that of the European Union.

The framework of the Hungarian environmental law

The most important piece of environmental legislation is Act No. LIII of 1995 on the General Rules of Environmental Protection (hereinafter referred to as "Act on Environment"). This is a framework environmental law, containing fundamental principles and basic legal institutions related to the environment. The fundamental principles declared by the act are: precaution, prevention, liability for damages, co-operation, access to information. The act contains the fundamental rules on the protection of the components of the environment, and lays down the basic regulations for EIA and environmental auditing. The act formulates the legal basis of the liability for environmental damages. The act sets forth the responsibilities of the government, municipalities, citizens and companies, and the basic procedures for public participation, and formulates the basic structure of environmental administration. Under the act, the National Environmental Council has been established as an advisory body to the Government. The council consists of the representatives of NGOs, the business sector, and academic experts.

The harmony of Hungarian and EU regulations

The harmonisation of Hungarian environmental regulations to EU norms will have an important role in the accession process. Since the weight of economic regulators in European regulations is growing continuously, special care must be paid to environmental charges, fees and the overall "greening" of taxation. Analyses carried out in the beginning of the 1990's showed that environmental charges and fees have become more and more important in Hungarian environmental regulation. Thus we can conclude that Hungarian environmental policy is moving closer to the European model. Furthermore, this holds true for environmental legislation and environmental policies and programmes. (Ref. 2.)

A comparison of basic environmental policies in Hungary and the EU show harmonisation in many respects. The underlying reason for this is that during the codification of the Act on Environment, the bill relied heavily on the *Fifth Action Programme of the European Union: Towards Sustainability*, published in 1992. (Ref. 2.) In spring 2001 Hungary became one of the first applicant countries to close the accession discussions with the European Union on questions relating to the environment. The overall costs of environmental development to EU levels are estimated at between HUF 2,500 billion and HUF 3,000 billion.

Environmental structures, policies, strategies and targets

The Hungarian National Environmental Programme (1996) is also based on EU recommendations. At the time of codification, Hungary was already an OECD member; furthermore, as an EU associate member, the government was preparing to start accession negotiations. However, beyond the general statements, the conformity of the two regulations is not so clear. The gradual "greening" of EU taxation is characterised by the following three features:

- amendment or abolition of distorting subsidies and tax decrees;
- restructuring of existing charges;
- introduction of new eco-taxes.

Of these three factors, since the 1990s Hungarian environmental policy has focused on regulations that favour various economic approaches. From this perspective, Hungarian policy harmonises with the "Union" part of Europe, or to be more precise the "Community" part, since this tendency has more in common with the preferences of the European Community in the 1980s.

Hungarian environmental policy has taken decisive and noteworthy steps in the fields of both regulations and environmental programmes, in order to move closer to EU and OECD definitions. So far this approach has been successful. One important step in the implementation of the EU programme is still missing: the effectiveness that makes environmental considerations an integral part of the entire economy. (Ref. 2.)

Hungarian efforts aim to generate as many resources as possible for the government through environmental fees and charges. The Ministry of the Environment (with the involvement of various environmental NGOs) redistributes

these resources. (The former Central Environmental Fund [KKA] has been replaced by the Environmental Target Fund [KAC].) This method exists in parallel with, but has no influence upon, national taxation. In today's Hungary it is unrealistic to restructure taxation along the environmental lines of Scandinavia (i.e. "eco-taxes for the environment and for better employment").

Other sectoral policies

Air

General rules on the protection of air quality are included in the Act on Environment. The basic law on the protection of air quality is Government Decree No. 21/1986. The decree defines air pollution, air pollutants, the levels of air pollution, and the main types of pollution sources (mobile and immobile sources). Based upon the decree, the subordinate legislation sets forth the (mainly emission) standards for different types of pollution sources.

The territory of the country is divided into three categories, setting different standards for air quality:

- Protected I;
- Protected II; and
- Strictly Protected.

Air quality permits are required prior to specific activities such as the incineration of industrial and municipal waste, construction and operation of petrol tanks and filling stations, use of cars, trade of certain products. Competent authorities may define individual emission standards, different from those set by law. Operators of different industries are obliged to measure and report the emissions of the industries to the competent authority.

The main sanction is an air pollution fine, but in some cases (e.g. filling stations) the operation of the polluter can be suspended. Authorities are entitled to take special measures in cases of emergency.

Hungary is a contracting party to the 1979 Geneva Convention on Trans-boundary Air Pollution and its Protocols, the 1985 Vienna Convention on Substances Depleting the Ozone Layer, the Montreal Protocol (and the London and Copenhagen Amendments), and the 1992 UN Convention on Climate Change.

Water

The fundamental rules on the protection of water are laid down by the Act on Environment. Sectoral legislation on water still reflects the concept of the socialist era, thus it is mainly a management-type regulation. The basic law is Act No. LVII of 1995 on Water Management. A series of implementing decrees regulate different water management issues, such as the construction of facilities, drinking water supply, public sewage. National standards apply to water quality issues (e.g. the quality of surface water, drinking water, and ground-water).

The most important environmental regulation on the protection of water is Decree No. 3/1984 of the National Waste Management Authority on waste-water fines. The surface and sub-surface waters of the country are divided into six categories of protection. Higher levels of protection are provided for tourist areas, drinking water bases and karstic waters. Pollutants and poisonous substances and emission standards are defined by the decree. Competent authorities are entitled to define individual emissions standards, which can either be higher or lower than those defined by law.

No special permit is required for activities that contaminate water: once the necessary permit is obtained for operation, changes can be made that result in water contamination without a special permit. Failure to comply with regulations is covered by the waste-water fine. Public administration of water management and water quality protection is shared by two organisations. Water management directorates, subordinated to the Ministry of

Transport, Communication and Water Management are responsible for management issues including water use permits, while protection issues fall within the competence of the environmental administration.

Waste

The basic rules and definitions are included in the Act on Environment and Act No. XLII of 1995 on Public Supplies. Special regulations are laid down by ministerial decrees. The emphasis of the legislation is on waste incineration, while decreasing the production of wastes and re-use or recycling are only general requirements without any special legal regulation. The most important regulation on waste management is Decree No. 1/1986 of the Ministry of Construction and the Ministry of Health related to public sanity and municipal waste.

According to the respective laws, localities are responsible for the collection and incineration of municipal waste, and local dwellers are obliged by law to use these services. Industrial waste (except for hazardous waste) can be incinerated together with municipal waste. Municipalities are competent to decide on waste disposal and incineration sites, and the conditions of public supplies connected to waste collection and incineration. The construction of municipal waste disposal sites and incinerators is subject to EIA.

Hazardous wastes

Hazardous waste issues are regulated by Government Decree No. 102/1996. Hazardous waste is defined in general as waste including certain hazardous components in a concentration which may potentially be hazardous to human life and health, flora and fauna, or any part of the environment. The decree lists the types of hazardous wastes. Requirements are laid down for each phase of the treatment of hazardous wastes. Administrative measures are regulated in details.

Producers of hazardous waste are obliged to prepare waste management plans for a three-year period, covering the prevention of the production of hazardous wastes, decreasing the quantity and hazardousness of waste, re-use and incineration.

Nuclear energy

The issues of nuclear energy are regulated comprehensively by Act No. CXVI of 1996. The act lays down the fundamental principles of the use of nuclear energy, and provides for safety requirements, disposal of nuclear waste, liability for damages, procedural rules for permitting and control, and the competence of administrative bodies.

Chemicals, industrial risks, biotechnology

Legislation related to dangerous chemical substances can be divided into three categories: hazardous wastes (as described above), poisonous substances, and pesticides. The basic rules are included in the Act on Environment. Government Decree No. 26/1985, and Ministerial Decree No. 16/1988 SZEM of the Ministry of Health regulate procedures connected to poisons. The definition of poisons covers mainly substances imposing direct risk to human health, or otherwise inflammable, explosive, or dangerous substances for the environment (the last condition is not explained exactly). The basic requirements are to avoid risks to human health and to promote the use of less dangerous substances where possible.

Pesticides are regulated by Law Decree No. 2 of 1988 and Ministerial Decree No. 5/1988 MEM of the Ministry of Agriculture. The general legal requirements are the control of pesticides, and to avoid the use of pesticides containing too much harmful substance. The protection of plants is the responsibility of agricultural producers.

Permits are required for activities connected to dangerous substances, especially their storage and trade. Packaging and labeling of substances are regulated in details by the respective decrees or standards.

Dangerous industrial activities are hardly regulated. The respective law is Act No. XXXVII of 1996 on Civil Protection, which deals mainly with natural disasters. The act also applies to emergency situations connected to industrial accidents and the storage or transport of dangerous chemical substances. However, the regulations are not detailed and the main scope of the act is the administrative competence of civil protection, and not the requirements for industrial activities.

Biotechnology is a completely new field of legislation. Certain general requirements are laid down by the Act on the Conservation of Nature, but there has been no detailed legislation passed yet. Hungary has signed the OECD documents on Good Laboratory Practices.

Noise

General rules concerning noise are laid down by the Act on Environment. Detailed regulations are in Government Decree No. 12/1983 on Protection Against Noise and Vibration. According to the decree, three categories related to protection against noise are defined: strictly protected areas, quiet areas, and noise protection zones around facilities producing high noise emissions (such as airports).

Noise emissions categories (industrial, construction, traffic) and emission standards related to four categories of areas are laid down by Ministerial Decree No. 4/1984 of the Ministry of Health.

Nature Conservation

The legislation on nature conservation refers to the general conservation of natural areas, landscapes and wild species, and the special conservation measures for protected species and natural areas, such as national parks, etc. The basic law is Act No. LIII of 1996 on the Conservation of Nature, which regulates the requirements concerning the conservation of species and natural areas, prohibitions related to them, and the competence of public administration in nature conservation issues. The main regulation on protected areas is that any activity affecting the natural conditions of the area needs prior consent from the competent authority. Endangered species are listed as protected under law, and generally all activities affecting them need a permit from the competent authorities. Hungary has signed the most important international treaties on nature conservation, including the 1971 Ramsar Convention on wetlands, the 1973 Washington Convention on international trade in endangered species, and the 1992 Rio Convention on biodiversity.

Education and information

Access to information and public participation

Access to environmental information and public participation in environmental administrative decision-making are basic principles laid down in the Act on Environment. Access to all kinds of public information is regulated by Act No. LXIII of 1992 on the protection of personal data and access to data of public interest. According to the act, state and municipal agencies are obliged to provide all kinds of information of public interest upon request. Exemptions are made regarding qualified data, such as those related to national defense or national security. Business secrecy is no exemption under law. There is no detailed "right to know" legislation, just broad legislation for state and municipal agencies.

As regards public participation, under the Act on Environment, environmental NGOs have a standing before administrative agencies and courts in environmental cases. The scope of environmental cases has not yet been clarified, and there are different judicial practices related to this issue.

Education

The Ministry of Education and the Ministry of the Environment signed an Environmental Education Cooperation Agreement in 1999. According to this agreement the two ministries cooperate to complete state duties in the field of environmental education in Hungary. The Ministry of Education shoulders a significant role in developing and promoting environmental culture and environmental education. Having a national concept processed and updated is part of the agreement and is essential for providing a basis for annual planning.

Between 3,000-4,000 students in roughly 40 secondary schools study five different branches of the environment in Hungary. (Ref. 3.)

When asked about their preferences for financial support, people put healthcare first and education second. Environmental protection took eighth place (table 1).

Table 1. Public opinion concerning the proposed ratio of financial support for various public sectors (% total expenditure)

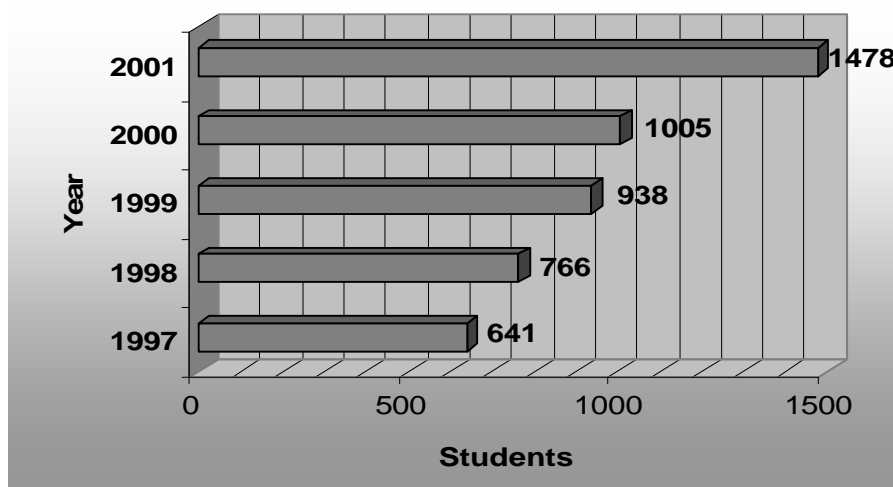
Public fields	1997	1999
Healthcare	24.7	22.1
Education	14.6	13.8
Public order and safety	13.3	12.6
Building and reconstruction of flats	8.2	12.0
Social care	12.9	10.6
Development of infrastructure and traffic	8.9	10.1
Culture, sport	5.9	6.6
Environmental protection, improvement of local environment	5.7	6.3
Support for local enterprises	3.9	3.7
Support for local NGOs	1.9	3.0
Total	100	100

Source: Poll on public education, 1999

Environmental education in higher education

The National Environmental Programme, the Hungarian Environmental and Health Action Programme and the National Environmental Education Programme, aim to educate all college and university students about the condition of the environment, the recent developments in environment protection and nature conservation (particularly in their professional fields). These programmes also promote access to up-to-date results and the use of environmental science research.

It is important to teach an “ecological approach and environmental sciences” in all professional fields of higher education in order to train professionals who will understand and comply with EU requirements. Therefore, qualification requirements have to be modified, mostly in those professional fields (art faculties, art colleges, social sciences, jurisprudence) where environmental knowledge has yet to be included in the curricula. As for building an environmental component into the curricula, all teacher-training programmes should take priority in higher education professional fields. (Ref. 3.)

Figure 3: Number of students admitted to universities and colleges for environmental professions

Environmental education in the curriculum, post-graduate education courses and support for teachers

Environmental and health education is included in all fields (curricula, programme modules, etc.) of education as it advances the knowledge and skills needed for a healthy, harmonious and constructive way of life. Post-graduate education courses are available on sustainability and environmental awareness in humanities, natural sciences, technical sciences, economic sciences and arts.

Knowledge related to sustainability should be integrated into as many subjects as possible and should be harmonised among the various subjects. There is a need for studies and teaching aids to help teachers to strengthen pupils' environmental awareness. In addition to institutions of higher education, environmental education associations and NGOs can play an important role in the organisation of post-graduate teacher courses.

Initiatives for Improving Environmental Performance

Cleaner Production in Hungary

Cleaner Production (CP) efforts in Hungary are almost entirely coordinated by two NGOs: the Hungarian Cleaner Production Centre (HCPC) and KOVET-INEM Hungaria. HCPC is a member of the international network established by UNIDO after the Rio Convention. UNIDO, UNEP, the Ministry of the Environment, Ministry of Economic Affairs and Budapest University of Economic Sciences and Public Administration (Department of Environmental Economics and Technology) took part in the implementation of this programme in Hungary. KOVET is the Hungarian delegate association of INEM (International Network for Environmental Management).

The aim of HCPC is the introduction and propagation of technologies, production processes, new methods and methodologies, which emphasize preventive measures in addition to the economic and environmental benefits. These processes reduce the environmental load by methods that mostly refer to increased productivity and economic benefits at the companies concerned (i.e. through reducing the amount of raw material usage, energy usage, and waste disposal cost).

The HCPC is a national focal point for the promotion of CP activities in Hungary. It serves as a central coordinating and catalytic clearing house determined to:

- contribute to sustainable industrial development in Hungary;
- improve the environmental performance and competitive advantage of industry by means of CP;
- increase nation-wide awareness of CP and sustainable development;
- and therefore achieve an overall reduction of environmental pollution. (Ref. 4.)

The HCPC works on a non-profit basis when assisting companies. The center provides consultancy for firms and policy makers to help them understand the concept of CP and attempt to put it into practice.

The centre intends to achieve these objectives by concentrating on activities in the following fields:

- Information systems. Building up and developing information systems about cleaner production and environmental technologies and new developments in this field. The HCPC aims to disseminate this information throughout the country.
- Education. Developing education programmes, organising conferences, training and courses in preventive environmental protection.
- Demonstration projects. Organisation and coordination of in-plant demonstration projects and cleaner production assessments, and the dissemination of the results among other companies. Special emphasis is given to solving environmental problems of SMEs. The HCPC helps SME's with consulting and advice, but financial contributions from companies is also expected.
- Environmental and industrial policy advice. Giving policy advice and preparing environmental policy papers in order to help the expansion of preventive technologies. During its operation the HCPC is guided by the principles of sustainability, preventive environmental protection and the promotion of regional approaches

Demonstration projects on Cleaner Production

Young graduates for Cleaner Production

This HCPC programme has an important role in the centre's activities, and offers opportunities for young environmental engineers. The aim of the programme is to provide a routine for young environmental specialists and to help them in finding a suitable job.

Environmental specialists who have graduated within the last three years can apply for this programme. The centre supplements the contribution of companies from its own resources. In this way HCPC also helps SMEs in employing environmental specialists. (Ref. 4.)

TisoT (POEMS) project

In 1999 a Pollution Prevention and Environmental Management Systems (POEMS, or "TisoT" in Hungarian) project was organised to assist SMEs in implementing the principles of Cleaner Production and Environmental Management Systems. (Ref. 4.)

The POEMS project is based on a series of workshops with the participation of company environmental representatives and the experts of HCPC and KOVET-INEM Hungaria. These workshops provide companies with the necessary knowledge to integrate Cleaner Production and Environmental Management Systems.

After the first meeting HCPC and KOVET experts visited participating companies in order to define the most pressing environmental problems and to explore possible solutions. These company visits, together with information derived from Cleaner Production analysis methods, were then used to give suggestions to the companies and prepare case studies for further use by the HCPC.

The first three POEMS programmes were undertaken with the participation of 27 SMEs, three of which had implemented an EMS by the end of the project, while three other companies were willing to carry on with the implementation of the system.

The best companies in the programme received a free certification audit, which was a strong incentive. Companies participating in the project were from different sectors (table 2).

Table 2: Companies taking part in POEMS projects

Company	Profile
Ajkai Elektronika Kft.	Electronic products
GEOFIL Kft.	Waste recycling
HIPP Kft.	Food industry
HTCM Kft.	Tool manufacturing
Injektor Kft.	Environmental services
Pannon-Mobil Kft.	Plastic production
Bárczy Kft.	Environmental services
Guardian Hungard Kft.	Glass production
Okker Festékház Bt.	Paint distribution
Pécsi Erőmű Rt.	Power generation
Terra-V Kft.	Environmental services
Tolna Megyei Környezetvédelmi Kft.	Environmental services
VITUKI Innosystem Kft.	Environmental services
Zalavíz Rt.	Sewage treatment
ZÁÉV Rt.	Building construction
Finomhengermű Munkás Kft.	Metallurgical products
Krems Chemie Magyar Gyanta Kft.	Chemical industry
Temperatur Kft.	Building technology

Eco-Profit Projects

Eco-Profit projects aim to provide integrated environmental technology. The objective is to strengthen both the economic situation of companies through Cleaner Production and the ecological situation of a region by involving more companies and creating a pollution prevention network. The activities within Eco-Profit are based on a very powerful three-way partnership consisting of the participating companies (industry, handicraft, trade), a consulting group and the local authorities of a city or a region. At the end of the project the best companies receive an Eco-Profit award. (Ref. 4.)

The Eco-Profit programmes are based on workshops and company visits. The topics of the workshops include: Cleaner Production and waste minimisation;

- environmental regulations;
- the establishment of an environmental programme and an environmental team;
- material flow analysis;

- energy analysis;
- waste logistics, handling of toxic substances, eco-controlling with eco-indicators;
- Environmental Management Systems;
- preparation for the final report and Eco-Profit award.

RegEM Project

The Hungarian Cleaner Production Center (HCPC), the Hungarian Association for Environmentally Aware Management (KOVET), the Belgian Association of Eco-Counsellors (ABECE) and Eco Counselling Europe has won the approval of the EU's PHARE programme. (Ref. 4.)

The programme started in January 2000 and runs until the end of 2002. The amount of assistance is HUF 50 million. The first step was the establishment of six EcoReg offices in six regions of the country. At present there are six offices in the following cities: Pécs, Debrecen, Eger, Kecskemét and Nyíregyháza.

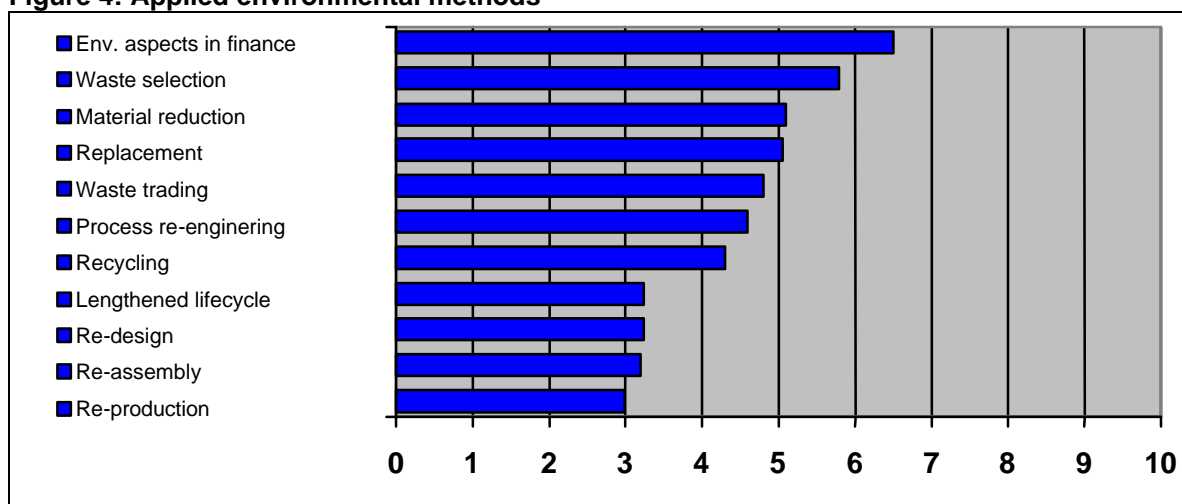
In the course of this programme these offices would like to propagate environmental tools and measures that enable enterprises to reduce their environmental impacts while improving their market position. Awareness-raising and demonstration projects will involve SMEs, who would otherwise find it difficult to acquire environmental information.

EcoReg offices aim to adjust to existing organisations, such as chambers, universities, green organisations and local governments, which already have functioning connections and acquaintances in the relevant region. The salary of the employee who coordinates the RegEM projects is sponsored by the programme.

Applied methods of cleaner production

Figure 4 shows the Cleaner Production methods applied by Hungarian companies. The figure uses a 0 to 10 scale with 0 as “not applied” and 10 as “widely and efficiently applied”

Figure 4: Applied environmental methods



Source: Environmental Management Systems in Hungary, Kósi –Háry

It can be seen that the listed methods are used at medium and low levels. It is important to take into account environmental aspects in the decision-making process for investments, but it is only relevant if the investment directly aims at a reduction of environmental impact. Waste selection is one of the most used methods in Hungary. The lower rate of recycling is an interesting result and shows that companies are probably not ready (technically) to recycle waste. Therefore the reduction of raw and production materials is a more important item. Replacement, process re-engineering and waste trade are further middle-level methods. Re-production, re-assembly, re-design and lifecycle lengthening have only small significance.

Environmental management

Auditing

The legal sources of environmental audit are the Act on Environment and Decree No. 12/1996. Environmental audit appears in two forms in Hungarian legislation; voluntary audit and obligatory audit. The main difference between the two procedures is that voluntary audit — as in western countries — is initiated by companies, whereas obligatory audit is ordered by the competent authority. The procedure covers the company's operation.

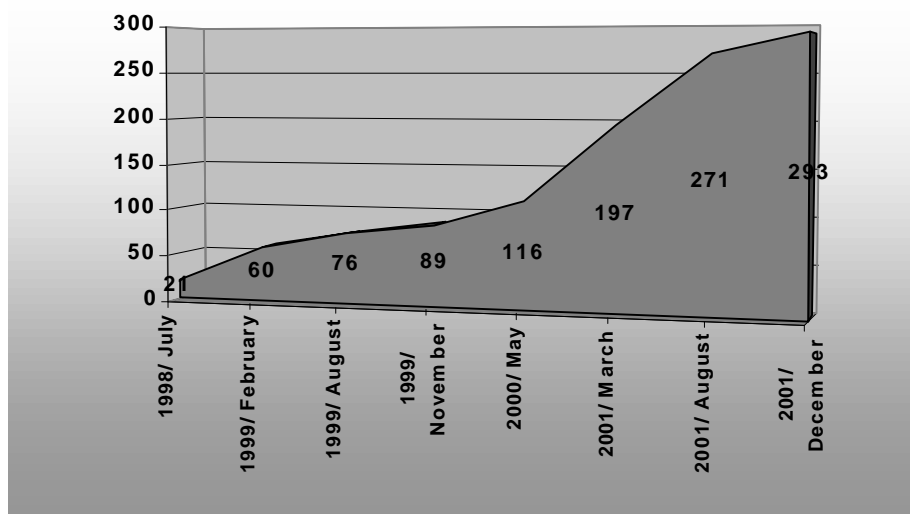
As regards environmental management, certain types of companies are required by law to employ an environmental manager.

Environmental Management System Standard ISO 14001

Since its publication in 1997, the ISO 14001 Environmental Management System standard has been successful in Hungary. There are now 293 certified companies in Hungary. Figure 5 presents the increase in certification in the previous years.

Consultation capacities

There are about 20 consulting companies offering services for establishing Environmental Management Systems and about the same number of accredited certifiers. These are mainly Hungarian subsidiaries of companies accredited abroad, mostly in Western Europe.

Figure 5: Number of ISO 14001 certificates in Hungary

Based on a summary of research, Table 3 contains the most important environmental management tools in Hungary. (Ref. 5.)

Table 3: The application of EMS tools in Hungary

Aspects	Environmental management tools
Under implementation or systematically applied at the most companies	Environmental targets Environmental programmes Environmental organisations
Occasional application at most companies	Communication with the public
Only existing at 50% of companies	Written environmental policy Training for top managers Training for employees Environmental marketing Environmental risk assessment Internal environmental communication
Established at less than 30% of companies	EMS fulfilling the standard requirements Supplier environmental evaluation

Source: Zilahy, 2000

Only three tools are widely applied among companies. Target setting is often used but usually in practice this only means measuring the impact of environmental actions. Material or energy flow monitoring takes place at almost 75 percent of the companies. Environmental programmes often exist, albeit informally. Environmental corrective actions usually provide the basis for these programmes. The environmental organisation usually sends an environmental expert to the company. The environmental department as an organisational structure is very unique. (Ref. 5.)

In general, communication with the public and social institutions is an occasional rather than continuous activity. More than half of the companies have no written environmental policy. The training of people is also a weak point and the environmental marketing, environmental risk assessment and internal communication should be improved.

About 30,000 organisations worldwide are certified under ISO 14001. So with 293 certifications Hungary ranks 40th overall, 17th per capita and second in terms of certifications/GDP. In terms of the Hungarian economy and the industrial sectors, this equates to a very good performance.

Eco-labelling

The Hungarian Eco-labelling Organisation calls for application to a permanent, voluntary and open system. The subject of the call is to obtain the right to use the environment-friendly label (figure 6) in accordance with Order No. 29/1997 (VIII.29) of the Ministry of Environment and regional policy.

Figure 6: The official Hungarian Eco-label



Applications may be submitted for any products or services that have a reduced environmental impact. Based upon the proposal of the assessment committee, the minister for the environment is entitled to make a decision on the correct use of the label. Ecological criteria are available for the following product groups:

- paper products made of waste paper and other waste material groups;
- power gas-free deodorant, hair-spray, shaving foam, air refresher;
- asbestos-free brake lining and clutch lining;
- mono-ethylene-free automotive antifreeze liquid;
- environment-friendly packaging (general conditions);
- inorganic binding materials for the construction industry with use of waste materials;
- stone building materials and building elements (general conditions);
- boiler of 5-10 litre capacity with open system;
- rapidly bio-degradable lubricants for chain-saws;
- CFC-free, low energy refrigerators and freezers;
- mono-ethylene glycol-free tank-level detecting liquid;
- car catalysts for subsequent mounting;
- electronic telephone switchboards;
- environment-friendly cleaning;
- cleaning by using textiles made of micro-fibres;
- rapidly biodegradable hydraulic fluids;
- closed, commercial refrigerators of medium internal temperature;
- energy efficient radiator valves;
- textiles of micro-fibres for cleaning;
- glass or plastic, pressurised, closed soda siphon;
- wooden noise screening walls;
- plastic drain-shaft;
- brooms made of natural raw materials;
- convection heaters (radiators, convectors);
- gas heaters (gas convectors) and related humidifier accessories;
- woollen bed clothes;
- cleaning of soil contaminated by mineral oil and its derivatives;
- bed mattresses of natural raw materials;
- admixtures of lubrication oils for decreasing friction and abrasion;
- bituminous road surface;
- porous concrete building blocks;
- compost made of communal waste and/or sewage-sludge.

Financial Mechanisms

Environmental Target Fund

The Central Environmental Protection Fund was established by Act LXXXIII of 1992 to ensure the financial means of environmental protection in Hungary. The former Central Environmental Fund [KKA] was replaced in January 2000 by the Environmental Target Fund [KAC]. This fund plays a primary role in environmental protection subsidies in Hungary.

The main objectives of the fund are to:

- encourage the development of an environmentally friendly economic structure;
- prevent environmental damage;
- eliminate the environmental damage that has already occurred;
- promote the conservation of natural values and areas;
- encourage and promote the most effective solutions;
- promote the development of public environmental awareness as well as environmental research.

The majority of the fund's revenue comes from the environmental product charge on fuels. In addition, more money comes from other fines and from a certain proportion of mining charges. The total revenue is about HUF 30-35 billion per year.

Most of the fund's revenues are spent on development to promote the protection of the environment. The remaining revenue is used to eliminate environmental damage and to finance environmental tasks of public interest (e.g. development of monitoring networks, education, research, raising awareness).

Several other regulated funds (e.g. Regional Development, Water Management, and the Land Protection Funds) also operate partly on the basis of environmental objectives. The major types of subsidies distributed by these funds are as follows:

- Direct budget subsidy: generally related to governmental decrees and the annual budget act. The budget appropriates significant sums to eliminate environmental damage at abandoned Soviet military barracks.
- Target subsidies: The central budget covers 30-50 percent of certain investments of municipalities. The goals include the provision of healthy drinking water, building sewers, setting up water treatment plants and communal waste landfills.
- Earmarked subsidies: Local governments may apply for funding to support certain water management projects, educational and cultural investment, and for reconstruction and building facilities.
- Governmental organs carrying out privatisation may guarantee the elimination of environmental damages. The central budget provides the sources from privatisation revenues.

Széchenyi Plan

The Széchenyi Plan is a medium-term economic development plan. Due to the favourable economic background — including permanent growth, gradual integration, dynamic exports, the inflow of foreign capital and macro-economic stability — the Hungarian Government set up a framework: a system of particular economic development programmes provides a framework for sector, functional and regional programmes. As a medium-term economic development plan, the Széchenyi Plan intends to:

- ensure rapid and sustainable economic growth;

- widen the basis of growth;
- provide for economic hotspots;
- provide for integration into Europe;
- mobilise domestic and foreign economic resources;
- create economic opportunities;
- provide social benefits; and
- react to the challenges of the new economic era.

In order to ensure rapid and sustainable economic growth, the Széchenyi Plan must facilitate the widening and deepening of the basis of economic growth according to sectors, industries and regions. The goal is to involve new sectors, business circles and regions in economic growth. For this reason the plan gives preference to the development of sectors such as tourism and R&D, in which Hungary has especially favourable endowments and promising development potential. SMEs are given support; production, innovation and information connections with modern, export-oriented large companies. Domestic SMEs are strengthened in order to extend growth into different sectors. Finally, with traffic infrastructure developments — of expressways, railways and regional airports — FDI can be directed into the less developed regions. With the implementation of independent regional development sub-programs, the Széchenyi Plan endeavours to involve every part of the country in growth.

The individual programmes of the Széchenyi Plan for 2002:

- Enterprise development programme.
- Housing programme.
- Tourism development programme.
- Regional economic development programme.
- Subsidies for active employment programme.
- Energy-efficiency programme.

Among these individual programmes we found the following programmes directly facilitating the development of eco-efficiency in Hungary:

Enterprise development programme:

- Subsidies for the implementation and certification of quality and environmental management systems.
- Subsidies for technology changes regarding the environment.

Housing programme:

- Subsidies for the energy-efficient reconstruction of houses built by industrial technologies.

Tourism development programme:

- Subsidies for developing eco-tourism and marketing for eco-tourism.

Increasing energy efficiency:

- Subsidies for improving energy efficiency at residents' houses.
- Subsidies for improving renewable energy use.
- Subsidies for improving the attitude towards energy efficiency (mainly in procurement).
- Subsidies for identifying energy losses of manufacturers and improving energy management at local authorities.
- Subsidies for improving energy efficiency at SMEs.

The plan also includes some indirect incentives towards eco-efficiency:

- Subsidies for competitive investments.
- Subsidies for developing commercial hotel rooms.
- Subsidies for implementing HACCP systems.
- Other conditions and aspects used during the evaluation of applications.

Foreign funds

PHARE Programmes

Hungary was one of the first beneficiaries of PHARE in Central and Eastern Europe. During 1990-1999 Hungary received PHARE assistance worth around EUR 1 billion (annual average EUR 100 million). From the total budget EUR 750 million had been contracted and EUR 577 million paid by January 2000.

According to the evaluations made by the EU and the Hungarian government, PHARE was successful in most fields. Until 1997 PHARE basically supported socio-economic reforms in Hungary. Priority areas of the programmes were: the privatisation process and structural changes in the economy; the development of SMEs and agriculture. Human resource development, especially higher education, also received massive support, mainly through the TEMPUS programme.

Since 1997, in accordance with the reorientation of PHARE, assistance focused on supporting the preparation for accession. Priority areas in this period included: institution building and investments for the adoption of the *acquis* (44 percent), regional development (14 percent), cross-border cooperation programmes (12 percent) and financial support for the participation in European Community programmes (10 percent).

Institution building is supported by pre-accession advisors from EU member states (i.e. twinning). In programmes between 1997 and 2000, Hungary established 30 twinning projects, with the participation of seven member states, which amounts to 25 percent of the twinning projects for all PHARE countries. Twenty-four long-term advisors already work in the Hungarian public administration, and several others will start soon.

Regional development programmes are important elements in the run-up to Hungary's EU accession, as they prepare central administration, regional and local actors for participation in the European Community's regional policy and use of Structural Funds. The weight of these programmes within the Hungarian PHARE programme has steadily increased. At present they support three selected regions out of a total seven in Hungary.

Cross-border cooperation programmes with Austria, Slovakia, Slovenia and Romania are of great importance. These contribute to the socio-economic integration of border regions.

Hungary participates actively in multi-beneficiary programmes initiated by the European Commission. Non-governmental organisations regularly submit applications and win support for numerous micro-projects in horizontal programmes.

ISPA (Instrument for Structural Policies for Pre-Accession)

The ISPA, introduced by the European Commission in 2000 as a new pre-accession support instrument, aims to promote the preparation for accession in the fields of infrastructure and environment. The goals of the programme will be implemented by development projects, which are in accordance with the mid-term strategies of the two sectors.

National coordination and programme management

In Hungary the minister without portfolio (responsible for the PHARE programme) is assigned as ISPA National Coordinator and Chairman of the ISPA Committee. The ISPA Committee is responsible for coordination strategic planning, programming and programme management.

Elaboration of project proposals and their implementation is the responsibility of the ministries concerned: the Ministry of Transport and Water Management, and the Ministry of the Environment. The ISPA Monitoring Committee is still being organised.

Hungary has developed a three-step selection system for ISPA priorities. The environmental strategy provides the long-term framework for sustainable development. The short-term (and periodically updated) ISPA priorities identify the key areas (sectors) of ISPA funding. Finally, a set of technical and financial project-level eligibility criteria is compiled, thus ensuring the optimum feasibility and effectiveness of ISPA projects.

According to the revised environmental policy, long-term priority areas of development are as follows:

- Application of the preventive-type environment policy tools must be strengthened.
- Greater attention must be paid to economic efficiency and environmental effectiveness.
- The scale of application of horizontal measures that are complex and system oriented, and serve more than one objective simultaneously, shall be broadened.
- The system of criteria for regional implementation of environmental policy shall be elaborated.

LIFE programmes

LIFE programmes contribute to the development, implementation and updating of European Community environment policy and environmental legislation, especially as regards the integration of environmental issues into other policies, and sustainable development in the EU.

LIFE co-finances environmental activities in EU and certain non-EU countries (i.e. those bordering the Mediterranean and the Baltic Sea, and CEE countries which have applied for EU membership). For the latter, participation in Life-Nature or Life-Environment is subject to the condition that those countries participate financially. LIFE is implemented in phases. The first phase ran from July 23, 1992 to December 31, 1995 and was granted EUR 400 million. The second phase ran from January 1, 1996 to December 31, 1999, and was granted approximately EUR 450 million. The third phase began on January 1, 2000 and will end on December 31, 2004, and has a budget of EUR 640 million. Hungary joined LIFE phase III in February 2001.

LIFE consists of three thematic components: Life-Nature, Life-Environment and Life-Third Countries.

Life-Environment

The specific objective of Life-Environment is to contribute to the development of innovative methods and techniques and to the further development of European Community environment policy.

Projects financed by Life-Environment must be:

- demonstration projects which integrate considerations relating to the environment and to sustainable development in land-use development and planning, promote the sustainable management of water or minimise the environmental impact of economic activities;
- projects which prepare new Community initiatives, instruments or legislation relating to the environment.

The maximum rate of Community co-financing is 30 percent for projects generating substantial revenue, 50 percent in other cases and 100 percent for accompanying measures.

Overview on environmental financing

The Action Plan for 2000 of the Hungarian National Environmental Programme had the following financial plan (table 4) for environmental goals and targets.

Table 4: Financial plan of the Action Plan for 2000

Areas	Sources (HUF billion)						Total	%
	Ministry of the Environment	Other ministries	Foreign sources	Local authorities	Companies			
Improving competitiveness by environmentally sound methods	3.44	2.54	1.76	0	20.00	27.74	11.31	
Regional environmental programmes	0.19	10.86	0.12	0.80	0.05	12.02	4.90	
Water-protection, environmentally sound waste-water treatment	7.60	31.46	5.52	24.02	0	68.60	27.95	
Improving communal waste management	10.37	1.46	8.18	4.22	5.25	29.48	12.02	
Improving energy and material efficiency, facilitating renewable resources	0.57	2.55	0.05	0	5.00	8.17	3.33	
Improving environmentally sound transportation	2.63	29.02	5.30	0.87	33.90	71.72	29.23	
Nature conservation	4.65	19.03	0.28	0	0.77	24.73	10.08	
Environmental health	0.15	0.16	0.08	0	0.04	0.43	0.18	
Environmental safety	0.18	2.07	0.20	0	0	2.45	1.00	
Total	29.78	99.15	21.49	29.91	65.01	245.34	100.0	
%	12.14	40.41	8.76	12.19	26.50			

Focus on eco-efficiency

Influences on environmental performance and eco-efficiency

Having outlined the structural, political, economic and legal framework for eco-efficiency in Hungary, here we will try to summarise the state of the criteria for initiatives.

Hungarian companies were asked to rank the influence of stakeholders on their environmental efforts (survey carried out by MTA, 2000). Table 5 shows the results.

Table 5: Stakeholders' influence on corporate environmental efforts

Weak influence	Moderate influence	Strong influence
Banks, insurance companies	Local authorities	Legal authorities
Public	Environmental organisations	Managers
Industrial associations		Owners
Scientific institutes		
Neighbourhood		
Employees		
Competitors		
Consumers		
Consumer's organisations		
Media		

The table shows that company leaders perceive only three main groups with real influence on their environmental efforts: legal authorities, managers and owners. These leaders do not feel any kind of (environmental) pressure at all from the majority of stakeholders.

Factors determining eco-efficiency

Eco-efficiency can be defined as follows:

$$\text{Eco-efficiency (EE)} = \text{Added Value (AV)} / \text{Effects on the Environment (AE)}$$

Estimated added value in different sectors for Hungary can be seen in Table 6.

Table 6: Added value in different sectors

	1995	2000-2004	2005-2010
GDP growth		4-5	5-6
Agriculture	7.1	6.6	5.3
Mining	0.5	0.4	0.2
Processing	22.6	27.7	29.6
Electricity, gas, heat and water supply	3.3	3.1	2.1
Building	5	6	6.8
Service	61.5	56.2	56.2
Sectors combined	100	100	100

Source: GKI, 1998

In the following sections we try to summarise the state and trends of three important elements of the eco-efficiency concept, such as energy intensity, toxic substance release and recycling. These factors have a heavy influence on the environment and eco-efficiency in Hungary as well.

Energy intensity

In 1991 Hungary started to restructure, liberalise and privatise its energy sector. Today the majority of the country's energy industry is privately owned. The downstream oil market is competitive.

Table 7: Energy demand in Hungary

	1996	2010
Electricity	2.46	2.71
Gross energy demand		
Industry	5.49	4.98
Transport	2.72	3.07
Other sectors	9.53	11.18
Electricity, gas, heat and water supply	17.74	19.23

Source: OECD, 1999

Gas and oil

The natural gas industry is now largely privatised, with foreign investment in gas distribution and supply. The Hungarian oil and gas company MOL retains a dominant position in natural gas production, imports and exports, pipeline transportation, and wholesale trading. Competition will be phased in when the country accedes to the European Union, which is expected around 2004. At present, all gas prices are regulated by the Minister of Economic Affairs, based on recommendations made by the Hungarian Energy Office (MEH), the regulatory authority for gas and electricity.

Security of gas supply is an important issue because the country has long had to rely on Russia (or the FSU and CIS) as the sole supplier, and because natural gas use amounts to almost 40 percent of Hungarian energy use, twice as much as in IEA Europe. Hungary has only been connected to the western gas grid since 1996, via Austria. Russian gas remains the cheapest option, but the new pipeline allows the exchange of “swap gas” as well as real deliveries, and the traded volumes are increasing. (Ref. 6.)

The task that lies ahead for Hungary is to adapt and prepare the gas market for competition while ensuring security of supply.

Electricity

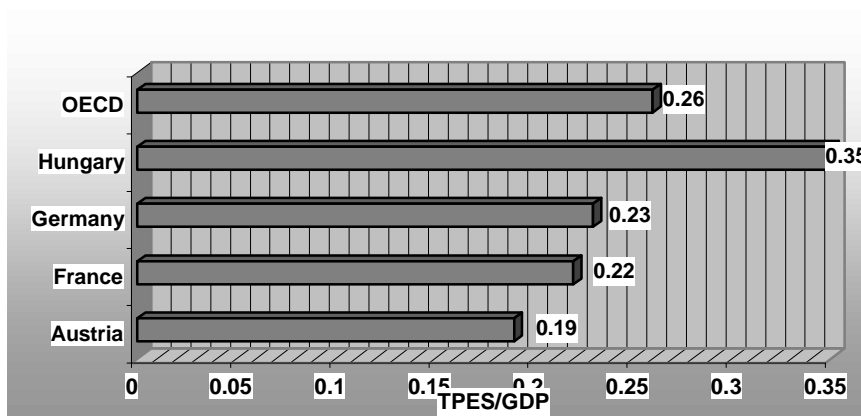
The Hungarian electricity supply industry was restructured in such a way that electricity generation is now largely separate from transmission. There are also separate distribution/retailing companies. Generation and distribution/supply are largely owned by foreign investors. At present, the *modus operandi* of the industry is based on long-term power purchase agreements. Price regulation covers most prices in the industry, and as in the gas industry, the ultimate price-setting authority lies with the Ministry of Economic Affairs. Competitive rules are to be phased in when Hungary accedes to the European Union.

The progress made in the Hungarian power industry in the past half decade is considerable. Not only was the industry restructured and privatised, but it was also brought up to the technical standards of the Western European grid, and has been running in parallel with the latter since 1995. The electricity supply industry, more than the gas industry, has been reformed to a point which is only a few steps away from competition. These steps would require introducing non-discriminatory open access to the power grids, and adaptation of the regulatory mechanisms, as in the gas industry. (Ref. 6.)

The following charts (figures 7, 8 and 9) show the energy intensity in Hungary compared to some Western European EU member states and the OECD.

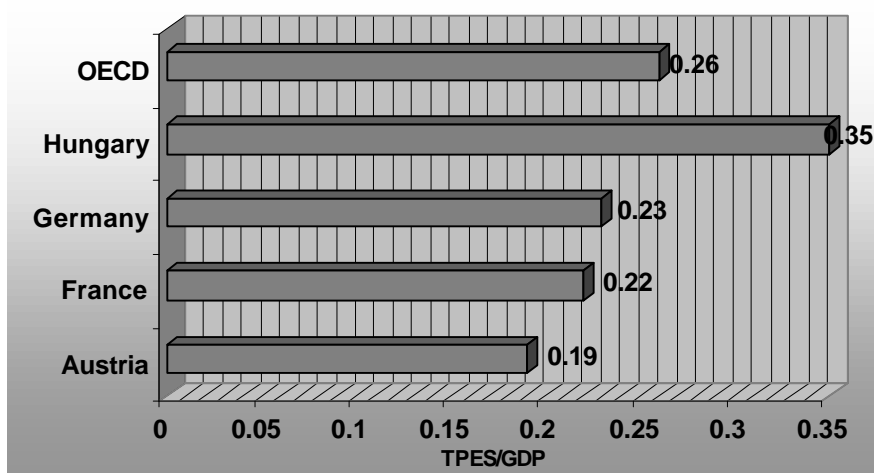
(Note: TPES — Total Primary Energy Supply.)

Energy intensity (energy use per GDP and energy use per capita) in Hungary per GDP, measured in purchasing power parities, is 70-80 percent above the corresponding figure for IEA Europe (because of the difficulties of estimating GDP correctly, the figures for energy intensity vary greatly).

Figure 7: Energy intensity in some countries

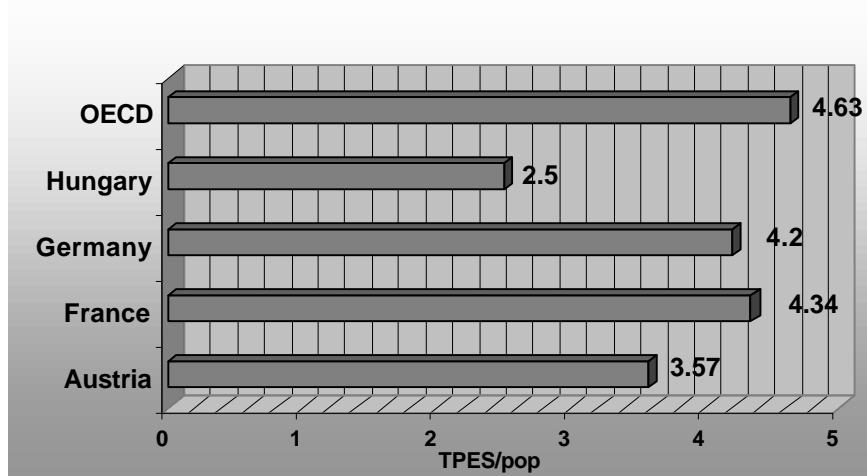
Source: IEA, Key World Energy Statistics

The IEA estimates, based on purchasing power parities, lie on the lower boundary of estimates. Other estimates yield energy intensities two-and-a-half to three times as high as in the IEA Europe region, whereas energy intensity per capita is close to or even slightly lower than IEA Europe as a whole.

Figure 8: Energy intensity in some countries by PPP

Source: IEA, Key World Energy Statistics

The reasons for this are complex and lie in the patterns of energy use and industrial production which developed in the command-and-control economy. The most obvious reason is the fact that Hungarian GDP per capita is only about one-fifth of per capita GDP in IEA Europe.

Figure 9: Energy intensity in some countries per capita

Source: IEA, Key World Energy Statistics

More precisely, artificially low real energy prices and a policy that measured industrial performance in terms of quantity rather than quality and adaptation to consumer needs led to high energy consumption and an overemphasis on the supply side in all industries, including the energy industries. This also included a propensity to preserve an energy- and resource-intensive industrial structure based on low added value. On the other hand, this system failed to deliver economic prosperity, which led to low GDP and to low energy consumption per capita.

Hungary's Total Final Consumption (TFC) has not yet reached its pre-1990 level, despite some growth in recent years. The Government does not anticipate energy demand to return to its 1987 peak before 2010, and even this is uncertain.

Dispersal of toxic substances

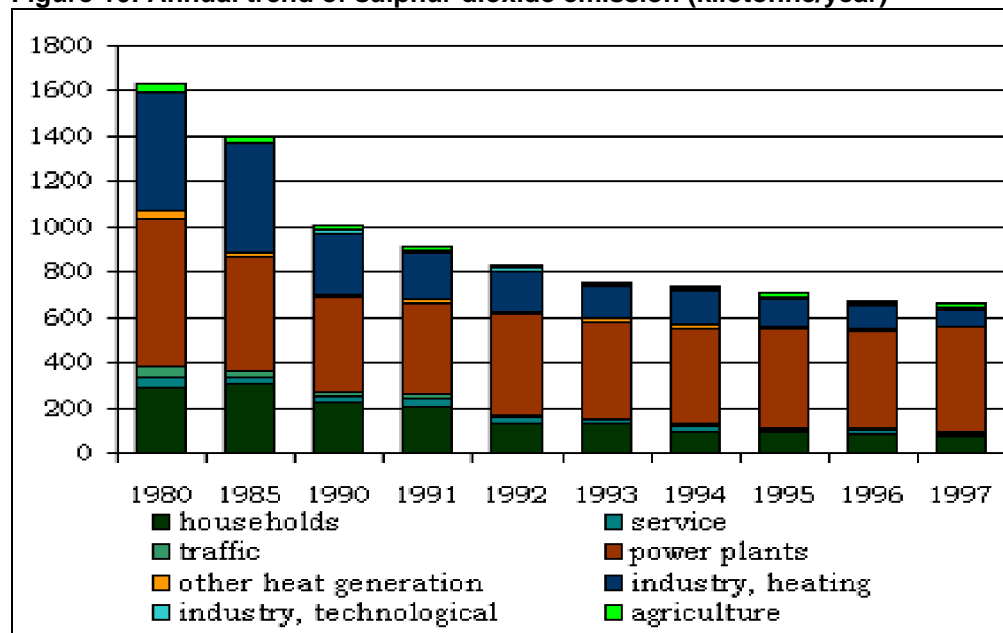
To decrease the discharged amount of toxic substances, environmental protection authorities establish and supervise emission limit values. Soon the environment overstress fee will be introduced, which will strongly reinforce the modern economic system of “the polluter pays” principle. The main discharges come from the following sources:

- Energy/industrial stokers.
- Industrial procedures.
- Traffic (combustion engines, aeroplane turbines).
- Crafts and trades.
- Household stokers.
- Other special sources, such as: active stock-breeding and aerosol sprays using gas propellants.

Trends in emission

As an example we present (figure 10) the trend of sulphur dioxide emission. The trend is typical of other substances. (Ref. 7.)

Figure 10: Annual trend of sulphur dioxide emission (kilotonne/year)



Source: Department for Integrated Pollution Control, MERP

From the trends it is clear that there has been a long-term and constant decrease in the emission of sulphur dioxide and particulate matter, which, before 1990 was mainly the result of the following: (Ref. 7.)

- activation of a nuclear power plant, which provides 40-50 percent of the national electric power supply;
- intense gas programme;
- decrease in the sulphur content of heating and fuel oils;
- decline of coal use;
- new technologies in the field of mineral oil processing resulted in the decrease of heavy fractions, while the recovery of white products significantly increased;
- reconstruction programmes started at power plants, which led to the installation of electrofilters at all coal-burning plants.

After 1990 slightly different factors played a role in the decrease of pollutant emission:

- lower industrial energy use as a result of economic recession and structural changes;
- spread of fluid-bed burning at power plants and industrial stokes;
- installation of low nitrogen oxide emitting burners at Százhalombatta;
- installation of combined cycle gas turbines (Százhalombatta, Kelenföld; installation of further turbines is planned);
- significant rise in the price of energy carriers, thus promoting economical and rational energy use;
- spread of low energy consuming household devices (stoves, refrigerators, freezers, boilers, washing machines, etc.);
- introduction and spread of unleaded petrol and cars with catalytic converters;
- decrease in the carbon monoxide discharge of vehicles with the introduction of annual environmental protection control (green card).

The total amount of nitrogen oxide discharge derived from traffic is almost constant, although its ratio has increased. One of the greatest achievements of the past years is the significant decrease in lead emissions, which derived mainly from traffic.

Recycling

In Hungary almost 110 million tonnes of waste is produced each year. Of the total quantity, roughly 90 million tonnes per year comes from industrial, agricultural or other activities. Waste management and landfill management, as well as the legal state of these problems, have yet to be organised properly.

In terms of origin, we can identify the following groups of waste categories and generation levels: production (industrial and agricultural) waste averages 90 million tonnes per year; municipal waste accounts for four million tonnes per year (more than one square metre per capita); hospital waste generates over 15,000 tonnes per year; and municipal liquid waste accounts for 20 million cubic metres per year. (Ref. 7.)

Industrial waste

The amount of industrial waste has been decreasing since 1992. The main reason for this is the 40-45 percent decrease in construction and construction material industry production. The majority of waste — about 10.1 million tonnes per year — is not hazardous. Of this amount, 0.7 million tonnes per year are utilised within plants and 7.2 million tonnes are handed over to businesses for disposal. The rest is stored by the producers, leading to the accumulation of some 106 million tonnes of waste, of which 38 million tonnes could be utilised. (Ref. 7.)

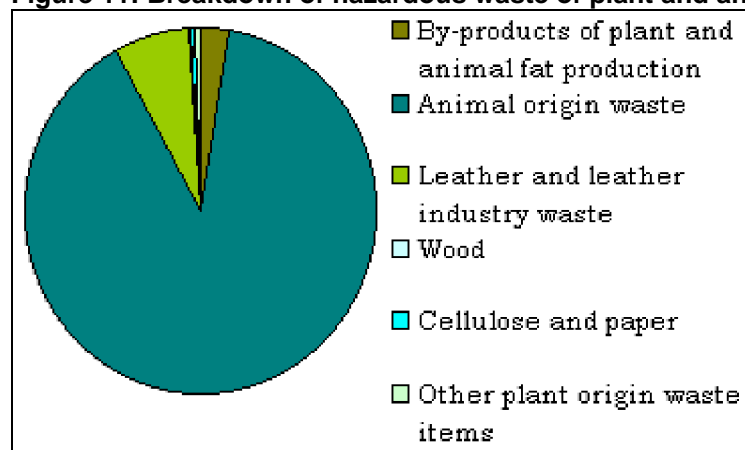
The quantity of production waste has been increased by the accumulation of mining refuse, power plant flue dust and materials from different slag heaps. Only a small portion of this mineral waste is utilised specifically for construction or soil-filling purposes.

Agricultural waste

The quantity of bio-mass produced and potentially utilisable in agriculture and forestry is about 25-28 million tonnes per year. Food industry produces an additional 5-6 million tonnes per year of partly utilisable waste. (Ref. 7.)

Some 14-15 million cubic metres of liquid manure accumulated in reservoir lakes have caused additional problems and the treatment issue has yet to be resolved. Meat products and animal debris are utilised by bio-technological and thermal methods. Figure 11 shows the breakdown of hazardous waste of plant and animal origin in 1997.

Figure 11: Breakdown of hazardous waste of plant and animal origin in 1997 (%)



Source: Statistical Yearbook 1998, CSO 1999

Municipal solid waste

The proportion of recyclable materials (such as wrapping materials) tends to increase in solid waste. Only 30 percent of the 2,700 communal landfills more or less meet the environmental standards. According to estimates the capacity of existing landfills in Hungary will be sufficient for some five years.

Construction demolition waste belongs to the non-hazardous production waste category, and is usually disposed of in landfills. According to estimates, the amount generated could be as high as 700,000-800,000 tonnes per year and only 1-2 percent of this is re-used or recycled. (Ref. 7.)

At present, waste disposal on modern landfill sites is the most common of all management possibilities. In Hungary there is a general goal to decrease the number of waste disposal sites from the existing 2,700 to 120-150. After the law on environmental protection was introduced, there were more and more rules and regulations prepared in order to decrease the amount of waste. These regulations cover several areas. Measures were taken to promote recycling and change buying habits through a production tax. Waste collection and recycling points were established. As the waste problem can be solved via public participation, the most important task is to increase the environmental awareness of the general public, especially the younger generation. Several programmes on environmental education have been started. (Ref. 8.)

Overview of eco-efficiency factors

Here we will try to summarise the available information on eco-efficiency in Hungary. Table 8 shows the present strengths and weaknesses.

Table 8: Strengths and weaknesses in eco-efficiency initiatives in Hungary

	Strengths	Weaknesses
General	Effect of EU accession on "top 300" companies	SMEs Environmental databases do not conform to EU standards Lack of influence on stakeholders
Reduced material intensity	Trends following international efforts on material intensity reduction Efficiency is present in calculations where appropriate economical indices exist Some prices include external costs	Efforts are mainly based on market trends Lower material costs cause higher waste emission
Reduced energy intensity	Changes in economic structure Signing of international convents Targets of Széchenyi Plan	Increasing traffic and transport High energy dissipation at panel block buildings Low use of renewable resources: 2.6% wood, 0.4% other Political factors
Reduced dispersion of toxic substances	Legal regulations Self-declaration of toxic release (two years ago) Decreasing total amount Limits for toxic release conform to EU standards	Lack of available data on specific substances Waste categories do not conform with EU standards No details of SME emissions and discharges
Enhanced recyclability	Successful selective waste salvage in industry on a market basis: paper, glass and metal industries (where the waste is mainly homogenous) Product charges since 1995 have caused increased amounts of package material recycling	Low level of communal selective waste collection High level of waste combustion: (e.g. 60% in Budapest) Lack of economic incentives Missing 20% can only be accomplished in the communal sector

	Strengths	Weaknesses
	The EU requires a 50% recycling level versus the present 30%	
Maximised use of renewables	Demonstration projects	Soil, roads: increasing traffic load Lack of financial background at local authorities: green projects instead of brown
Extended product life	Following international trends	Low number of products with an eco-label Low interest from consumers
Increased service intensity	Following international trends	“Business culture”

Corporate opinions on financing the improvement of the environment

Finally, we examine what organisations think about financing environmental improvement. Managers in different sectors guessed which sectors are paying the price for improving environmental performance, and which sectors are taking advantage of the process. (Table 9.)

Table 9: Financial load of improved environmental performance

Sectors “paying the price”	Sectors taking advantage of improved environmental performance
<ul style="list-style-type: none"> • Energy • Chemical industry • Metallurgy • Transportation • Light industry • Mining 	<ul style="list-style-type: none"> • Tourism • Environmental industry • Banks, insurance companies • Health insurance • Education • Local authorities • Administration

Source: MTA, 2000

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Eco-efficiency Country Review: Poland

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Eco-efficiency

Introduction

The objective of this report is to further develop the short report entitled *The Eco-efficiency Country Report* [20] prepared by the company ATMOTERM Sp. z o.o., Opole, Poland (later changed to ATMOTERM S.A.). This work is commissioned by the Regional Environment Center, in the framework of understanding the status and developments in economics and the environmental field in Poland. There is a special focus on the efficiency of industrial production, for the purpose of future actions and strategies proposed or set for Poland.

The report deals with the problems occurring during privatisation and restructuring periods, solutions adopted to handle past environmental damages and outlines decrees of environmental pollution, as well as policies, strategies and plans already executed for better efficiency of the economy in the country.

This work follows the WBCSD format of S.T.A.R. reporting: Situation, Targets, Action, Results.

According to the REC's requirements, this report includes the text from *The Eco-efficiency Country Report* [20].

“The eco-efficiency reports (after establishing a standard methodology) elaborated periodically and performed at different levels (national, regional, branch, plant) would be very interesting and advisable in order to highlight the potential, growth and main CP problems. To achieve this and prompt a discussion about eco-efficiency based on reliable facts, an adequate Environment Management Information Systems (EMIS) shall be implemented. In the opinion of the authors, lack of such systems hinders any elaboration of rational eco-efficiency reports, because of the impossibility of finding corresponding data. The existing incoherent environmental registers only serve to obfuscate recognition of pollution prevention initiatives.”

What does eco-efficiency mean?

According to the OECD definition, “eco-efficiency expresses the efficiency with which ecological resources are used to meet human needs.” Eco-efficiency can be considered as a ratio of an output divided by an input: the “output” being the value of products and services produced by a firm, a sector, or the economy as a whole, and the “input” being the sum of environmental pressures generated by the firm, sector or economy. Measuring eco-efficiency depends on identifying indicators of both input and output.

Instead, the WBCSD describes eco-efficiency as a state that can be “achieved 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.” The term “eco-efficiency,” created by combining economic and ecological efficiency, has itself become firmly entrenched in the modern business lexicon. A growing number of companies now recognise that eco-efficient practices can feed right through to the bottom-line. Simply put, “eco-efficiency means creating more goods and services while using ever-less resources and producing less waste and pollution.”

Extremely interesting is what, according to WBCSD, eco-efficiency is *not*. Eco-efficiency was never meant to be an all-inclusive panacea. Indeed, it is important to remember that eco-efficiency is:

- not a take-it-or-leave-it approach;
- not an either/or approach (but much more a “both-and-and” approach);
- not a solution to all the problems on the path to sustainability;
- not a rigid framework;
- not anyone’s single strategy;
- not a management system;
- not a certifiable standard;
- not a reporting format;
- not a “cook-book”;
- not something one can buy off the shelf;
- not an assurance against failure.

As we can see, the OECD and WBCSD definitions are slightly different and are heavily dependent on context.

The OECD definition relates only to efficiency appraisal (which can be high or low) of ecological sources utilisation, without any additional ideology.

We believe that this definition should be a little wider and include both ecological, economic (financial and technical) as well as public aspects.

According to WBCSD eco-efficiency correctly describes the high state (level) of functionality that leads towards sustainable development. Moreover eco-efficiency can be achieved only through the use of the Cleaner Production (CP) strategy. The quality/value of this state can be expressed by the equation: product or service value/environmental influence.

The generally applicator indicators for product or service value are:

- quantity of goods or services produced or provided to customers; and
- net sales.

Those relating to environmental influence in product or service creation are:

- energy consumption;
- materials consumption;
- water consumption;
- greenhouse gas emissions;
- ozone-depleting substance production and import.

The final effect should be established as a form of the “eco-efficiency profile” comprised of five elements:

Organisation profile — to provide a context for the eco-efficiency information.

- Value profile — indicators from the “value” portion of the WBCSD framework, including financial information, the quantity of products, or functional indicators for specific products.

- Environmental profile — including generally applicable environmental influence indicators as well as business specific indicators relating to product/service creation and use.
- Eco-efficiency ratios — in addition to providing in the previous two elements the basic “numerator” and “denominator” data for estimating eco-efficiency, companies may also wish to provide calculations of eco-efficiency indicators that they consider most relevant and meaningful for their business.
- Methodological information — covering the approach used to select indicators, data collection methodologies, and any limitations on use of the data.

It seems that the WBCSD methodology would be especially useful in the valuation of eco-efficiency projects.

It would be advantageous if the eco-efficiency report on the country level was developed in the same structure used for the industry level.

To describe the economic, environmental and social state, as well as trends, the WBCSD proposed a set of indicators. However, only some of them have been implemented in the collection of Polish national statistics data.

Overall economic, environmental and social state

Situation

Poland is one of the 29 OECD countries. The OECD countries are responsible for about 70 percent of global production and services. Sustainable development policy is a living idea in Poland. It is implemented both in the legal system and in organisational structure. However, there is still a lot to be done in this area in Poland.

The WBCSD developed a set of indicators that describe:

- the economic state (10 groups of economy indicators);
- the environmental state (11 groups of environment indicators and eight groups of resources indicators);
- the social state (seven groups of government indicators, nine groups of health indicators, three groups of housing indicators, 11 groups of education indicators, six groups of transportation indicators, five groups of public safety indicators and four groups of recreation indicators).

The indicators proposed by WBCSD, particularly those in economic groups, differ significantly compared to those collected by the Polish National Statistics Office.

Here we give a further description of the economic, environmental and social state in Poland, based mainly on national statistical data.

Economic state

The Republic of Poland is one of the Central and Eastern European countries. In 2000 Poland accounted for 0.2% of the world's landmass. Regarding the country area, Poland was ranked 61st in the world in 1990 and 69th in 2000, and within Europe seventh and ninth positions respectively in 1990 and 2000. Poland's share in the world's population decreased from 0.8 percent in 1990 to about 0.7 percent in 2000. In a world comparison these numbers

gave Poland 24th place in 1990 and 29th in 2000; in a European comparison, seventh and eighth place in 1990 and 2000 respectively. As regards Polish public finances, the central government budget revenue in 1995 was PLN 117.9 billion and expenditures were PLN 123.7 billion, while in 1999 revenue was PLN 201.3 billion and expenditures were PLN 206.0 billion. The result expressed in percent of gross domestic product (GDP) was -1.9 in 1995 and -0.8 in 1999. Polish GDP in 2000 (at constant prices) was 143 percent of the GDP level of 1990. During this period, GDP at purchasing power parity per capita almost doubled. Comparing the 1990 and 1999 data, it must be noted that the final consumption expenditure increased to 155 percent of the initial value. Gross capital formation reached 185 percent in the same period. The average US dollar value expressed in national currency changed from PLN 0.95 in 1990 to PLN 4.35 in 2000. As regards Polish debts, the foreign debt per capita was USD 1,293 in 1990 and rose to USD 1,404 in 1999. The international trade indicators increased significantly in the last ten years. Exports grew from USD 376 per capita in 1990 to USD 819 per capita in 2000. In the same period imports grew from USD 250 per capita to USD 1,266 per capita, marking Poland's negative balance in international trade. In the 1990s the value of production per capita grew 1.5 times. The average gross nominal wages and salaries in 1999 were 4.75 times greater than in 1990. The number of entities of the national economy recorded in the REGON register, excluding natural persons conducting economic activity and civil law partnerships, is still growing. For example, in 1995 210,000 entities ran businesses, while in 2000 this figure was more than 381,000. The economic activity of the population aged 15 and over grew from 29,106,000 in November 1995 to 30,671,000 in the fourth quarter of 2000. The economic activity rate slowed down from 58.4 percent in 1995 to 56.4 percent in 2000. The employment rate fell from 50.7 percent in 1995 to 47.4 percent in 2000. On the labour market, the number of strikes in Poland in 1990 was 250, versus 42 in 1995, 920 in 1999 and only 44 in 2000. In 1990 the registered unemployment rate was at 6.5 percent. The reported unemployment rate of 2000 was 16.0 percent. The average income per capita was PLN 610.51 in 2000 while in 1999 it was PLN 560.43. The retail price of electricity for households (all day tariffs) grew from 0.02 PLN/kWh in 1990 up to 0.3 PLN/kWh in 2000. The transport of goods by railway decreased from 83.5 billion tonnes/km in 1990 to 55.5 billion tonnes/km in 1999. The railway transport of passengers also noted a serious decrease from 50.4 billion passengers/km in 1990 to 26.2 billion passengers/km in 1998. The road transport of goods grew from 40.3 billion tonnes/km in 1990 to 69.5 billion tonnes/km in 1998 while the road transport of passengers, excluding transport by the urban road transport fleet, decreased from 46.6 billion passengers/km in 1990 to 34.0 billion passengers/km in 1998. The amounts of goods loaded and unloaded in seaports as well as air transport of goods and passengers increased in the period 1990-1999. The number of hotels and restaurants also grew.

Table 1: Indicators of Poland's economic situation (for additional indicators see Polish annex)

INDICATOR			1990	1995	1996	1997	1998	1999	2000
Area	km ²	GUS	312,685	312,685	312,685	312,685	312,685	312,685	312,685
Population	1,000 cap	GUS	38,119	38,245	38,365	38,459	38,544	38,588	38,646
Population density	cap/km ²	own calc.	121.9	122.3	122.7	123.0	123.3	123.4	123.6
GDP (constant prices)	1990=100	GUS	100.0	109.6	116.3	124.2	130.1	135.5	140.9
GVA (constant prices)	1990=100	GUS	100.0	109.6	115.4	122.8	128.6	133.3	138.4
GDP per capita (current prices)	PLN	GUS	1,470	7,984	9,395	12,144	14,316	15,913	17,742
Unemployment	% of labour force	GUS	6.3	14.9	12.3	11.2	10.6	13.9	16.1

Environmental state

The environment in Poland has been a crucial field in the national economy during the past decade. At present, an estimated 8-9 percent of total investments in Poland is strongly connected with the environment [16]. According to the Polish Central Statistics Office (GUS), the emissions of sulphur dioxide decreased from 3,210,000 tonnes in 1990 to 1,719,000 tonnes in 1999, marking a reduction of almost 50 percent, while the emissions of sulphur dioxide from industrial technology sources was down around 70 percent. Emissions of nitrogen dioxide were reduced from 1,280,000 tonnes in 1990 to 951,000 tonnes in 1999, i.e. about 25 percent. In power generating plants and industrial power plants the reduction was higher than 30 percent and in technology sources the reduction was around 45 percent. However, the reduction of total particulates emissions was significant: almost 60 percent in the same period. According to GUS statistics, the total emission of ammonia decreased by 38 percent from 550,000 to 341,000 tonnes. The reduction of total emissions of non-methane volatile organic compounds is at 7 percent.

In the analysis of the reduction of greenhouse gas emissions, the results are insignificant. The achieved level of reduction is about 16 percent, taking into account the 1990 and 1999 data. For the detailed data see Polish annex.

The table below shows the values of greenhouse gas emissions measured in metric tonnes of carbon dioxide equivalents for the period 1990-1999, as well as carbon dioxide emissions and the calculation of CO₂ emissions per capita. The value of fair earth share of CO₂ emission is 1.7 tonnes per capita. For Poland, this value is exceeded more than five times.

Table 2: Greenhouse gas emissions

INDICATOR			1990	1995	1996	1997	1998	1999	2000
Greenhouse gas emissions measured in metric tonnes of carbon dioxide equivalents	1,000 ODP tonnes	OECD, EEA	458,950	437,759	436,545	426,899	403,250	400,274	-
CO ₂ emission	1,000 tonnes	GUS	381,482	348,926	373,202	362,300	338,095	329,739	-
Population	1,000 cap	GUS	38,119	38,245	38,365	38,459	38,544	38,588	38,646
CO ₂ emissions per capita	tonnes	own calc.	10,011	9,614	9,704	9,464	9,659	9,042	-

The water required for the national economy and population decreased by about 23 percent between 1990 and 2000. The reduction of use was higher in the case of surface waters than the use of underground sources. The water use for production purposes decreased from 9,549.4hm³ to 7637.9hm³ in the same period, i.e. about 20 percent. The exploitable underground water resources grew about 14 percent. The calculated water consumption per capita was 306.86m³ in 1995 and 269.34m³ in 2000.

The industrial and municipal waste-water discharged into surface waters decreased by about 20 percent in the period 1990-2000. Discharges of municipal waste-water by sewerage systems decreased even more, by about 35 percent. More efficient use of water might be observed.

The problem of waste generation and management is still not resolved in Poland. However, the generation of industrial waste diminished by 13 percent between 1990 and 2000. The amount of utilised industrial waste grew, although municipal waste generation is still on the increase. During the last decade, the growth was about 21 percent. Of total municipal waste 96 percent remained stored without pre-selection [16].

Table 3: Total energy consumption

INDICATOR	UNIT		1990	1995	1999	2000
Global consumption of energy	TJ	GUS	4,211,005	4,170,163	3,903,255	3,753,478
Direct consumption of energy	TJ	GUS	3,021,328	3,215,080	2,999,705	2,829,505
Direct consumption of energy per capita	TJ/capita	GUS	0.079	0.083	0.078	0.073

Total energy consumption per product generally diminished (more detailed data in Annex 1).

Table 4: Total water abstraction for production purposes

INDICATOR	UNIT		1990	1995	1996	1997	1998	1999	2000
Water abstraction for production purposes	1990=100	GUS	100	93.0	87.6	85.2	85.2	88.3	89.8

Table 5: Total water abstraction per capita

INDICATOR	UNIT		1990	1995	1996	1997	1998	1999	2000
Total water abstraction per capita	1990=100	GUS	100	83.7	83.2	81.7	78.3	78.0	76.5
Underground water abstraction per capita	1990=100	GUS	100	83.8	82.0	80.3	75.6	86.1	84.9
Surface water abstraction per capita	1990=100	GUS	100	83.5	83.3	82.1	79.5	77.2	75.7

More indicators characterising the sectors of agriculture, industry, transport and energy generation are available in Polish annex. The annex also includes data concerning water consumption in various sectors, emissions of

acidifying substances, greenhouse gases, use of ozone depleting substances and wastes. Additional data on land-use change are also available.

Social state

Various parameters characterise the social state changes during the last decade. In 1990 the total population stood at 38.2 million, and grew to 38.6 million in 2000. In Poland, the ratio of women to men was 106 to 100 in 2000, only a slight change versus 1990. The natural increase slowed down from 4.1 per thousand population in 1990 to 0.3 in 2000. The number of live births decreased from 14.3 per thousand of population to 9.8 in the same period. The number of deaths changed from 10.2 per thousand in 1990 to 9.5 in 2000. This data includes infant deaths, which diminished from 19.3 per thousand in 1990 to 8.1 in 2000. The life expectancy in 1999 at “age 0” was 68.8 years for males and 77.1 for females; for “age 65”, this value was 13.3 and 17.1 respectively. The number of emigrants increased by 46 percent and the number immigrants tripled in the last decade. According to GUS calculations based on balances, the population of working age was 22 million in 1990 and 23.7 million in 2000.

The changes in health funds are difficult to describe due to reforms carried out in the healthcare system, which took place in the beginning of 1999. The total health fund was PLN 1,844.7 million in 1999.

The number of ambulances fell by almost 50 percent from 1990, while the number of medical airplanes and helicopters diminished by about 75 percent.

As regards alcohol and tobacco consumption, in the last decade drinking of pure vodka and brandy diminished by 50 percent and smoking of cigarettes diminished by 20 percent. At the same time the number of exercisers in sport clubs increased by 30 percent.

The average number of persons per room decreased from 1 in 1990 to 0.92 in 2000.

The graduates of adult education colleges grew from 71,400 in 1990 to 98,000 in 2000. The number of graduates of higher education institutions grew fivefold. However, a serious increase in the student/teacher ratio was marked in the above period: 6.27 in 1990 compared to 19.82 in 2000.

The number of passenger cars almost doubled and the number of persons per number of registered passenger cars diminished from 7.25 in 1990 to 3.87 in 2000. The number of deaths because of all accidents per 100,000 people diminished from 192.37 in 1990 to 162.86 in 2000.

Total crime grew about 40 percent while crimes against life and health more than doubled between 1990 and 2000. The number of male juvenile prisoners more than tripled in the period, while the number of female juvenile prisoners quadrupled. The number of rapes and crimes against families and custody also grew.

During the last decade, the number of theatres and music institutions increased by about 30 percent, while the number of cultural centres decreased by about 10 percent. However, the audience in cinemas diminished by about 10 percent and the same trend applies to audiences in theatres and music institutions.

Targets

Natural resources targets

The targets connected with natural resources are classified into the following categories:

- Rationalisation of water use. This area includes the short-term target (2002) of introducing water consumption factors into industrial monitoring and reporting, as well as regional and local environmental programmes. The set of medium-term targets (2010) include the implementation of water-use standards for industry, based on BAT, the elimination of underground water use for most industrial purposes, the reduction of industry water consumption index to 50 percent of the 1990 level and the implementation of water-use standards for municipalities. The area of rationalisation of water use also includes the long-term target (2025) of full implementation of sustainable water use for industrial, municipal and agricultural purposes and achievement of average OECD values for the water use indices.
- Reduction of material use and waste production. This area includes the short-term target (year 2002) of introducing material use and waste production factors into industrial monitoring, reporting and regional and local environmental programmes. Two medium-term targets (2010) are the reduction of the industry material consumption index to 50 percent of the 1990 level and the introduction of LCA methods for evaluation of products that impact the environment. The long-term target (2025) in this field is the full implementation of sustainable manufacturing as well as wide implementation of BAT standards.
- Reduction of energy use and increase of renewable energy sources contribution. This area includes the short-term target (2002) of introducing energy consumption factors into industrial monitoring, reporting and regional and local environmental programmes. The medium-term target (2010) is the reduction of energy consumption per GNP unit by 25 percent versus 2000. The set of long-term targets (2025) includes the reduction of energy consumption per GNP unit by 50 percent versus 2000, the achievement of average OECD values for the energy use indices and the achievement of a renewable sources contribution level comparable with the EU level.
- Soil protection. This area includes two targets: the short-term target of introducing regulations concerning rational use of fertilisers and the medium-term target of implementing the national soil reclamation programme (2002 and 2010 respectively).
- Enrichment and rational use of forest resources. This area includes the target of conservation of forest ecosystems in a state close to natural. No term is specified.
- Protection of mineral resources. The targets are closely connected with the reduction of material use; output of minerals will be reduced if the application of substitute methods is possible (based on waste or renewable raw materials).

Environment quality targets

The targets connected with environment quality are classified into the following categories:

- Waste management. This area includes the following long-term (2025) targets: the reconstruction of production and consumption model to improve energy and material efficiency; a solution to packaging waste problems; the development of recycling systems with the application of best available technologies; the total neutralisation of disposed hazardous wastes; and the reduction of disposed bio-degradable wastes according to EU Directive 1999/31.
- Water management. This area includes two medium-term targets (2015): the realisation of waste-water treatment plants (WWTP) construction/modernisation programmes in towns (agglomerations) with more than 10,000 inhabitants (WWTPs with a high level of biogenic substances reduction); the construction or expansion of sewage networks and WWTPs at residential areas (compact settlement) with fewer than 2000 inhabitants.

The long-term targets (2025) in the area of water management are the reduction of pollution discharge from industrial plants including salt and coal mines and the reduction of agricultural sources of nitrate discharges.

- Air quality, climate changes. This area includes a set of long-term (2025) targets: the minimisation of air emissions from all basic sources; the wide use of renewable energy sources; the elimination or reduction (according to international phase-out schedules) of production and use of all substances/products containing hazardous pollutants (heavy metals, persistent organic pollutants, controlled substances, asbestos); contribution to international research projects on air pollution assessment and best available air pollution control technologies.
- Urban stress, noise and radiation. This area includes two long-term (2025) targets: the reduction of urban noise level to 55dB at night and the establishment of stationary noise monitoring networks for all cities with more than 100,000 inhabitants, including areas impacted by the most intensive noise sources (transport, industrial, high voltage lines).
- Chemical and biological safety. This area includes a set of medium-term (2010) targets: the establishment of the national PRTR system (according to OECD guidelines) and implementation of the global chemical classification system; the establishment of the register for chemicals produced in Poland and imported to Poland; the development of public information systems on the hazards connected with the use of chemicals and GMOs; and the introduction of EIA procedure applicable to the new substances and new bio-technologies.
- Environmental incidents. This area includes a set of medium-term (2010) targets: the preparation of the emergency plans for approximately 200 industrial sites and risk assessment studies for approximately 1,000 industrial sites (according to the Seveso II directive); the preparation of local emergency plans as well as local and regional risk assessment plans; and the establishment of a central (national level) incidents analysis system. The area of environmental incidents also include the long-term (2025) target of achieving an industrial incidents index not exceeding the average OECD level.
- Biological and landscape diversity. This area includes a set of medium-term (2010) targets: the introduction of Polish protected areas to the European NATURA 2000 network; the improvement of damaged ecosystems; the use of ex-situ methods of nature protection or conservation; and the introduction of biological diversity monitoring.

Overall political and economical framework

General economic context

Poland's former political system came to an end on June 4, 1989, which marked the beginning of the transition to a democratic state and market economy. The process is still taking place. In 1990 inflation was 30 percent and GDP per habitant was USD 1,500 per year, while production slowed to below 30 percent. In 1999, after 10 years of transformation, the industry potential was more than 130 percent of the 1989 level. Annual average inflation in 2000 was 10.2 percent. Unemployment is still increasing, as is the fiscal deficit. GDP per head in purchasing power standards (PPS) was 39.2 percent of the EU average in 2000. In 1995 the figure was 34 percent. This shows sustained growth. There are significant regional disparities. Polish regional GDP data show that four eastern voivodships are, on a per capita basis, below 77 percent of the national average and that their highest unemployment rate was 24.5 percent in 2000, versus almost full employment in Warsaw. Unemployment has increased rapidly, with particularly high rates for young people (35 percent).

Table 6: Main indicators of economic structure in 2000

Main indicators of economic structure in 2000	
Average population (thousand people)	38,646
GDP per head (PPS)	8,700
% of EU average GDP per head (PPS)	39
Share of agriculture in:	
- gross value added (percent)	3.3
- employment (percent)	18.8
Investment to GDP ratio (percent)	25.3
Gross foreign debt/GDP (percent)	27.3
Export of goods and services/GDP (percent)	31.2
Stock of foreign direct investment (EUR mn)	25,956
(EUR per head)	671

Poland	1996	1997	1998	1999	2000
Real GDP growth rate (%)	6.0	6.8	4.8	4.1	4.0
Inflation rate annual average (%)	19.9	14.9	11.8	7.2	10.1
Year-end unemployment rate (%)	12.3	11.2	10.6	13.9	16.1
Current account balance (EUR mn)	-2,571	-5,065	-6,156	-11,716	-10,788
Gross foreign debt (EUR mn)	32,711	35,884	38,308	45,267	46,739

Data source: [6]

Economic reforms supporting environmental management: towards EU Accession

The tangible assets of Polish industry depreciated 70 percent in 1989. Old-style industrial processes were the main cause of waste of raw materials, energy and pollution of the environment in this period. Economic reforms and the EU accession process are the main reasons for changes in the field of environmental management. Regardless of its impact upon the environment and the economic results, industry under the old economic system existed due to the fact that the social aspects, understood mainly as securing jobs and right to work, was the decisive aspect.

Transformation to a market economy, introduction of competitiveness, the promotion of new technologies and innovation together with the process of harmonisation of Polish law with EU legislation have paved the way to better environmental management.

Economic reforms force companies to economise use of raw materials and energy, whilst prices are increasing because of the process of shaping the prices according to real calculations of costs of production. Companies are carrying out changes in the methods of management and organisation of production, as well as structural changes and the modernisation of particular branches.

The structural changes taking place in industry are a dynamic, constant process stimulated by numerous external factors. In the beginning of the 1990s, large-scale changes to the structure of industry took place. The reasons for this were economic reforms, discontinuation of large state-budget subsidies and adaptation to the free market and competitiveness.

According to Poland's Central Statistics Office, as a result of direct privatisation and liquidation, 222 new companies had been formed by the end of June 2001, including 55 with foreign investors shares and 34 with 100 percent State Treasury shares. These privatisations encompassed the properties of State-owned companies and 1,437 workers' companies using the properties of privatised or liquidated companies. The most common type of activity classification was industrial processing. The group of workers' companies is characterised by a significant share of building and trade companies. The foreign investors prefer companies producing goods from non-metal materials, food and drinks.

The processes of privatisation and foreign investments are additional factors influencing organisation and management. Companies started the implementation of ISO 9000 and ISO 14000 with the help of foreign capital.

The forthcoming EU accession has accelerated the implementation of environmental management at all levels. At present, about 3,000 enterprises in Poland have implemented norms from the ISO 9000 group, and about 300 enterprises have implemented ISO 14000 norms. Privatisation using foreign capital has taken place in 101 companies.

The restructuring process: influence on the environment

According to Nowicki and Ribbe [16], a discussion of restructuring industry in Poland mainly covers the mining, steel, iron, chemical and cement industries. Restructuring of mining resulted in 40 percent lower production of coal, due to the adaptation to the market's needs. Market forces imply a better quality of coal and thus a reduction of pollution at the source. The reduction of sulphur and stone contents has ecological impacts. The struggle for market share means producers strive for the highest calorificity of coal and the highest coal contents in coal.

In 1990 as much as 30 percent of steel was produced in archaic open-hearth furnaces, and only 8 percent using modern methods of continuous casting. It is now intended to use continuous casting for 95 percent of production. A significant reduction of nitrous oxides emissions and dust, as well as greenhouse gases will be obtained based on the 60 percent savings of energy. The greater share of better steel in products will decrease corrosion, prolong the period of products' use and decrease demand for raw materials.

The industrial branches of petro-chemicals, coke, non-organic and organic synthesis have planned a radical modernisation of plants by 2005 and adaptation to market needs. This should lead to a 50 percent reduction of emissions and a 30 percent drop in energy demand.

Foreign capital appeared in the privatisation of the cement industry, which resulted in the modernisation of technology. In 1990 about 60 percent of cement was produced using the wet method, which is energy consuming and requires large amounts of water. The emission of dust from most old cement plants was about 0.5 percent of cement production. The introduction of new technologies in some plants lowered emissions by around 90 percent.

- Investment climate: The investment climate differs in various areas in Poland. It depends not only on the local demand but also on the local law and decisions taken. Not all Polish people are sure that foreign investments are a good solution for business development. Foreign direct investment (FDI) inflows are high in Poland, and play a key role in lifting the level of technology and the competitiveness of the Polish economy. In 2000, net

inflow recorded on a cash basis came close to EUR 9,000 million. The investment ratio was 25.3 percent of GDP in 2000. State capital expenditure represented 2.9 percent of GDP in 2000.

- Foreign trade: According to GUS total foreign trade turnover in 2000 was USD 48,940 million for imports, and USD 31,651 million for exports. The balance was around USD –17,288 million. Poland’s main partner countries for imports are Germany, Russia and Italy. The main partner countries for exports are Germany, Italy and France.
- Management capacities in companies: Management capacity in companies is growing based as young educated people move into the labour market. There are also lots of opportunities to improve management practices in the form of numerous types of training courses as well as relevant literature.

Environmental Policy Framework

Environmental structures, policies, strategies and targets

The structure of environment protection in Poland includes legal, organisational and institutional elements that are strongly connected with existing policies and strategies.

Duties and competencies concern:

- central government and its regional/local representatives (legislation changes, setting standards, permitting);
- self-government regional and local authorities (environmental charges, contribution to permitting, investments);
- Environmental Inspectorate (monitoring, inspection activity);
- industry (compliance with standards and permits, self-monitoring, investments);
- National Fund (support of investments through environmental charges system);
- other financial (domestic and international) institutions;
- NGOs (public monitoring).

The most important framework of environmental activities in Poland is a national policy. Current policy is defined in The Second State Environmental Policy issued June 2000 [1]. Targets of the policy are divided into two groups:

- natural resources;
- quality of environment.

A brief description of the main targets was presented in the “targets” section of the report. Detailed aspects of sustainable development are described in The Strategy of Poland’s Sustainable Development, issued December 1999 [5]. The following instruments of sustainable development concept implementation until 2025 are taken into account:

- economic mechanisms;
- financial mechanisms, institutions and sources;
- legal system;
- education (all levels);
- research and development, technology transfer;
- information on the environment and its use in the decision-making process;

- environmental management and integrated permits system;
- international cooperation;
- indices of sustainable development;
- planning and monitoring of realization

Harmonisation with EU environmental acquis

There is a general opinion that implementation of the EU environmental *acquis* in Poland will be a difficult area of the accession process.

It is planned to transpose approximately 170 EU documents into the Polish legislative system [2]. Full implementation of 12 directives and two regulations will be very difficult or not possible before the date of accession. Poland has applied for special transition periods ranging from three to 13 years.

Negotiations concern nine subjects:

- horizontal law;
- nature conservation;
- water quality;
- reduction of industrial pollution and risk assessment;
- air quality;
- noise generated by machines and devices;
- chemicals and genetically modified organisms;
- waste management;
- nuclear safety and radiation protection.

Negotiations were provisionally finished on October 26, 2001, when the EU common position was issued.

Table 7: Accepted transition periods

EU legislation document	Transition period
Directive 1999/32/EC relating to reduction in sulphur content of certain liquid fuels	4 years
Directive 94/63/EC on the control of volatile organic compound (VOC) emissions resulting from the storage of petrol and its distribution from terminals to service stations	3 years
Directive 94/62/EC on packaging and packaging waste	5 years
Directive 1999/31/EC on waste landfill	3 years
Regulation 259/93/EEC on the supervision and control of shipments of waste within, into and out of the European Community	5 years
Directive 91/271/EEC of May 21, 1991, concerning urban wastewater treatment	6-10 years for sewage networks (depending on agglomeration quantity) 8-13 years for WWTPs
Directive 76/464/EEC on pollution caused by certain dangerous substances discharged into the aquatic environment; and related directives	5 years

Directive 96/61/EC on integrated pollution prevention and control	3 years for limited group of existing installations
Directive 97/43/Euratom of June 30, 1997, on health protection of individuals against the dangers of ionizing radiation in relation to medical exposure	4 years

Experts [2] estimate the total costs of environmental *acquis* implementation in Poland to be between PLN 75 billion and PLN 140 billion (approximately EUR 19 billion to EUR 35 billion). However, the real level of costs will depend on several factors including:

- interpretation of individual directives or regulations;
- method of implementation agreed with EU.

The costs of implementation will burden industry and the public administration. Apart from existing financial sources (National Environmental Fund, Ekofundusz, bank loans), considerable support from the EU is assumed (ISPA, SAPARD, PHARE, LSIF). Support from GEF and the World Bank is also taken into account.

There are, on the other hand, a lot of benefits connected with the implementation of the EU environmental *acquis*, including:

- improvement of environment quality;
- improvement of citizens living standard;
- reduction of pollution impact on citizens health;
- development of infrastructure that will stimulate development of regions;
- improvement of Poland's international image as a sustainable development country.

An important point is that most projects and investments undertaken to implement the EU environmental *acquis* will comply with the priorities of Polish national environmental policy.

Environmental standards and permitting

Standards

Environmental standards in Poland are represented by both environment quality and emission standards. Environment quality standards for air and open water established in the 1990s are still valid. However, according to the new Environmental Law (issued 2001) new standards will be set up to comply with EU legislation. What can be considered as specific for existing standards is a quite large number of air pollutants (173) for which air quality standards were established.

On the other hand the emission standards side of legislation is not yet extensively developed. For waste-water discharge to open water and to the soil uniform standards have been established, although these are not process specific. For air emissions there are also no standards specific to given processes, except the recent Executive Order Dz.U.2001.87.957 issued by the Ministry of the Environment on August 24, 2001. This order establishes emission standards for several processes indicating the substances for which air emissions are limited:

- combustion of fuels (SO₂, NO_x, CO, dust);

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- waste incineration (SO₂, CO, dust, TOC, HCl, HF, heavy metals, PCDD/PCDF);
- production of asbestos (dust, asbestos);
- production of titanium dioxide (dust, sulphur compounds, chlorine).

According to the new Environmental Law there will be general legislation movement towards process-specific emission standards based on European BAT documents. Environment quality standards will be modified (harmonisation with EU standards). Other environmental standards that will be implemented in Poland in connection with accession to EU can be classified as the following [6]:

- product-related standards (for instance quality of fuels, noise level limits of building equipment);
- procedures and rights standards (environmental impact assessments, access to environmental information, contribution of civil society in decision-making process);

Permitting

The existing permitting system in Poland includes requirements for air emissions, water intake, waste-water discharge, waste materials generation and disposal as well as noise emission. The thresholds are established to release small installations or enterprises from the permitting procedure. The new Environmental Law generally maintains the system, although some important new concepts and provisions are introduced:

- for installations having a significant impact on the environment, integrated permits will be applied to comply with UE IPPC directive (for new installations since 2002 and for existing installations permits will be issued in the period 2004-2010);
- the thresholds defining permitting requirements for small and medium installations/enterprises are increased.

The rules of operator application procedure and integrated permit issuing are established in the Environmental Law, including public participation in the permitting procedure and public access to all IPPC related documents. Many detailed IPPC-related regulations (executive orders) will be issued as a consequence of the new Environmental Law. These include the following:

- a list of installations and/or activities covered by integrated permits system (initial estimates show that the system will cover approximately 4,000 industrial plants);
- schedule of integrated permits issuing for existing installations;
- requirements and general rules of monitoring;
- set-up of BAT evaluation system;
- minimum BAT requirements for the installations;
- set-up of the penalty system referred to IPPC requirements.

All of the above-mentioned executive orders are at the preparation (drafting) stage.

Measurement/monitoring site-specific requirements can be included in permits (water and air emissions) by permitting authority.

Enforcement of environmental legislation

Very intensive environmental legislation changes took place in Poland in 2001. Three major acts of basic importance for the entire environment management system were issued:

- The Environmental Law Act (including public access to information — formerly the Act on Access to Information on the Environment and Its Protection and on Environmental Impact Assessments);
- The Act on Waste;

- The Water Law Act.

The list of other new (or revised) acts issued 2001 is as follows:

- The Act on Ozone-Depleting Substances;
- The Act on Packaging and Packaging Waste;
- The Act on the Selected Obligations of Waste Producers and the Product and Deposit Charges;
- The Act on Nature Conservation;
- The Act on Genetically Modified Organisms.

All of the acts mentioned above were issued or significantly amended due to the harmonisation of Polish environmental legislation with the EU *acquis*. The process of legislation harmonisation has not yet finished. There are many executive orders to be issued in the near future. Progress will be monitored by the EU [3]. Also, the new EU legislation will be the subject of current legislation work in Poland.

Reduction of environmental pollution

The most significant quantities and most toxic pollutants are created in the generation and distribution of steam and hot water, in the production of metals and chemicals (60-70 percent of total emissions). The gaseous pollutants are particularly threatening, as efficiency in reducing these pollutants is low (43.7 percent in 2000). The emission of particulates has fallen considerably from 1,163,000 tonnes in 1990 to 181,000 tonnes in 2000. Nevertheless, the emission of gases still remains high (4,114,000 tonnes in 1990, 2,083,000 tonnes in 2000; data excluding CO₂). The absolute levels of emissions from the main air pollutants in Poland are among the highest of European OECD countries [9], [15].

According to 2000 data [9], only 53 percent of the population was serviced by waste-water treatment plants (80 percent in urban areas, 11 percent in rural areas). The percentage of population connected to waste-water treatment plants increased from 35 percent in 1990.

As regards the water quality of Polish rivers, the analysis of pollution loads reaching the Baltic Sea reveals that values for lead and cadmium have fallen significantly: lead was 17 percent lower in 2000 versus 1990, while cadmium was 26 percent lower). The load of phosphorus increased by 7 percent in the period, while nitrogen increased 86 percent.

Environmental taxes and charges

Environmental charges

The environmental charging system in Poland includes the following activities:

- emission of gases and dust to air;
- discharge of waste water to open water and soil;
- water intake;
- waste disposal.

The economic unit (industrial, commercial, others) calculates the charge itself once per quarter and transfers it into the Regional Office account. The rates of charges are updated each year. In addition to the money transfer, a

document describing calculation methods and reporting the quantities of emitted pollution/disposed wastes/water use should be sent to the Regional Office. A copy of such a document must be archived by the reporting unit.

There are several exemptions within the charging system including:

- intake of surface water for energy production;
- intake of surface water for watering grounds and forests;
- discharge (to open water) of cooling water if its temperature is lower than 26C or lower than natural temperature of receiver;
- discharge (to open water) of medium salty water (salinity <500mg/l).

Also, the charge is not paid if the quarterly level is below the threshold of approximately PLN 200.

Penalties

The following cases are subject of penalty:

- violation of limits set in the air emission permit;
- violation of waste-water discharge limits or waste-water composition set in the water permit;
- violation of water intake limits set in the water permit;
- violation of waste disposal conditions set in the waste permit;
- violation of permitted noise levels.

The penalty is imposed by the Environmental Inspectorate after discovery of the violation.

Product and deposit charges

Product and deposit charges were introduced in 2002. The system of product charges includes:

- paper and wood packaging;
- aluminium and steel packaging;
- plastic and glass packaging;
- cooling and air conditioning equipment containing CFCs and HCFCs;
- batteries;
- lubricating oils;
- tires;
- discharge lamps.

The producing or importing unit of the above products and packaging is obliged to pay the product charge if it does not comply with the required levels of recovery and recycling.

Deposit charges concern only rechargeable lead-acid batteries.

Other sectoral policies with an impact on environmental management

For the policies of sectors having an impact on environmental management there are measures defined that allow the combination of economic effect with environmental protection. Most important measures are presented below.

For industry and energy management:

- implementation of clean production and energy efficiency methods;
- use of alternative raw materials and renewable energy sources;
- reduction of water consumption, elimination of underground water consumption;
- development of planning process with implementation of Environmental Impact Assessment (EIA);
- implementation of BAT concept and standards;
- implementation of methods for evaluation of products' impact on the environment; Life Cycle Assessment (LCA), Life Cycle Impact Assessment (LCIA).

For transport:

- control of transport demands;
- introduction of cleaner fuels and cleaner vehicles;
- development of rail transport of goods;
- development of public transport in cities;
- construction of ring roads around cities.

For agriculture:

- better use of soil biological potential;
- reduction of impact on environment resulting from the use of fertilisers and pesticides;
- utilisation of contaminated soils for production of plants for non-food usage.

For forestry:

- increase of forestation;
- improvement of sustainable methods in forestry and health status of forests;
- improvement of fire protection measures.

For housing:

- modernisation of heating systems including utilisation of local renewable energy sources;
- thermo-modernisation of existing buildings;
- modernisation of water distribution networks;
- sorting of wastes;
- recycling of raw materials;
- recovery of waste heat.

For spatial planning:

- incorporation of environmental, landscape and cultural conditions into spatial planning documentation (programmes, studies, permits).

For tourism:

- decrease of tourist activity in the most frequently visited areas;
- control of traffic connected with tourist areas (to, from and within an area);

- promotion of public transport use for tourist purposes;
- support for alternative styles of tourism, for instance agro-tourism;
- improvement of tourist services quality.

For health care:

- introduction of classification and identification system for diseases caused by environmental impact;
- introduction of modern medical waste management systems.

For trade:

- development of eco-labelling system including information on product's impact on environment as well as data on energy and water consumption in the manufacturing process.

For defence activity:

- introduction of organisational and technical measures ensuring prevention and control of hazardous substances handling;
- fire protection of forest areas used by military units

Public monitoring and pressure from civil society

New Polish regulations established by the Act on Access to Information on the Environment and Its Protection and on Environmental Impact Assessments, and by the Environmental Law introduce wide public access to environmental information, which is the main condition of efficient monitoring. The new legislation says that “everyone” can access the information so there is no requirement to be “a part” of the respective administrative procedure [4].

The following documents can be publicly accessed (examples):

- environmental permits and respective applications;
- policies, strategies, plans or programmes;
- environmental impact reports;
- geological survey documentation for liquidated mining facilities;
- the results of environmental research and studies.

Other information in the form of written documents or databases should also be available if it concerns:

- the state of the natural elements of the environment and their interactions;
- pollutants released into the environment, and activities and measures which are likely to have or may have adverse effects on the environment;
- the effect of the state of the environment on human health, the quality of life and the cultural heritage;
- activities and measures, including administrative and economic ones, designed to protect the environment;
- plans, programmes and financial analyses related to the taking of decisions which are significant for environmental protection;
- safety reports and emergency response plans referred to in the laws concerning the protection and management of the environment.

Another important tool for the civil society is the contribution in the Environmental Impact Assessment (EIA) process. Again the legislation says “everyone” can submit comments to the draft decision (permit) that is covered by EIA. All EIA documents including reports are publicly available.

New, above-mentioned, regulations enabled the ratification of the Aarhus Convention by Polish Parliament (June 2001, the Convention was signed by Poland in June 1998).

Apart from the provisions of new legislation it is important to give examples of existing means of environmental information dissemination. The Polish Statistics Office publishes the most important information concerning state of environment, emissions and discharges to environment as well as environmental investments on an annual basis. More information, especially concerning environmental monitoring results, can be found in reports prepared by Environmental Inspectorates, including:

- comprehensive voivodship (regional) annual SoE reports, including information on the inspection activities and activities of regional environmental funds (recently some reports have been available via the internet);
- Daily website reports on urban air quality (e.g. Krakow) presenting the results obtained from monitoring network analyses and studies (component specific, long-term trends) concerning the environment quality in selected cities or regions.

Information, Education, Training and Capacity Building

Environmental information and education policies

According to the National Strategy of Ecological Education [21] the main goals of Polish ecological education is to spread the idea of sustainable development in all areas of human activities. This implies a continuous education process for everyone in Poland. Education is treated as an interdisciplinary activity at all levels of formal and informal education. The educational programmes are under development and in the realisation stage at all levels, from the national level to the domestic level. All formal education institutions implement different kinds of programmes. It is crucial to develop more interdisciplinary programmes following the sustainable development goals. There is a lot of work still to be done to insert an understanding of sustainable development into academic courses. Many NGOs are in close cooperation with scientific centres. Universities also cooperate with adult education centres. Local authorities are involved in the promotion of ecological education. The Church promotes educational activity on sustainable development. Enterprises have also started to participate in the sustainable development education process. The promotion of sustainable development by the media should be improved. In Poland there is an awareness of how important education is in the promotion of sustainable development. Some activities are not fully developed because of financial constraints. While there are many information centres, there is a lot to be done in terms of information availability on the internet. Integration of information is necessary for sustainable development management, as it is for the education process. In Poland there are no harmonised, integrated databases with ecological information. Also, there is no harmonised, integrated ecological, economic and social information at the local or national level.

Poland participated in the second generation of community programmes, Socrates and Leonardo, as well as in the new Youth Programme, which incorporates European Voluntary Service activities.

Universities, technical and business schools, and vocational training curricula

In Poland, there are various educational institutions that offer environmental subjects. Higher schools offer around 100 specialisations on environment protection in the country; around 80 offer specialisations on environmental engineering. Only a few cover ecology. Environmental management is a separate specialisation (with about 500 courses in the country). Environmental protection is also the subject of some other specialised courses. For now, sustainable development does not exist as a specialisation in Polish high schools, although it is the subject of education and training courses.

Activities of business networks

The biggest business network in Poland consists of two groups of networks: the Business Centre Club and National Chamber of Commerce. The Business Centre Club consists of over 1,700 members from about 1,000 firms. The Chamber of Commerce consists of about 150 different chambers, each with about 50 firms or members. The main activity is to spread information, to connect different firms, to train and to promote best practice.

Activities of expert and other networks

The Polish experts act in different international projects and organisations. They participate in the projects and works of UNEP, UNIDO, UNITAR, OECD, EIONET, EEA, EUROSTAT, REC, IEA, WTO, WMO, WHO, NATO, among others. Polish experts are very active in cooperation with large consulting firms.

Consultation capacities

In Poland, various consulting firms have been present on the market for a long time, even under the former political system. Scientists now organise their own private firms. Young graduates also try to earn money in this way. On the Polish market, there is competition in this respect, especially as a result of the presence of large EU and US consulting firms. Every quarter the weekly magazine *The Warsaw Business Journal* publishes a special edition concerning the biggest consulting firms in the Polish market.

Institutional arrangements (Cleaner Production/Pollution Prevention)

According to Pazdan and Adamczyk [20], “Cleaner Production has gained a high level of development in Poland. At the very beginning it was focused on typical improvement projects (raw materials, energy and water consumption reduction programmes/rationalisation), which was a kind of continuation of the Federation of Engineering Societies (FSNT NOT) activities from the 1970s.” Therefore it is no accident that groups of professionals connected with these activities have taken to the idea of Cleaner Production very actively and quickly. A very important role in this process was played by foreign aid programmes in 1989-1990: the “Norwegian Programme” developed by the NIF, supported by the Norwegian government; the “American Programme” led by the World Environment Centre and supported by USAID; the “Canadian Programme” known as “Responsible Care.” These programmes helped to transfer individual initiatives into well-organised environmental quality management systems, based on the simplified Deming rule: “Plan-Do-Check-Correct.” The Norwegian programme, which has become the “NIF-NOT” programme, received financial support from the National Fund of Environmental Protection. After a short period of cooperation between the group — led by the Polish Cleaner Production Center (Professor Z. Nowak’s group) — and the Main Mining Institute (GIG), two independent CP centres were created in Katowice: one connected with GIG, the other connected with the Federation of Engineering Societies (FSNT NOT). This programme started in the early

1990s and continues today. The American programme (1992-1999) funded three Pollution Prevention Centers (ATMOTERM Opole, Technical University Lodz, Technical University Katowice), which became self-sustaining after three years of operation (1995–1997) and continue to operate today. The Responsible Care Programme was carried out by the Polish Chemical Industry Chamber and Employers' Alliance (PCIC) for 10 years. One of the main achievements of Cleaner Pollution Centres (CPC) was the training of engineers at so-called "CP Schools", which involved lectures and the design and implementation of demo CP projects, with the assessment of results. Participants were primarily from industry (about 80 percent) and from local authorities, education institutions and the public sector (about 20 percent). The final stage of the CP School is a public exam during which the results of implemented projects are presented. People who participate in all phases of the school and pass the exam receive the Polish/Norwegian CP experts' certificate and become teachers in the subsequent courses of the schools. Until now 38 CP Schools have been organised, with the participation of more than 1,800 people. Of these, 1,300 have completed CP schools and become CP experts. The overall number of implemented case/demo CP projects is 653. Taking into account all conferences, seminars and CP schools organised by the programme, about 20,000 people in Poland have been trained in PCPC strategy. Experts who are especially active can apply for verification of their activities and be awarded the title of Verified CP Expert of the Federation of Engineering Societies. The federation gives the titles based on various criteria and a score achieved by an expert for his activities. The following criteria are taken into account:

- how active the expert is in his/her company and/or region;
- lecturing in CP schools, working as a consultant on CP projects;
- involvement in CP EMS implementation (CP certificate);
- involvement in the preparation of ISO 14001 implementation.

At present, the FSNT-NOT federation has successfully verified 89 experts.

The next main achievement in Poland was establishing the Cleaner Production Environmental Management System (CP EMS) in 1996, which became a new methodological phase of CP implementation in PCPC. Such a scheme has now been implemented by more than 200 companies, which have been awarded the Cleaner Production certificate. The certificate is issued by the Federation of Engineering Societies, the Polish Centre for Testing and Certification, and the Governmental Technology Agency. Companies that verify their CP EMS after two years are inscribed in the Polish CP Register. CP EMS is a system of organisation and management in production and services, ensuring a continued decrease of environmental loads (indicators are calculated in relation to production volume) and raw materials consumption. CP EMS focuses on preventing pollution at the source. It also includes decreasing the short- and long-term risks to environmental and human health. The basis of the system is a voluntary commitment to continually decreasing the environmental load generated by a company. The phases of CP EMS implementation are the following:

- analysis and implementation (management commitment, CP structure, initial review, feasibility study, pilot case/demo project);
- Cleaner Production certificate;
- verification of the CP certificate (management commitment, application and documentation, CP audit, environmental report, CP register);
- continual improvement.

In 1992-1993 the World Environmental Center (WEC) carried out activities to document economic and ecological benefits resulting from low-capital pollution minimisation ventures and the implementation of Cleaner Production technologies. The WEC programme was characterised by a methodological and reliable approach to the undertaken activities. During the process of realisation of the first part of the projects, the attention was especially concentrated on quality, not on quantity. Implementation contracts were signed with the selected industrial plants representing particular types of industry. These contracts guaranteed provision of thorough help by WEC, from the beginning of the process of realisation up to the summary of programme results. All of the undertaken ventures were carefully

documented, with particular attention to the financial results. After the end of the process of realisation, information concerning the programmes was published and widely advertised. A system for financial analysis of pollution minimisation programmes was prepared and implemented by the WEC. Moreover, all industrial plants received wide support, which included: training of the implementation team, purchase of the equipment for the purpose of tests and measurements, consultations with the internationally recognised specialists, visits to the leading modern industrial plants representing the same type of industry, and access to sources of information from all over the world. In Poland, the WEC established three Pollution Prevention Centres and incorporated them to the worldwide PPC network in order to improve it. The staff of the PPC were trained (also in the USA) and equipped, which enabled them to provide further pollution minimisation programmes independently. In Poland, the WEC has performed over 82 projects in over 40 companies. It is worth pointing out that the system implemented by the WEC was not an individual environmental management system, but was determined by the preparation for further implementation of ISO 14001 or EMAS. Like CP EMS, this programme aspires to be an individual environmental management system. The idea of this programme is a voluntary declaration of managers to carry out production processes in conditions that assure constant minimisation of influence on all kinds of natural environment elements, technical safety improvements and preventive management for employees' health and local populations. In Europe, the main centre of promotion and coordination of this programme is the European Chemical Industry Board (CEFIC), with its seat in Brussels. In Poland, the direct superintendence for the realisation of this project is carried by the Polish Chemical Industry Chamber.

Employers Alliance (PCIC)

The tasks concerning promotion and direction of activities and assessment of merit were subordinated to the PCIC's chapter of the Responsibility and Care Programme, which included representatives from the Ministry of the Environment and Ministry of Economy. The programme secretariat is responsible for coordinating all kinds of executive activities; this task is currently performed by the Chemeko Corporation in Wloclawek. The Responsibility and Care Programme has public importance. Industrial plants have realised that the programme is necessary if they are to carry on a dialogue with their clients, deliverers, cooperators and local society. Continual improvement is the measure of universality of the programme, because the managers responsible for its execution are not required to fulfil certain preconditions. However, there is a requirement for the existence of a public declaration of continual improvement and demonstration of its results. In the currently promoted model, the integrated management system structure within the Responsible Care Programme is very similar to the general management structure in plants and is based on the simplified Deming loop. The process begins with a decision about programme realisation at the highest management level. Next, the analysis of weak and strong aspects already existing in the industrial plant is performed and the elements connected with health, environment and safety are recorded. The next stage is to define the direction of operation and aims to achieve, to describe organisational structure and responsibility division and the requirements needed to achieve the outlined activity directions. The order and realisation of operation is made after a description of hierarchy. Programmes complement one another in order to achieve measurable effects in the field of environmental protection, health, technical safety, distribution and "life-cycle analysis," which gives cohesion to aims and procedures during the implementation and realisation of ISO 14001, PN-ISO 18000 and the Responsibility and Care Programme. The last stage is the checking and verification of effects and results of operation. The plant undergoes an audit programme and, if it achieves a positive result (score), it receives a certification from the Responsibility and Care Programme executor. The Responsibility and Care Programme has been in place for 10 years. At present the programme includes 21 significant chemical plants for which participation in the programme has resulted in ecological benefits as well as public relations benefits. There has yet to be an assessment of economic results.

Critical overview

This very short presentation of initiatives in Poland demonstrates that the country is well prepared to implement invaluable projects on a larger scale. However, the number of these projects is not rising dynamically, which raises the question of obstacles to the implementation of CP projects.

The research results from industrial plants that are actively implementing the Cleaner Production or pollution prevention programmes clearly show that initiating or starting such activities are advantageous in terms of profit, public demand, environmental and market pressure. In most cases these terms indicate the plant's ecological awareness, which improves the company's position on the market. The other elements are financial results (savings gained by the implemented project) as well as meeting environmental standards and avoiding conflicts with environmental administration.

A very important factor that could spread the range of implemented programmes could be low-interest credit for eco-efficiency projects. In some cases such credit has been given as the main reason to implement the programme, but in most cases lack of such funding was the main barrier to further development of these kinds of activities.

Another factor influencing the development of eco-efficiency projects is the role of stakeholders in supporting Cleaner Production activities in the country:

- The Government — At present most of industry perceives the role of governmental institutions (both central and local) as not the most significant in terms of CP projects. On the other hand, the Ministry of Environmental Protection, Natural Resources and Forestry and the Ministry of Industry have participated in Cleaner Production activities, which resulted in a donation from the National Fund of Environmental Protection and Water Management for two centres promoting cleaner production: GIG and FSNT-NOT. It appears that the government should focus on support promotion of environmental management ideology, especially through the use of local authorities to be in touch with the representatives of industry.
- Local authorities — Contributions from local authorities to Cleaner Production is minimal. However, it appears that cleaner production as a way of thinking and acting should be developed together by industry and boroughs that represent community interests. New environmental regulations that were passed in the last three years created, in the authors' opinion, a working basis, a dialogue platform for boroughs and industrial plants, as the new acts of law make the local authorities the regulating body for industrial environmental impact in most cases.
- Industrial confederations — The only known industrial confederation that is very efficient in promoting activities regarding pollution prevention is the Polish Chemical Industry Chamber/Employers' Alliance, which has been promoting the Responsible Care Programme for many years. The range of such operation keeps increasing and pollution prevention is one of the crucial commitments made by industrial plants willing to be part of these activities. Although other industrial confederations maintain some environmental programmes, none has developed a programme according to eco-efficiency rules to a level which could be considered as significant.
- Universities — There are a few academic centres in Poland that hold lectures on cleaner production and environmental management, and their role in the implementation and popularisation of Cleaner Production is increasing. Most important are those colleges which actively participate in American and Norwegian CP programmes (i.e. Silesian Technical University, Lodz Technical University).
- Trade unions — The authors' experience shows that this particular group does not take part in supporting Cleaner Production in an active way. The reason for this could be that the dual negative and positive role of trade unions in the Cleaner Production programme has never been fully appreciated. The authors believe this group could be a potentially powerful ally in activities that improve the state of health and safety in industrial plants and at the same time prevent environmental pollution.
- NGOs — Excluding pollution prevention centres from this group, the role of NGOs in promoting and implementing Cleaner Production is minimal at present. The NGO that has been active in this field is the Olawa and Nysa Klodzka Foundation. These institutions work very effectively in promoting workshops and implementing Cleaner Production projects. Environmental Partnership Foundation in Krakow presently operates on a limited scale, although this is increasing.
- Cleaner Production centres — The role/participation of these bodies in popularising and implementing Cleaner Production and environmental management systems may be described as the basis for the development of this activity in Poland. Existing centres organize workshops and promotions of the Cleaner Production programmes,

and also support industrial plants in implementing projects with their professional knowledge and consultations. Most plants possess information about these centres in the country and know the range of their activity.

At the same time new possibilities for the popularisation of pollution prevention/Cleaner Production ideology should be noted. They appear together with increasing interest in ISO 14001. More and more companies and institutions are engaged in environmental management systems. Unfortunately there is a danger that the Cleaner Production ideology could be treated as the "dead" rule of ecological policy required by the standard. This will depend on the awareness and sensitivity to these problems of people responsible for standards implementation as well as consultants supporting the plants.

- Business associations working in the environmental field — There are numerous organisations in Poland working in the environmental field. On the Zielona Siec (Green Network) website <www.zielonasiec.pl>, there is a database of relevant organisations, which includes information on more than 780 organisations in Poland.
- Environmental Management Systems and other voluntary approaches — The implementation of environmental management systems according to ISO 14000 is more extensive in industry (about 300 examples) than in the administrative sphere. However, there is some implementation in local authorities. Another voluntary programme, Responsible Care, has been popular in the chemical industry.
- Twinning arrangements — According to the MoE [3], "In Poland, the eight 1998 twinning projects are nearly completed and 17 twinning projects under PHARE 1999 are on-going. New areas covered are financial control, tax and customs, civil service development, and road transport. For PHARE 2000 there are 44 twinning projects with Poland, of which a considerable number have started in the meantime, including twinning between regional administrations in order to prepare Poland for regional policy and the management of future structural funds. For PHARE 2001, there will be 39 twinning projects, of which five are "twinning light" projects (six-month duration). Statistics show that a considerable range of member states are involved and a number of policy sectors covered in Poland. Nearly all member states are or will be engaged in twinning, allowing Poland to benefit from the variety of administrative models and cultures in the European Union."
- Product (and services) chains' requirements — According to sustainable development principles it is very important to implement the pollution prevention rules on a whole chain of activities, beginning from production, including all services, up to the "end of life" of the product. It is necessary to implement the rules of Life-cycle Analysis and adequate law. The productivity of resources have to be improved. We have to analyse not only the direct material input for product DMI but also the total material input TMR. According to the Wupertal Institute for Climate, Environment and Energy, TMR is the sum of DMI and "hidden flows" which are involved in such production. Dematerialisation, or the reduction in use of material and energy per unit of output is necessary. The goal for the next 20-30 years is to reduce the natural resources, raw materials and energy in each unit of production to one quarter of the current level (factor 4). The goal for the next 30-50 years is the reduction to one tenth respectively (factor 10). Eco-efficiency is a strategy connected with Factor 4 and 10: "getting more from less." The indicator TMR in Mg per capita for 1997 year for Poland is 31.7 while DMI is 14.0. Implementation of ISO 14000 has to be connected with pollution prevention activity. In Poland such a process is already in progress.
- Unified corporate cultures — The EU accession process in Poland is an additional driving force for the implementation of ISO 14000, ISO 9000/2000 in industry. There are no unified corporate cultures existing. There are many reasons for such differentiation. The main one is based on the historical chain and financial situation of enterprises. Many competitions are held which lead to partial harmonisation of cultures. The most recent activity in Poland is the Forum of Corporate Social Responsible (CSR) and the Global Compact Initiative.

Financial mechanisms to support EM and other preventive measures:

- Self-financing enterprises — Some big companies have their own environmental experts. SMEs mostly delegate the preparation of implementation of EM systems to external experts. The financing, in both cases, as well as the EM system and preventive measures, is performed by the enterprises. Part of the cost may be refunded.
- Foreign investments and their role — In the first decade of transformation processes international financial bodies such as the World Bank and EBRD, contributed 5 percent of expenditures in ecological investment in Poland. In the same period the bilateral aid from the reach countries was at 2.8 percent of all ecological

investments in Poland, mainly for new technology (44 percent), followed by consulting (32 percent) and monitoring and training (24 percent). The PHARE programme spent EUR 150 million on environmental protection in Poland. The PHARE Cross-Border Programme spent EUR 12 million on environmental protection. The ISPA fund spends up to EUR 1 billion per year in Poland. PHARE intends to spend EUR 1.5 billion, and SAPARD EUR 0.5 billion, on restructuring agriculture and the protection of nature. Polish debt conversion is the fund administrated by EKOFUND in Poland. In a period of nine years, EKOFUND spent USD 165 million on ecological investments in a grant form [16].

- Survey on existing credit lines — In Poland there are bank credit lines available for energy saving and technology changes for heating houses. The credit lines are available for both individuals and municipal projects.
- Commercial finance — Besides the special funds, it is possible to raise funds in a commercial way for ecological projects in Poland. The commune/municipality, district or voivodship, can prepare emissions of debentures which will be quoted on the Warsaw Stock Exchange. This is a commercial way to raise funds for ecological projects with participation of the market and society.
- Environmental funds (technology subsidies) — The charges and fees for emissions are the national source of these funds, which are administered by the National Fund for Environmental Protection and Water Management and Voivodship Funds for Environmental Protection and Water Management with control of local authority. These institutions play a significant role in stimulating environmental protection and new technology implementation activities in Poland. During the years 1990-1994, almost half of the new ecological investments were financed by national or voivodship funds. At present, local authorities and enterprises also play a very important role in financing environmental protection activity. For example, in 1998 the participation of local authorities' funds stood at 22 percent, while the participation of enterprises stood at 40 percent and national/voivodships funds stood at 30 percent. Government help was four percent, as was international participation [16]. According to Pazdan and Adamczyk [20] "Cleaner Production projects realised so far were mainly financed by enterprises themselves, but due to general deterioration of economic conditions and smaller profits, the availability of own financial sources in enterprises has dropped. Therefore the importance of external financing for the projects has grown. In some cases plants declare financial help received from the environmental protection and water management funds. Those sources were particularly used for modernisation of the heating and boiler systems, which led to substantial air emission reductions at the beginning of 1990s. Further CP financing programmes have become available from environmental funds. Funds have not only offered credits and donations for industry to realise CP projects, but have also supported the promotion and development of CP programmes on a wider scale. The financial help/support was a very important element at the initial stage of the programmes' development, particularly Norwegian and American experts. The National Fund of Environmental Protection and Water Management has taken part in donating two Cleaner Production programmes in the country (projects led by FSNT-NOT and GIG). At the same time Polish law has incorporated a sustainable and cleaner production approach. The new Environmental Protection Act introduced a notion of 'cleaner production' into the law-term dictionary. The regulations oblige enterprises to implement the rules of Cleaner Production. These new notations in the acts of law must be accounted as the crowning achievement of works lasting for many years in the country. They are the result, but also show the direction that the country and especially state financial institutions should follow. A new law regarding wastes will change the position of the boroughs due to the industrial plants which will have to agree with the boroughs on ways of disposing of waste generated on the territory of the plant management. This will be an excellent opportunity to popularise pollution prevention ideology through the local self-governments and the intensive training of communal office employees. During last five years, state policy has highlighted Cleaner Production opportunities, which resulted in credit lines and financial sources becoming available to industry through the Bank of Environmental Protection and other environmental protection funds. Funds and banks interviewed have stated that there are problems in spending sources that are available. On the other hand, industry points out that many eco-efficiency projects cannot be realised because of formal and financial barriers which are connected to the above mentioned credit lines and donation programmes. One of the most important of these are problems with warranty. This will become even more acute if more SMEs join the eco-efficiency movement and seek financial sources to realise projects. The next problem reported by the funds and enterprises is the lack of environmental fee payment. This is an interesting issue since plants that have problems with environmental fees are those which: have a substantial environmental impact, undergo restructuring from previously state-owned

complexes, and therefore have the largest ‘eco-efficiency’ potential. Problems with the general financial standing of the enterprise blocks the credit as a result of Polish banking law. Banks cannot finance projects which show economic and ecological benefits if the enterprises are unable to prove a generally good financial standing...financing eco-efficiency projects is impacted by the general economic situation in the country. Interest rates for the last year in Poland have been at 20 percent, which makes many investments economically unviable and therefore they are not realised or are being realised in a limited way."

- International finance instruments (technology subsidies) — The EBRD has a mandate of shareholders to promote sustainable development. It is the first international financial institution with such a shareholders' mandate. Mostly the projects are part of the credit agreement and have to be prepared very well following the bank's procedure. The procedures promote sustainable development projects and better solutions than the country and EU laws require.

Results

"Many business leaders, inside and outside the WBCSD, often express eco-efficiency as creating more value with less impact or doing more with less. Academic experts and practitioners term eco-efficiency the synthesis of economic and environmental efficiency in parallel, where the prefix ‘eco’ stands for both economy and ecology. The OECD has called eco-efficiency the efficiency with which ecological resources are used to meet human needs and defines it as the ratio of an output (the value of products and services produced by a firm, sector or economy as a whole) divided by the input (the sum of environmental pressures generated by the firm, the sector or economy). The European Environment Agency (EEA), which intends to use eco-efficiency indicators to quantify progress toward sustainability on the macro-level, defines eco-efficiency as more welfare from less nature and says it comes through decoupling resource use and pollutant release from economic development." [10]

"Eco-efficiency can serve companies as a means for developing and successfully implementing a business strategy toward sustainability. Such a strategy will have a strong focus on technological and social innovation, accountability and transparency, as well as on cooperation with other parts of society with a view to achieving the set objectives.

In the same way as it serves private companies, eco-efficiency can support governments in deriving a national strategy for sustainable development. Setting framework conditions which foster innovation and transparency, and which allow sharing responsibility among stakeholders, will amplify eco-efficiency for the entire economy and deliver progress toward sustainability. The economy, together with quality of life, will continue to grow while the use of resources and pollution will go down." [10]

"Both the EEA and the WBCSD are working toward matching headline indicators for nations and generally applicable indicators for corporate reporting." [10]

Eco-efficiency requires very good databases of information. The precision of information should be at the unit production process. Such information should be harmonised, integrated with the environmental media and technology. It should also be possible to access this information at the upper levels, such as commune, district, voivodship, country, branches, and on any geographical area or according to internationally agreed catalogues.

On the global level, the Global Reporting Initiative prepares guidelines for states about harmonised reporting thus allowing the monitoring of trends at this level. These reporting requirements will probably be harmonised with PRTR requirements according to the Aarhus Convention. This should allow for sufficient information on eco-efficiency throughout the world.

In Poland, there is a SOZAT[®] system present. This is an integrated computer system for emissions inventory and is an environment information management system helping all levels of management. This system can also work as a GIS integrator of different databases. Data from this system can be transferred to European reporting formats. The

SOZAT[®] system is not focused on selected technologies or sectors. It is not obligatory in Poland. It can work on more detailed data than required by Polish law. ATMOTERM[®] S.A. has new clients almost every day.

The WBCSD indicators require a lot of information that is not available in routine national statistical questioning of the data performed by GUS.

The eco-efficiency indicators shall be calculated based on the same detailed definitions implemented to law at the international level. Such definitions should work at all levels of management. It is very important to have the integrated emission information (to air, water and land).

It is also necessary to prepare very detailed definitions and algorithms for eco-efficiency headlines indicators if we would like to use them for comparing the trends on international level as well as on all management levels inside the country. It is very important to obligate the national statistical offices and other bodies to prepare and disseminate the same, well-thought-out information taking into account headline indicators agreed at the international level.

For instance, there is a need to calculate the eco-efficiency indicator for cement production in Poland, based on the data published by GUS. The following data are available:

Table 8: Eco-efficiency indicator for cement

INDICATOR	UNIT	SOURCE	2000
Cement production	thousand Mg	GUS PKD 26.51	15,046
Cement production, water consumption	hm3	GUS PKD 26.51	8.6
Cement production, CO2 emissions	thousand Mg	GUS PKD 26.51	not available on PKD 26.51

Once again, according to Pazdan and Adamczyk, “Poland has achieved a significant level regarding the country capacity to develop eco-efficiency programmes. The country is prepared to continue programmes of this type on a larger scale.

Polish environmental regulations have undergone substantial changes in recent years. Now they clearly demonstrate and require the use of Cleaner Production philosophy in administering environmental protection.

Public financial sources are available to support Cleaner Production and other eco-efficiency projects through environmental funds and some banks.

Most of these credit lines are not used to a great extent so far.

Public sources for supporting CP have changed from donations to credit-type support. They offer much better interest rates and ways of payment than commercial sources, but are becoming more stringent regarding formal conditions to achieve the credit. These requirements are becoming closer and closer to ones used by banks.

This results in not being able to finance a number of good eco-efficiency projects suggested by enterprises whose general condition is weak or who have problems arranging an appropriate warranty.

Implementing CP rules in Polish law seems not to be connected with putting an appropriate monitoring system in place by the Government. This results in the lack of a systematic approach to identify barriers and obstacles while implementing state policy in this field and consequently taking appropriate corrective actions.

To create effective monitoring an environmental information management system need to be implemented in Poland which will allow the preparation of appropriate local, regional and country eco-efficiency progress reports.

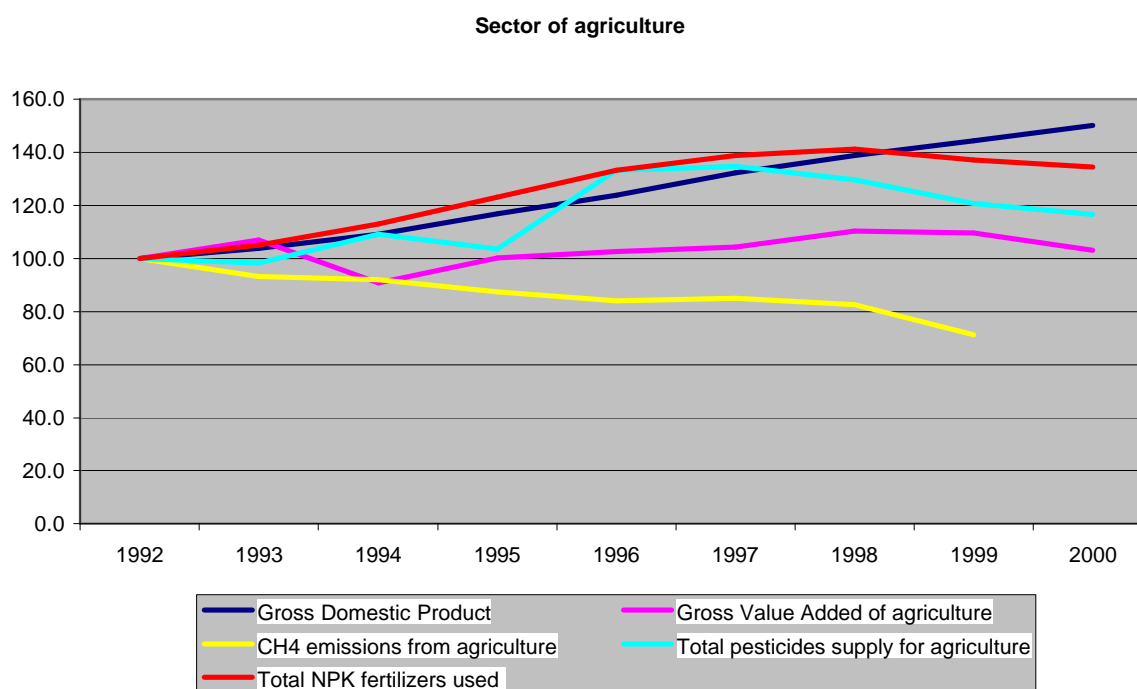
There is a low level of knowledge and involvement of local administration in CP programmes.

Recommendations (consultant and discussion panel on eco-efficiency in Poland held by the REC):

- Return to donation rule within public environmental funds, at least for project identification phase costs.
- Compensating of the project performance/investment costs from environmental fees paid by the enterprise, instead of paying the fees application for credit.
- Creating a national environmental warranty fund that could be used by enterprises to receive a warranty from external institutions for credit application to financial institutions.
- Implementation of national environmental information system, which could be used for monitoring and preparing eco-efficiency progress reports.
- Running a national training programme for financial institutions and local authorities on eco-efficiency.
- Supporting further development of eco-efficiency centres that could promote, educate and help industry with expert knowledge.” [20]

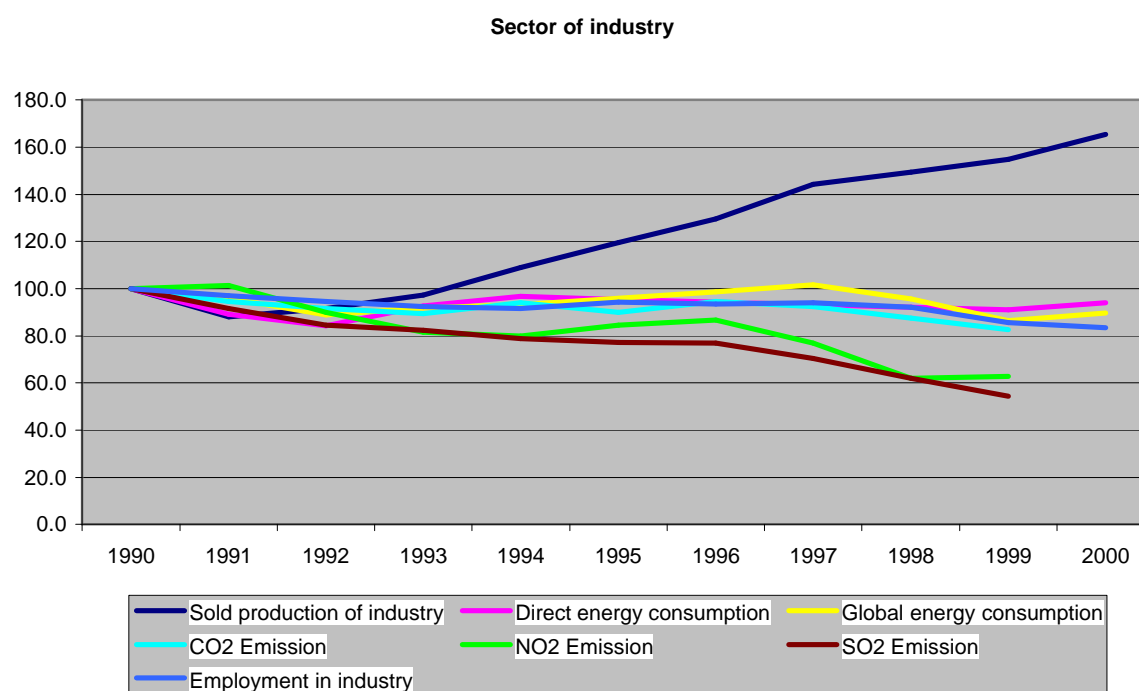
The authors of this report fully agree with the above conclusions.

Polish annex 1: Indicators



1992=100									
Indicator	1992	1993	1994	1995	1996	1997	1998	1999	2000
Gross Domestic Product	100.0	103.8	109.2	116.8	124.0	132.4	138.8	144.4	150.2
Gross Value Added of agriculture	100.0	107.0	90.8	100.3	102.7	104.2	110.4	109.7	103.1
CH4 emissions from agriculture	100.0	93.2	91.9	87.4	83.9	84.9	82.7	71.3	
Total pesticides supply for agriculture	100.0	98.3	109.1	103.6	133.3	134.8	129.7	120.7	116.6
Total NPK fertilisers used	100.0	105.1	113.0	123.1	133.2	138.8	141.3	137.2	134.5

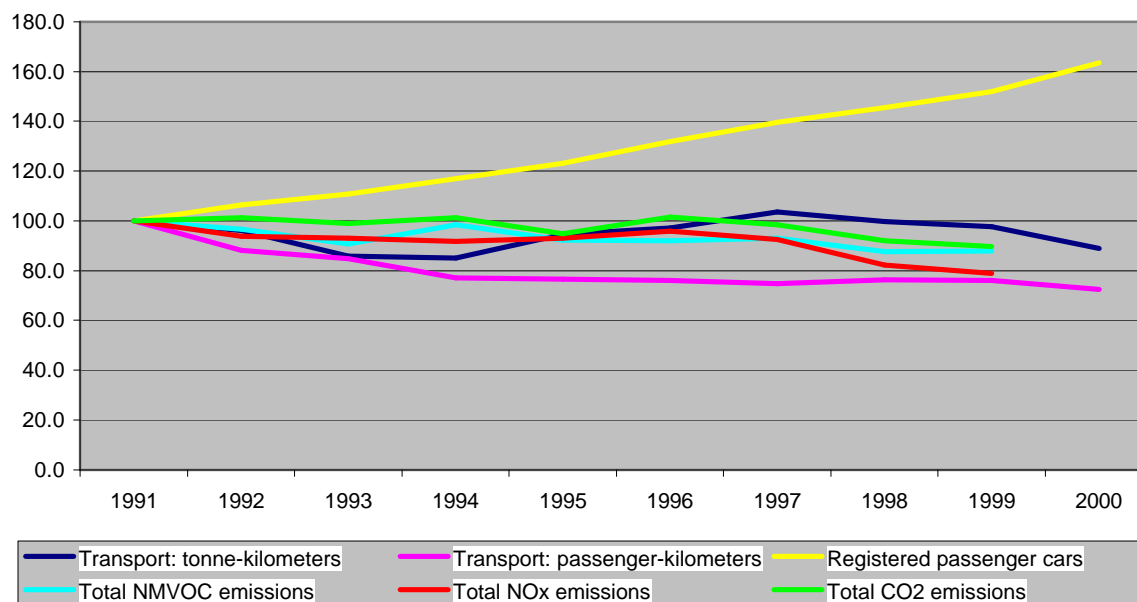
Source	Notes
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices
Ministry of Environment	-
GUS Environment Yearbook 2001	Total mass of pesticides
GUS Environment Yearbook 2001	1995 data interpolated



1990=100											
Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Sold production of industry	100.0	88.1	91.5	97.2	109.0	119.5	129.5	144.4	149.4	154.8	165.3
Direct energy consumption	100.0	89.1	84.2	92.7	96.6	95.5	94.3	93.2	92.1	91.0	93.9
Global energy consumption	100.0	95.9	88.9	91.8	93.1	95.9	98.7	101.6	95.7	86.4	89.7
CO ₂ emission	100.0	94.5	91.6	89.5	93.9	89.8	94.5	92.5	87.4	82.5	
NO ₂ emission	100.0	101.4	90.0	81.4	80.0	84.4	86.6	76.9	62.0	62.7	
SO ₂ emission	100.0	91.7	84.6	82.3	78.8	77.2	77.0	70.4	62.1	54.2	
Employment in industry	100.0	96.9	94.5	92.4	91.6	94.3	93.6	94.1	92.0	85.5	83.4

Source	Notes
GUS Concise Yearbooks 1991-2001	
GUS Energy Statistics 1990-91, '92-'93, '93-'94, '98-'99, '99-'00	Corrected data of previous years published in newer yearbooks; latest data available used. 1995-1999 data interpolated
GUS Energy Statistics 1990-'91, '92-'93, '93-'94, '98-'99, '99-'00	Corrected data of previous years published in newer yearbooks; latest data available used. 1995-1997 data interpolated
Ministry of Environment	
GUS Environment Yearbook 2001	
GUS Environment Yearbook 2001	
GUS Concise Yearbooks 1991-2001	Average employment

Sector of transport



1991=100

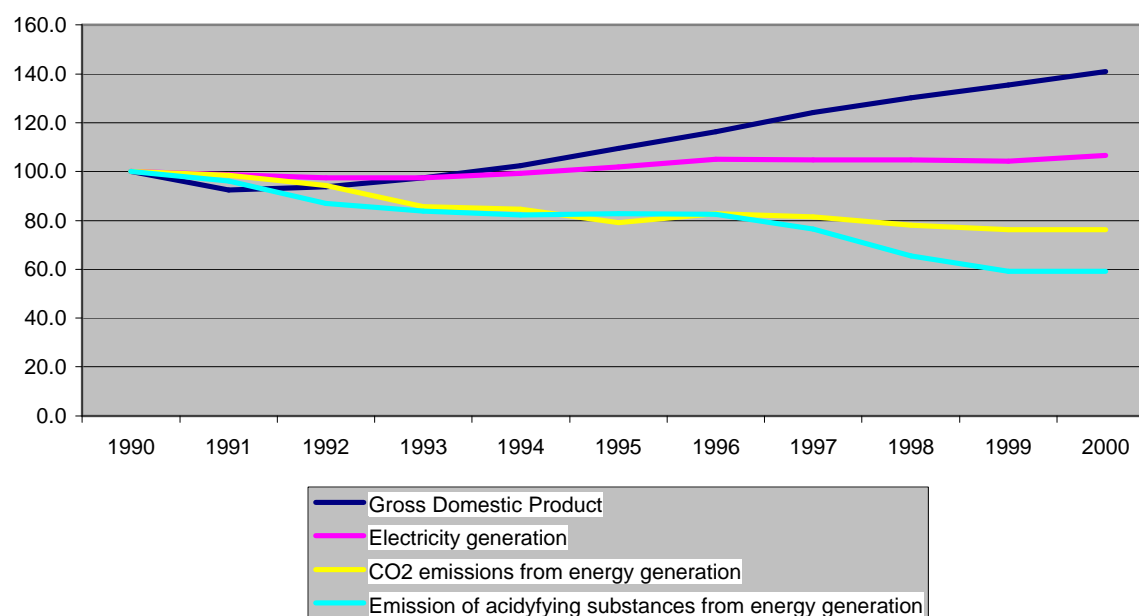
Indicator	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Transport: tonne-kilometers	100.0	96.0	85.8	85.0	94.5	97.2	103.6	99.6	97.6	88.8
Transport: passenger-kilometers	100.0	88.0	84.7	77.2	76.5	76.0	74.8	76.2	76.2	72.4
Registered passenger cars	100.0	106.4	110.8	117.0	123.0	131.8	139.6	145.5	151.9	163.5
Total NMVOC emissions	100.0	96.5	90.8	98.4	92.3	92.0	92.9	87.6	87.8	
Total NOx emissions	100.0	93.8	92.9	91.7	92.9	95.8	92.5	82.2	78.9	
Total CO ₂ emissions	100.0	101.3	99.0	101.3	94.9	101.5	98.5	92.0	89.7	

Source

Notes

GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	-
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Excl. railway passengers transported free of charge, excl. transports by urban road transport fleet
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	
GUS Environment Yearbook 1993-2001	-
GUS Environment Yearbook 1993-2001	-
GUS Environment Yearbook 1993-2001	-

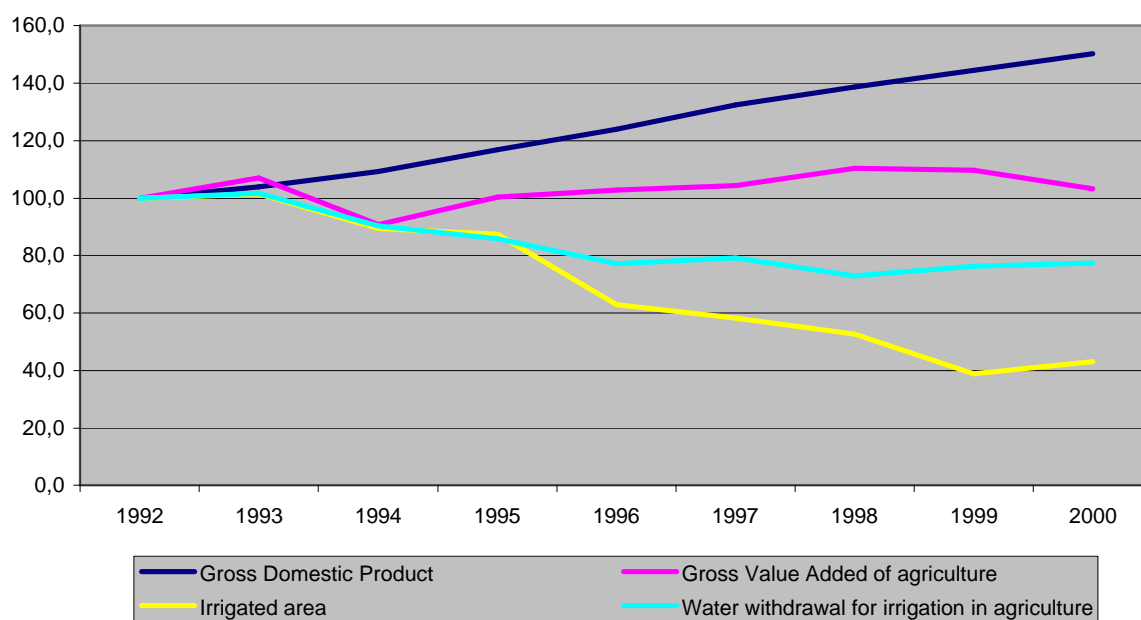
Sector of energy generation



1990=100											
Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Gross Domestic Product	100.0	92.4	93.8	97.3	102.4	109.6	116.3	124.2	130.1	135.5	140.9
Electricity generation	100.0	98.8	97.4	97.5	99.3	102.0	105.0	104.6	104.8	104.3	106.5
CO ₂ emissions from energy generation	100.0	98.5	94.3	85.6	84.7	79.2	82.8	81.5	78.2	76.1	76.1
Emission of acidifying substances from energy generation	100.0	96.1	87.0	83.8	82.2	82.8	82.6	76.5	65.6	59.2	59.2

Source	Notes
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	-
Ministry of Environment	Weighted GWP: CO ₂ *1 + CH ₄ *21 + N ₂ O*310
GUS Environment Yearbook 2001	Weighted acidifying factor. Calculation of factor: 1/32 NO _x + 1/46 SO ₂ + 1/17 NH ₃

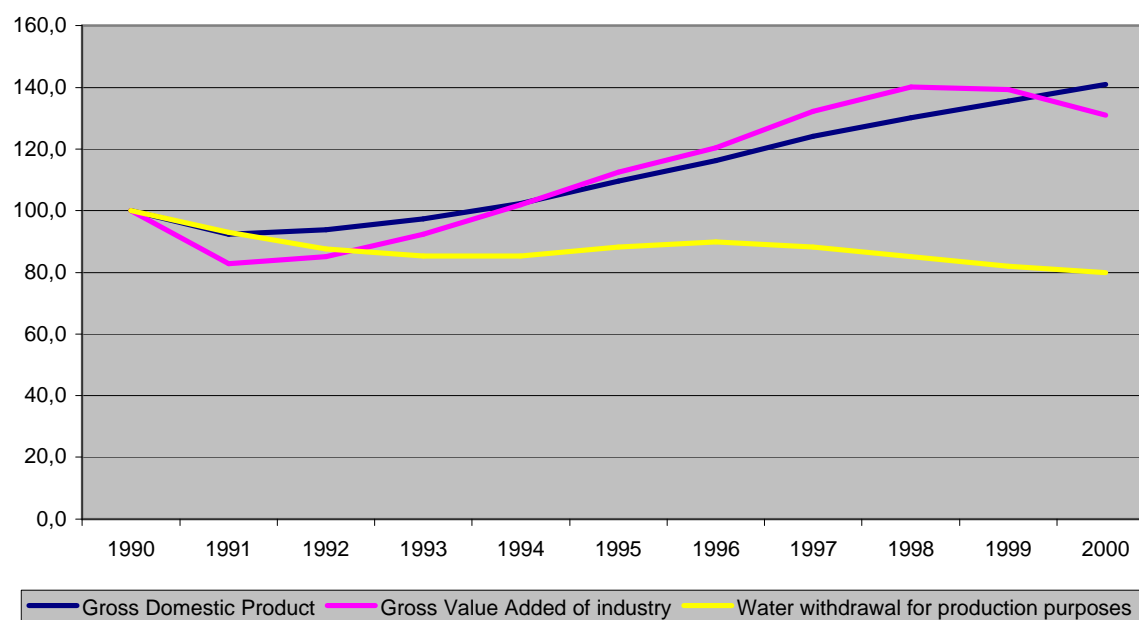
Water - Agriculture



1992=100									
Indicator	1992	1993	1994	1995	1996	1997	1998	1999	2000
Gross Domestic Product	100.0	103.8	109.2	116.8	124.0	132.4	138.8	144.4	150.2
Gross Value Added of agriculture	100.0	107.0	90.8	100.3	102.7	104.2	110.4	109.7	103.1
Irrigated area	100.0	101.4	89.4	87.4	63.0	58.3	52.6	38.9	43.1
Water withdrawal for irrigation in agriculture	100.0	101.7	90.4	85.9	77.2	79.1	73.0	76.3	77.5

Source	Notes
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices
GUS Environment 1993-2001	-
GUS Environment 1993-2001	-

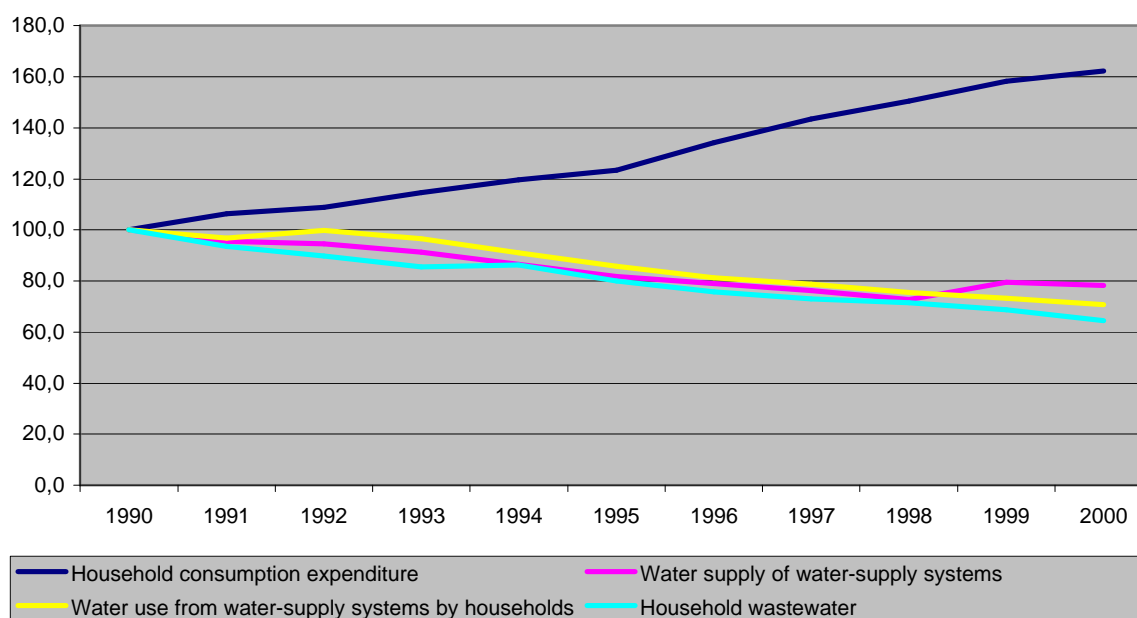
Water - Production



1990=100											
Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Gross Domestic Product	100.0	92.4	93.8	97.3	102.4	109.6	116.3	124.2	130.1	135.5	140.9
Gross Value Added of industry	100.0	82.9	85.1	92.4	101.9	112.5	120.5	132.3	140.1	139.2	130.9
Water withdrawal for production purposes	100.0	93.0	87.6	85.2	85.2	88.3	89.8	88.2	85.1	82.1	80.0

Source	Notes
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices
GUS Environment 1993-2001	-

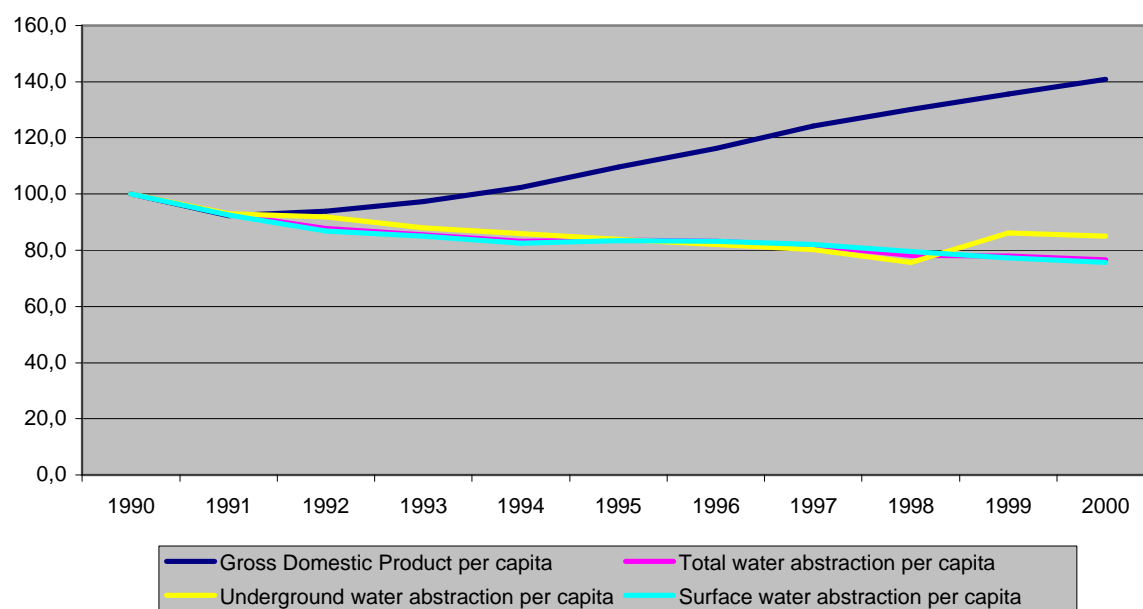
Water - Households



Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Household consumption expenditure	100.0	106.3	108.7	114.7	119.7	123.5	134.2	143.5	150.4	158.2	162.3
Water supply of water-supply systems	100.0	95.5	94.5	91.3	86.6	81.8	79.1	76.3	72.9	79.6	78.2
Water use from water-supply systems by households	100.0	96.8	100.0	96.6	91.0	85.7	81.4	78.7	75.5	73.2	70.8
Household waste-water	100.0	93.6	89.7	85.6	86.4	80.1	75.7	73.1	71.5	68.7	64.6

Source	Notes
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	-
GUS Environment 1993-2001	-
GUS Environment Yearbook 1993-2001, PIOS Podst. Probl. Srod. w Polsce 2000	-
GUS Environment Yearbook 1993-2001, PIOS Podst. Probl. Srod. w Polsce 2000	-

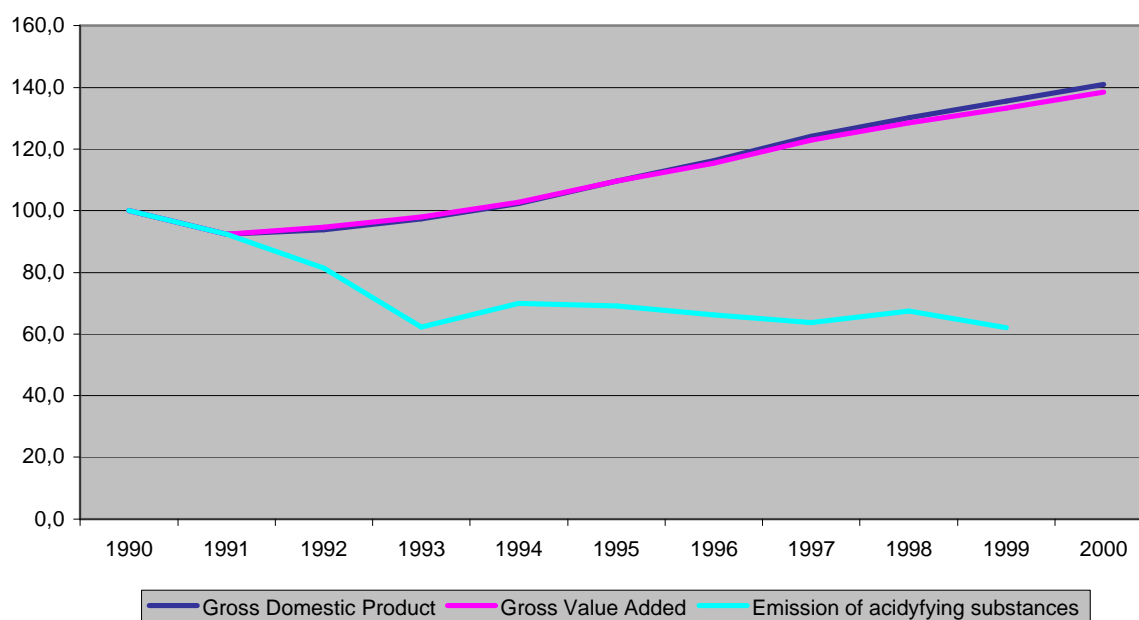
Water - Withdrawal



1990=100											
Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Gross Domestic Product per capita	100.0	92.4	93.8	97.3	102.4	109.6	116.3	124.2	130.1	135.5	140.9
Total water abstraction per capita	100.0	92.8	87.7	85.4	83.1	83.7	83.2	81.7	78.3	78.0	76.5
Underground water abstraction per capita	100.0	93.1	91.9	87.9	85.9	83.8	82.0	80.3	75.6	86.1	84.9
Surface water abstraction per capita	100.0	92.6	86.7	85.0	82.5	83.5	83.3	82.1	79.5	77.2	75.7

Source	Notes
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices
GUS Environment 1993-2001	-
GUS Environment 1993-2001	-
GUS Environment 1993-2001	-

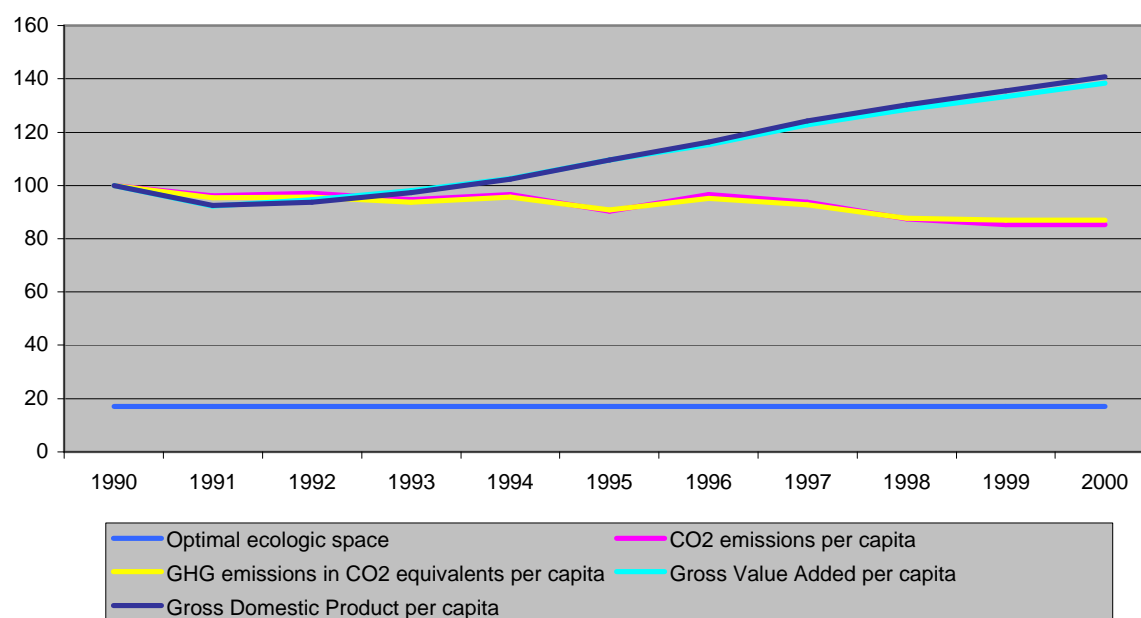
Emission of acidifying substances



1990=100											
Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Gross Domestic Product	100.0	92.4	93.8	97.3	102.4	109.6	116.3	124.2	130.1	135.5	140.9
Gross Value Added	100.0	92.3	94.6	97.9	102.7	109.6	115.4	122.8	128.6	133.3	138.4
Emission of acidifying substances	100.0	92.4	81.3	62.3	69.9	69.1	66.2	63.7	67.4	62.0	

Source	Notes
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices
GUS Environment Yearbook 2001	Calculation of factor: $1/32 \text{ NO}_x + 1/46 \text{ SO}_2 + 1/17 \text{ NH}_3$

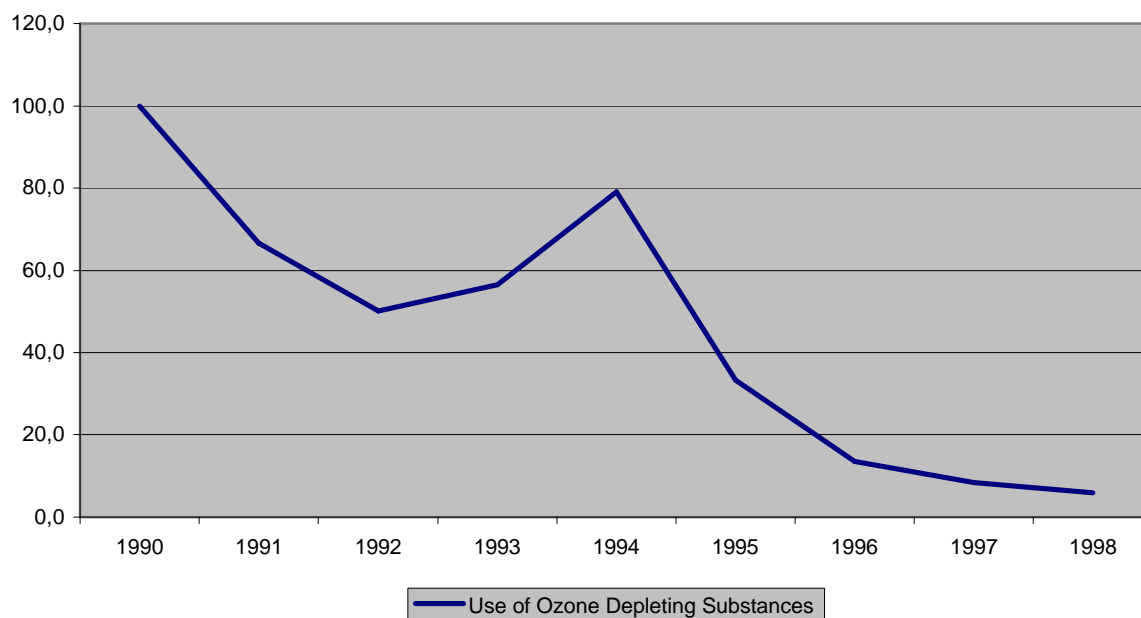
GHG emissions



1990=100											
Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Optimal ecologic space	17	17	17	17	17	17	17	17	17	17	17
CO ₂ emissions per capita	100.0	96.1	97.0	94.6	96.5	90.4	96.6	93.7	87.4	85.2	85.2
GHG emissions in CO ₂ equivalents per capita	100.0	95.3	95.6	93.6	95.6	90.7	95.1	92.8	87.7	87.0	87.0
Gross Value Added per capita	100.0	92.3	94.6	97.9	102.7	109.6	115.4	122.8	128.6	133.3	138.4
Gross Domestic Product per capita	100.0	92.4	93.8	97.3	102.4	109.6	116.3	124.2	130.1	135.5	140.9

Source	Notes
<i>Sharing the World</i> . M. Carley, P. Spapens	1,7 t per capita on the World
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001, Ministry of Environment	
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001, Ministry of Environment	Weighted GWP: CO ₂ *1 + CH ₄ *21 + N ₂ O*310
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices

Use of Ozone Depleting Substances



1990=100											
Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Use of Ozone Depleting Substances	100.0	66.6	50.0	56.4	79.0	33.3	13.5	8.4	5.8		

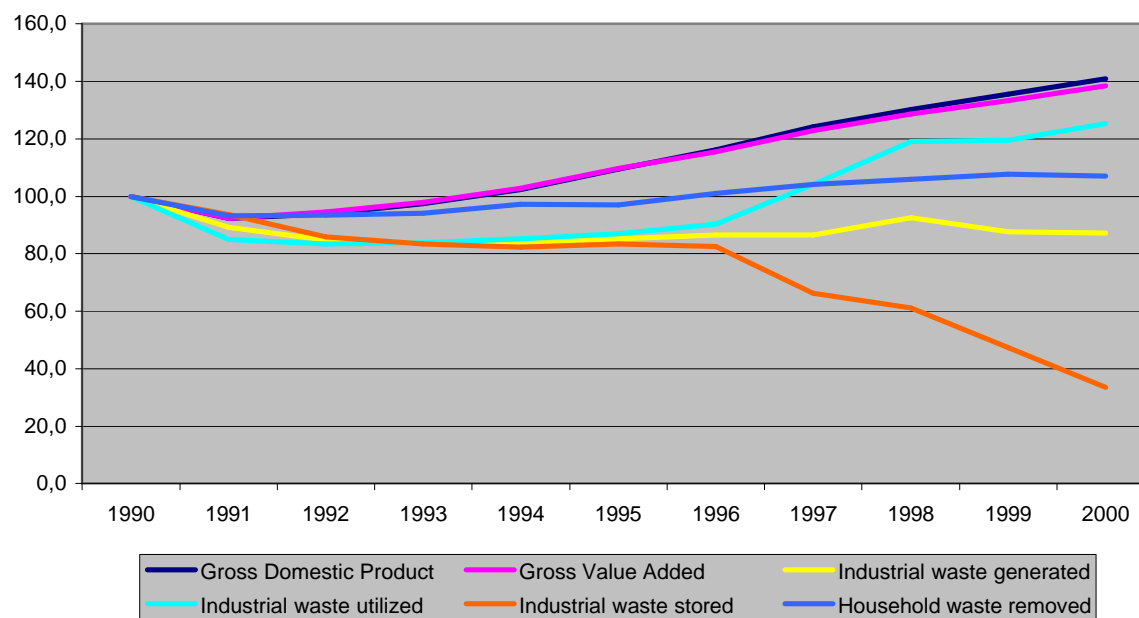
Source	Notes
GUS Environment 2001	

12

Number of days ozone concentrations exceeded Polish norms (8 hours, 110 mg)

City, Voivodship	1998	1999
Warszawa, Mazowieckie	4	4
Zabrze, Slaskie	2	7
Katowice, Slaskie	21	28
Olkusz, Malopolskie	50	79
Krakow, Malopolskie	43	30

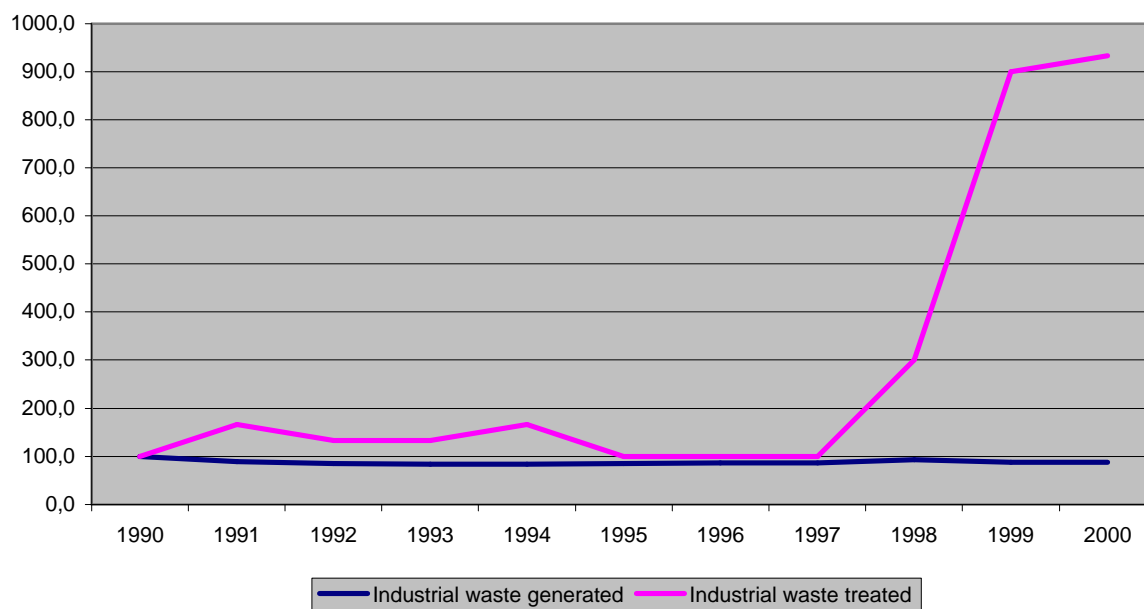
Waste



1990=100											
Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Gross Domestic Product	100.0	92.4	93.8	97.3	102.4	109.6	116.3	124.2	130.1	135.5	140.9
Gross Value Added	100.0	92.3	94.6	97.9	102.7	109.6	115.4	122.8	128.6	133.3	138.4
Industrial waste generated	100.0	89.2	84.7	83.7	84.0	85.3	86.6	86.5	92.5	87.7	87.2
Industrial waste utilised	100.0	85.1	83.5	83.9	85.2	86.9	90.3	104.0	119.1	119.5	125.3
Industrial waste stored	100.0	93.7	85.9	83.5	82.3	83.5	82.4	66.2	61.1	47.4	33.5
Household waste removed	100.0	93.1	93.3	94.1	97.1	97.0	101.1	104.1	105.9	107.8	107.0

Source	Notes
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices
GUS Yearbook 2001, GUS Concise Yearbooks 1991-2001	Constant prices
GUS Environment 1993-2001	-
GUS Environment Yearbook 2001, PIOS Podst. Probl. Srod. w Polsce 2000	-
GUS Environment Yearbook 2001, PIOS Podst. Probl. Srod. w Polsce 2000	-
GUS Yearbook 1995, GUS Environment Yearbook 1993-2001, PIOS Podst. Probl. Srod. w Polsce 2000	1991-1992 data interpolated

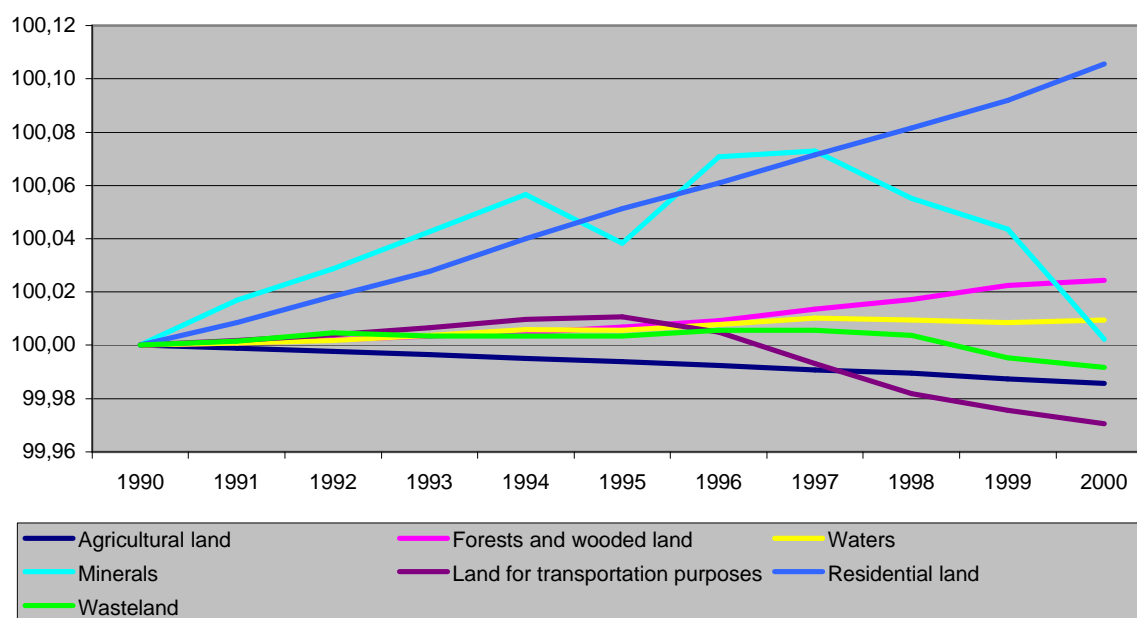
Waste treatment



1990=100											
Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Industrial waste generated	100.0	89.2	84.7	83.7	84.0	85.3	86.6	86.5	92.5	87.7	87.2
Industrial waste treated	100.0	166.7	133.3	133.3	166.7	100.0	100.0	100.0	300.0	900.0	933.3

Source	Notes
GUS Environment 1993-2001	-
GUS Environment Yearbook 2001, PIOS Podst. Probl. Srod. w Polsce 2000	-

Land use change



1990=100											
Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Agricultural land	100.00	100.00	100.00	100.00	100.00	99.99	99.99	99.99	99.99	99.99	99.99
Forests and wooded land	100.00	100.00	100.00	100.00	100.00	100.01	100.01	100.01	100.02	100.02	100.02
Waters	100.00	100.00	100.00	100.00	100.01	100.01	100.01	100.01	100.01	100.01	100.01
Minerals	100.00	100.02	100.03	100.04	100.06	100.04	100.07	100.07	100.06	100.04	100.00
Land for transportation purposes	100.00	100.00	100.00	100.01	100.01	100.01	100.00	99.99	99.98	99.98	99.97
Residential land	100.00	100.01	100.02	100.03	100.04	100.05	100.06	100.07	100.08	100.09	100.11
Wasteland	100.00	100.00	100.00	100.00	100.00	100.00	100.01	100.01	100.00	100.00	99.99

Source	Notes
GUS Environment 2001	-
GUS Environment 2001	-
GUS Environment 2001	-
GUS Environment 2001	-
GUS Environment 2001	-
GUS Environment 2001	-
GUS Environment 2001	-

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Eco-efficiency Country Review Summary: Bulgaria

Written by: Dimiter Brankov, Ph.D Director of the Clean Industry Center, Bulgarian Industrial Association

Eco-efficiency and related initiatives

Introduction

The current stage of development of the Bulgarian economy is dominated by the restricted monetary policy enforced under agreements signed with the IMF, the country's broad EU accession goals and unstable political situations in the neighbouring Balkan countries in recent years. The unemployment rate is one of the highest among the CEE countries, at around 18.4 percent. The prevailing problem of the banking system remains the lack of capital and high rate of collateral/guarantees required.

In terms of the adoption of EU environmental legislation, Bulgaria has been advancing relatively rapidly, but the level of enforcement is still poor.

Organisations involved in eco-efficiency promotion

The experience and knowledge of eco-efficiency and related approaches (EMS, CP, WM, PP) in Bulgaria date from 1994 when the World Environmental Center (WEC) launched a waste minimisation programme at several pilot companies. Between 1995 and 1997 a series of training seminars and workshops were provided and publications were made available to industries under the follow-up activities initiated by the Clean Industry Center/Bulgarian Industrial Association. Government support is still lacking, especially in terms of funding from the National Environment Protection Fund. Currently several organisations are active in the eco-efficiency field, including Energy Efficiency, EMS (ISO 14001), Cleaner Production, Waste Minimisation and Pollution Prevention.

The Clean Industry Center (CIC) was established within the framework of the Bulgarian Industrial Association (BIA) in September 1995 under the Cooperation Agreement with the WEC, sponsored by USAID.

The CIC has the status of a unit of the BIA. BIA is the main representative employers/industrial association in Bulgaria, and unites 72 industry branch (sector) associations and more than 40 regional and municipal industrial associations.

The activities and objectives of the BIA's environmental policy are directly connected with the efforts of industrial enterprises in achieving better environmental performance and minimisation of their impact on the environment. The BIA's policy is also linked with the implementation of the preventive and sustainable development concept (EMS, CP/WM/PP/EE), while it also aims to improve efficiency and productivity, and to avoid technical barriers to international trade in years to come.

The CIC has gradually broadened the scope of its work implementing the Cleaner Production (CP) concept and modern Environmental Management Systems (EMS). CIC also provides a number of services such as EMS diagnostics, management support in conducting initial environmental reviews, developing companies' environmental policies, etc.

In addition, CIC continues its original programmes, such as: the establishment of a database on the emissions of the main industrial plants; the expansion of the existing information system on water and air discharges, solid waste and polluted soils; the establishment of the National Pollutants Release and Transfer Register (Toxic Release Inventory); an information exchange on clean technologies, resource saving, waste minimisation and energy-efficient techniques, etc.

The CIC also facilitates dialogue between industry, government and society, by encouraging, strengthening and supporting the capabilities of the various industrial sectors in the formulation and implementation of their own environmental policies and an implementation of the modern EMS.

The CIC is in active cooperation with similar centres in Central and Eastern Europe (a tripartite agreement has been signed with Czech CEMC and Romanian PPC) that deal with pollution prevention and EMS, such as WEC and INEM. CIC has also played a significant role in establishing Cleaner Production centres in FYR Macedonia (Veles and Skopje).

Other institutions active in the field of eco-efficiency are those connected with the implementation of energy efficiency. One of the most active organisations is Eneffect, which started its activities with USAID support, implementing a number of projects and disseminating the results achieved, including publishing a regular newsletter. Other organisations actively involved in the promotion of eco-efficiency include the Bulgarian Chamber of Chemical Industry, which works with CEFIC on a Responsible Care programme. Also, branch organisations have undertaken various pilot projects aimed at adopting and meeting EU environmental requirements, such as food, oil, machinery, ferrous and non-ferrous metals, mining industries, etc.

Among active donors that have contributed significantly to the CP/EMS implementation in Bulgaria are USAID (WEC, Ecolinks Programme, FLAG), REC, JSF/REC, the governments of Denmark, Holland and Japan, PHARE, etc.

Education and training

Since 1996 the CIC has organised seminars on waste minimisation and the WEC has launched several demonstration projects in selected Bulgarian enterprises. Several other companies have been involved in the 1997 waste minimisation impact programme. More than 500 representatives of industry have been trained on the simultaneous implementation of ISO 14001 and CP (WM, P2) in about 25 short training courses/seminars. At the same time around 300 top management executives have been acquainted with the concept, benefits, challenges and major implementation approaches associated with ISO 14001 implementation.

The CIC and WEC, with the support of the Swiss government, organised the first seminar on eco-efficiency in 1996 in the town of Pleven for 20 company representatives. The related case studies have been published (a local central heating company and a sugar company). In May 2000 a group of Bulgarian and Macedonian companies were acquainted with ABEI and eco-efficiency issues. In 1998 a distance learning training course was started in order to broaden the scope of the target training audience.

EMS is also part of curricula and university courses developed and provided in Varna, Sofia and Rousse, Gabrovo.

Standardisation and accreditation

BIA/CIC exerted significant pressure on the official adoption of ISO 14001 as a Bulgarian national standard (June 1998). A CIC representative currently leads the Permanent Work Group on EMS within the Bulgarian TC 15 "Environment", which is responsible for the adoption of the ISO 14000 series. A national accreditation body was established in 2000 and is responsible for accreditation of the national certification bodies acting in EMS. The only body locally accredited by the Bulgarian Accreditation Service is SGS Bulgaria.

After the adoption of the new Environment Protection Act, which has been passed to Parliament for approval, a voluntary EMAS and eco-labeling legal framework will be adopted by mid-2002.

EMS consultation services and certification

Bulgarian industry has shown a significant delay in terms of the number of companies certified under ISO 14001, especially compared to other CEE countries. Nevertheless, five companies have been certified and another four or

five are finalising their corporate EMS development for final certification audit. Many others are at the initial or mid-stage of developing corporate EMS.

The adoption of the new Environmental Protection Act and the integrated (IPPC) permitting regime, and the speeding-up of the enforcement of environmental legislation and regulations, should accelerate the development and implementation of corporate EMS as an IPPC requirement. This should lead to wider implementation of the low cost preventive (win-win) techniques/measures and heavy investment associated with eco-efficiency.

A number of accredited foreign certification bodies providing certification for ISO 9001 are now active in the ISO 14001 field. Some of them have received grants from USAID.

Cross regional cooperation

Examples of cross-border cooperation took place in the cooperative activities undertaken in the exchange and parallel implementation of ISO 14001 and CP in Bulgarian and Macedonian industry between 1999 and 2001. The project has received support from the Japan Special Fund (REC). Under this project seven seminars and workshops were organized with more than 210 participants.

At the same time, since 1999 CIC has undertaken the major responsibility for providing package training and consultation on EMS and CP implementation in six companies in the town of Veles, Macedonia.

Funding sources and opportunities

The National Environmental Protection Fund run by the Ministry of Environment and Water and the National Eco Trust Fund are two governmental agencies that can be involved in financing eco-efficiency projects. There is no specialised private bank operating in the environmental field (CP).

The main problem is the restricted investment climate associated with the strict monetary policy. Even though the basic interest rate is pretty low at about 5 percent, bank loans are released at 15-20 percent. Banks usually ask for collateral amounting to 200-300 percent of the required loan.

The majority of private environmental investments are oriented towards end-of-pipe solutions. Recently, some huge investment projects have been reoriented from the initial end-of-pipe solutions to win-win projects.

Conclusions, evaluation, proposals

The main proposals can be summarised as follows:

- The network of country focal points with clear responsibilities and roles should be enhanced.
- A set of pre-prepared country funding proposals should be directed to the appropriate donors.
- Selection, training and curricula development of a set of locally registered auditors.
- Demonstration projects for presentations; the best local company should be sponsored for its contribution to final certification.
- Support for the dissemination of information in existing local centres.

Eco-efficiency Country Review Summary: Croatia

Written by: Marijan Host, Director of Croatian Cleaner Production Center, APO-Hazardous Waste Management Agency

Eco-efficiency and related initiatives

Introduction

Croatia is a Mediterranean country covering an area of 56,500km², and with a population of 4.5 million. At present Croatia is still recovering from the impacts of war: industry suffered from various negative effects such as loss of market, destruction of factories, human losses, etc. As a result, Croatian industry has tended to lag behind new technological achievements and production processes, leading to an even bigger gap between Croatian industry and industry in other Central and Eastern European countries.

In reality, even before the war the majority of Croatian industry was reluctant to make new technological investments, so an alternative approach was needed with an aim to improve old production processes. Cleaner Production (CP) has proven to be one of the most efficient, low-priced approaches acceptable to the management of enterprises while also being favourable for good environmental policy.

Cleaner Production in Croatia

The initiative for CP came from the APO-Hazardous Waste Management Agency, which organised a roundtable on Cleaner Production in 1996 when the National Declaration on Cleaner Production was launched. The year 1997 proved to be significant for CP in Croatia, as UNIDO proposed a project named “Capacity Building in Cleaner Production in Croatia.” As one of the objectives of the UNIDO project, the Croatian NCPC was established in 2000.

Capacity building in Cleaner Production

The UNIDO “Capacity Building for Cleaner Production in Croatia” project was initiated in 1997. The main aim of the project was to form the basic capacity level suitable for further dissemination of the CP concept and principles throughout industry and society. This included a network of institutions and experts for CP implementation, an active core of CP advisors and trainers, a set of demonstration projects, functioning CP centre(s), CP principles included in university courses (such as business administration, engineering and economics courses), as well as a monitoring framework and quality assurance.

Within Multilateral Development Assistance Programmes through UNIDO, the Czech Republic provided assistance in developing basic capacities for CP. The project was organised with a “training of trainers” (ToT) approach, with the intention of educating local experts through various seminars and workshops that would, in the long term, enable them to educate others. Through the project 58 experts were trained in CP. Of these, 43 came from industry while the others were from the government, universities, NGOs and consulting firms.

With 18 enterprises engaged in the project, 21 demonstration projects (case studies) were developed. Those projects were mainly oriented towards housekeeping improvement, process control improvement, internal recycling, equipment and processes, cleaning process modification, education, raw material substitution, process change and new equipment and technology.

Overall savings were USD 3.89 million and the environmental effects were significant. Fresh water savings were 2.37 million m³/year, raw material savings 1,564 tonnes/year, reduction of waste-water 2.4 million m³/year, reduction of waste-water load COD of 54.6 tonnes O₂/year, air emission reduction 33.2 tonnes/year and solid waste reduction of 16,540 tonnes/year.

The range of investments in the project (with an average payback period less than one year) was from zero investment (in 28 percent of cases) to more than USD 350,000 investment in five percent of cases. Two thirds of cases were made with an investment less than USD 50,000.

Chemical factory Herbos is a good example in this case. The enterprises original concentration of herbicides in waste-water was 67.2 mg/litre, mainly due to the product Atrazine, finely suspended in the waste-water. Total produced herbicide lost in waste-water was 0.85 percent of annual production. The result of the CP project was much better filterability of the suspension: filtration of the total mixture became easier and faster and no decantation phase (the main source of water pollution) was needed. Atrazine concentration in waste-water was minimised to 5.4 mg/litre and financial savings were USD 215,000 per year with no investment or immediate payback period.

Cleaner Production in Osijek-Baranja County

This was the first regional project on Cleaner Production in Croatia. The aim was to animate industry and local authorities into CP philosophy thus making implementation much easier.

Through long-term interactive training (eight months of education), 17 representatives from six enterprises gained basic knowledge of CP and started demonstration project implementation within their firms. At the same time 10 representatives from local government, schools, universities and NGOs obtained basic knowledge on CP, environmental management and sustainable development. Experts from participating enterprises implemented eight demonstrational projects. Overall savings were USD 1.35 million and the environmental effects were significant. Waste-water reduction was 1.53 million m³/year, air emission reduction 412 tonnes/year, reduction of technological waste 72,670 tonnes/year, reduction of hazardous waste 245 kg/year, fresh water savings 350,183 m³/year, raw material savings 65 tonnes/year and reduction of natural gas 153,000 m³/year.

With investments in projects ranging from zero (one project) to more than USD 100,000 (one project), the payback period was less than two years (five projects under six months).

Cleaner Production Centre today

UNIDO TEST project

During 2001, the Croatian Cleaner Production Centre started work on the TEST project (Transfer of Environmentally Sound Technology in the Danube River Basin), which was initiated by UNIDO under the UNDP/GEF Danube Pollution Reduction Programme.

The TEST project is a joint activity of five Danube basin countries: Bulgaria, Croatia, Hungary, Romania and Slovakia. The monitoring process revealed 130 industrial polluters as “hot spots.”

A three-year project, TEST is organised around long-term interactive training and practical activities that include eco-auditing, environmental review and environmental analysis.

The aim of the project is to establish environmentally sound technology that is harmonised with the Danube Convention, while still reducing the barriers confronting enterprises by building capacity in industrial service institutions and undertaking analytical assessments for recognition of the lowest-cost path for environmental compliance.

In the first phase of the project, the participation of four enterprises recognised as hot spots was secured. All of these enterprises are located in sub-river basins, and during their production processes pollution in the form of nutrients and/or persistent organic pollutants is generated.

Norwegian project

At the NEAP Donor's Conference held in Zagreb, September 2001, the Croatian Cleaner Production Centre and National Institute of Technology, Oslo, presented project proposals under the name "Implementation of the Cleaner Production Strategy in the National Economy of Croatia." The project is financed by the Norwegian government.

The project goals are to contribute and enhance economic growth and reduce environmental impacts in Croatia based on the implementation of a sustainable CP strategy and to establish a national infrastructure for sustainable promotion of CP. The project will follow up on the success of the UNIDO project. Within the framework of this three-year project 30 enterprises will be trained in CP assessment methodology, from which five enterprises will be selected and prepared for EMS certification. Also, investment options will be identified through CPAs, and the most viable investment options developed into loan applications. A recommendation policy linked to the EU IPPC directive will be drafted.

Overview of the situation

Croatia has only recently developed its National Environmental Action Plan (NEAP). This plan correlates with sustainable development policy, although CP is not integrated into any national economy document.

Environmental Management Systems (EMS) in line with ISO 14001 and EMAS have a growing importance. By September 2001, only 17 enterprises had implemented ISO 14000.

The past few years have been important for the Croatian legal system. Several important legislative acts came into force. The existing legal framework in Croatia does not yet fully comply with many of the key horizontal requirements of the EU environmental directives.

Ratification of the Stabilisation and Association Agreement established a legal obligation for Croatia to align its entire domestic legislation with EU requirements by the end of 2006. Political commitment obliges governmental bodies to draft harmonised regulations by the end of the June 2005.

The law stipulates risk assessment for dangerous work substances. There are no criteria for hazardous waste risk assessment. The existing risk assessment and reduction system is applicable to persistent organic pollutants (i.e. POP pollution) from European and other inventories, although it needs to be improved.

Cleaner Production Centre

The Croatian National Cleaner Production Centre (NCPC) is primarily dependent on projects financed by international institutions. The organisational structure has not yet been developed in a way to assure independent organisation. Conditions are improving for NCPC at the moment. Outstanding results in the first two CP projects made it easier to identify project partners. Croatian NCPC was included in the UNIDO/UNEP Network of National Cleaner Production Centres.

Nevertheless, NCPC should be more progressive in its business actions. Until now, only 25 companies have participated in CP implementation. (Nearly 50,000 industrial-related companies are registered in Croatia).

NGOs

Environmental NGOs in Croatia are very active at the moment, although their activities are mainly focused on educating the general public. NGO work has not yet been directed towards the promotion of better business practice of enterprises. The Croatian Business Council for Sustainable Development (Cro BCSD) undertook an individual initiative for CP promotion. BCSD efforts to make information available on good business practices resulted in dissemination of vital information on efficient approaches to environmental problem solving.

Financing conditions

So far, all CP projects in Croatia have been mainly financed through donor programmes or enterprises as participants in the project. During the introductory projects, the economic situation in Croatia was not favourable for investors/enterprises. Economic growth was slow, firms did not have funds to use for new projects and financial institutions were not prepared to risk the uncertain results of proposed projects. The cost of industrial credits was high; interest rates from 17 percent to almost 25 percent per year.

Since environmental fees were not charged, additional financial sources for environmental projects were missing. New legislation on the environmental fund is now in its preparation phase, and the situation could improve in the near future. Governmental institutions need to initiate changes based on environmental consciousness and sustainable development. Initiation of favourable credit lines for environmentally friendly investments is expected.

Conclusion

Croatian environmental legislation is currently in being harmonised with European directives.

Cleaner Production, while incorporated in Croatia's environmental law, is not yet identified by enterprises as a means of economic advantage. Measures of CP are not recognised and incorporated in the business strategies of enterprises.

Although sustainable development is incorporated in Croatia's development strategy, the government still does not recognise CP as an industrial strategy that could prevent pollution and create economic savings.

There are no public financial sources available for CP support. There is still no environmental fund in Croatia, so establishing this institution is of some importance.

Credit lines for environmental projects do not exist. Banks and local authorities do not have sufficient information on CP and eco-efficiency.

The Croatian Cleaner Production Centre should develop stronger connections with NGOs and other stakeholders and with their help work to improve public awareness of CP.

Eco-efficiency Country Review Summary: Latvia

Prepared by: Janis Plavinskis, director of the Latvian Pollution Prevention Center

Eco-efficiency

Introduction

Since no market demands requiring good environmental performance exist in Latvia at the moment, there are no strong incentives for companies to look ahead and consider cleaner technology options. Companies that are working in Western markets or work in cooperation with their Western partners are often required to operate in an environmentally sound manner. Such companies at the moment are potential candidates for EMS and CP projects.

State of Eco-efficiency Measures in Latvia

In recent years growing attention has been focused on the implementation of Environmental Management Systems (EMS) that provide holistic improvement of the environmental performance of companies.

In Latvia major EMS implementation projects have been carried out within the framework of cooperation between DATI and the Latvian Ministry of Economy. Projects are implemented in cooperation with designated Danish and local consultancy companies.

Individual Cleaner Production projects

A number of individual Cleaner Production (CP) projects have been carried out since the mid-1990s, and most of them had a demonstration or pilot project character. There is very little information available on companies that have been implementing eco-efficiency measures without the involvement of consultancy services. Therefore, information about eco-efficiency projects carried out in Latvia is based on the results of demonstration and pilot projects.

In 1995, American experts carried out 18 successful waste minimisation projects in 11 Latvian companies. The sectors covered by these companies included machine construction, textiles, food production and chemical industry. Total investments amounted to USD 205,000 and financial benefits amounted to USD 1,021,000. In several cases, there were no financial inputs required to achieve positive results.

Projects showed very good economic results — i.e. payback times ranged from two weeks to 12 months, and six months on average. Investments were not high, mostly several thousand US dollars invested by the company or the World Environmental Center (WEC).

Another set of CP pilot projects was carried out in 1996 within the Latvian and Netherlands joint government programme “Energ-efficiency and clean technologies in food industry in Latvia”. Cleaner production projects were carried out in five designated companies and involved rather simple solutions (e.g. replacement of old and inefficient equipment, changes in planning of production premises). However, no information is available regarding financial and environmental benefits.

From 1997 to 2000, as part of the “Development of cleaner technologies in Latvia” project, several CP projects were realised in beer production, fish processing and metal processing industries. The project was implemented by the Carl Bro company, in cooperation with the Environmental Consulting and Monitoring Centre. During the project, consultants prepared environmental performance reviews for several companies, and three companies were selected

to carry out demonstration CP projects. As in previous projects, due to commercial considerations, no quantitative information on pollution reduction and/or financial gains from the CP project is available.

A few CP projects have been implemented recently in the food industry, with financial support from LEIF. LEIF funded single CP/CT projects in one meat processing plant and two breweries. The issues addressed in CP projects were: 1) change in fuel; 2) change of refrigerant agent; 3) economy of electrical energy; 4) some changes in production process to increase resource savings and efficiency.

The most recent activities in the field of CP include three projects in food and metal processing industries. The Latvian Pollution Prevention Centre carries out these projects. Food industry projects contemplate improvements in water and energy economy. CP improvements in the metal processing industry are technology based, for example 1) shift from water-based painting process to powder painting; 2) changes in metal chilling technology; 3) improvements in energy efficiency.

CP projects implemented as part of EMS

While EMS projects do not focus specifically on CP, but rather on the improvement of the whole system, CP issues are treated in environmental action plans. In some cases CP projects are carried out as defined in environmental action plans. Often CP implementation is limited by the availability of resources.

Recent EMS projects

A total of nine CP projects were implemented in four companies operating in the pharmaceutical industry as part of an EMS preparation project between 2000-2001. Projects were funded by DATI and implemented by DTI in cooperation with LPPC. CP projects addressed such issues as 1) reduction of chemicals consumption; 2) substitution of chemicals; 3) reduction of resource use; 4) reduction of toxic waste-water; 5) improvements in the production process, cleaner technology solutions.

Recent/forthcoming projects

A new DATI-funded demonstration project “Environmental management in the chemical, pharmaceutical, rubber, plastics and textile industries in Latvia” started recently. The aim of the project is to facilitate compliance with ISO 14001/EMAS II in chemical, pharmaceutical and textile industry companies.

The DATI demonstration project “Environmental management in the wood industry” started in July 2001. The specific objectives of the project are to demonstrate the effects of environmental management and the use of cleaner technologies in wood industry companies. By the end of the project, four participating companies are expected to have introduced EMS. The project aims at specific CP targets: the provision of documentation for the propagation of environmental management and CP know-how among other companies in the Latvian wood industry.

The third DATI-funded EMS demonstration project in Latvia is the “Implementation of EMS in the iron and metal industry in Latvia.” The project organiser is the Danish Technological Institute and the Latvian Pollution Prevention Centre provides practical support. The overall objective of the project is to train and support employees from the participating companies in EMS.

Experience and Conclusions from the Projects

Experience from companies that have implemented CP measures within their EMS projects shows that there are a number of difficulties/barriers that impede the application of CP measures in industry:

- lack of financial and human resources that prevent companies from pursuing more radical cleaner technology investments;
- lack of (monitoring) equipment needed to determine the progress and extent of eco-efficiency measures;
- problems related to management commitment are also mentioned;
- other barriers include market pressures, ownership changes, uncertainty about the future of the enterprise and financial problems.

Financing Eco-efficiency Projects

As yet there is no solid basis for financing eco-efficiency projects in Latvia. The reality of today's situation is that the majority of projects have been demonstration or pilot projects, usually funded by external sources.

Organisations in Latvia that provide funds for CP projects

The Latvian Environmental Investment Fund (LEIF) has started providing financial resources for environmental projects and CP projects in particular. Since LEIF has been operating in the field of CP for a relatively short period of time (18 months), only three CP projects have been accomplished so far.

The purpose of LEIF is to pool local earmarked resources with foreign bilateral and multilateral support, to bolster public and private environmental investments. The funds today amount to a total of about LVL 8.5 million, of which LVL 3.5 million are PHARE funds and LVL 2 million are NEFCO funds.

LEIF finances projects with total project costs up to a maximum LVL 500,000, at an interest rate of 7 percent. The typical size of loans ranges for LVL 120,000 to LVL 250,000. LEIF covers up to 80 percent of the project costs, but at least 20 percent of the project costs have to be financed by the project undertaker.

The role of NEFCO is increasing in the field of CP in Latvia. The Latvian Pollution Prevention Centre has signed a cooperation agreement with NEFCO regarding financing CP projects. The role of LPPC in this agreement is environmental supervision of projects and LEIF provides financial supervision of the projects. Companies can obtain soft loans for CP projects up to a maximum of EUR 200,000 at an interest rate of 3.5 percent, with a payback time from one to three years.

The Valmiera glass fibre factory is one of first companies that will receive funding for a CP project from NEFCO. Several more companies are now working actively to prepare CP projects.

Potential CP areas for IPPC in the future

According to a DEPA/MEPRD study¹³ the action plans for implementation of BAT to be carried out by Integrated Pollution Prevention and Control (IPPC) installations will require significant investments. Implementation of EU IPPC directive requirements is felt as one of the major driving forces for effecting cleaner production (BAT) options. According to the study on IPPC approximation, there are around 125 IPPC plants at the moment in Latvia, which will need IPPC permits by the year 2007.

LEIF, and possibly new and specialised EBRD credit lines, may be an important means of supporting the process as such credits can expand the amount of finance available for IPPC approximation purposes.¹⁴

Local banks

Local commercial banks do not have special credit lines for funding CP projects. Banks offer commercial loans on a competitive basis at an annual interest rate of 9-14 percent. The amount of loan varies depending on the bank.

Latvian Business Advisory Service Programme (LBASP)

The programme was established and financed by the governments of Denmark, Iceland, Norway, Sweden and Finland, and supports the development of SMEs in Latvia. Entrepreneurs are able to receive a grant for preparation and certification according to ISO 14001. LBASP can cover one third of the costs and usually includes consultant service fees.

Private resources

Several EMS projects have been implemented without external financial support. In 2000 three enterprises in the Ventspils seaport (Ventspils Nafta, Ventamonjaks and Kalija Parks) implemented EMS according to ISO 14001, bearing the costs of EMS implementation on their own.

Also, several companies have financed cleaner technology projects by themselves. However, detailed information on the scale and size of projects is not available.

¹³ DEPA/MEPRD Approximation Strategy and Plan Project to Assist Latvia in Approximation of EU Law Concerning IPPC, final draft

¹⁴ DEPA/MEPRD, IPPC Approximation Assessment of Compliance Cost of Latvia, final report

Eco-efficiency Country Review Summary: Lithuania

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Eco-efficiency

Introduction

Eco-efficiency starts from issues of economic efficiency, which have positive environmental benefits, while Cleaner Production (CP) starts from issues of environmental efficiency, which have positive economic benefits. Both concepts ask companies to follow a strategy of preventive environmental management by integrating environmental aspects throughout the lifecycle of their products and services (including R&D, design, manufacturing, maintenance, transport and use).

Many examples have shown that both are today linked to the bottom-line. Applying eco-efficiency and CP generates tangible economic savings for an enterprise by improving overall efficiency of its processes. Optimising resources use and reducing emissions may lead directly to significant savings, so capital investments can have a short pay-back period.

Cleaner Production in Lithuania

Until 1998 environmental progress in Lithuania relied on a philosophy of pollution control. Efforts to reduce industrial pollution were mostly focused on developing environmental institutions and legal frameworks, largely by establishing command and control regulations. However, formal regulation by itself has not proven very effective in reducing industrial pollution. Therefore there was a need to focus on what makes industry take action and stimulates improvement of their environmental performance.

In Lithuania CP methodology was introduced in 1993. Since then 12 CP programmes (three of them integrated with EMS) have been performed in different economic sectors. Around 150 companies, representing 18 branches of industry, participated. The projects, developed during the CP programmes, covered all the main environmental areas: reduction of water pollution, emissions to the atmosphere, solid waste, and effective use of water and energy resources.

Most of the projects implemented in the areas of resource efficiency, minimisation of emissions and waste generation in Lithuania have been implemented by the Institute of Environmental Engineering (APINI), Kaunas University of Technology, jointly or in cooperation with foreign partners and financial support from several donor countries.

In its activities, APINI uses the CP definition of the United Nations Environmental Programme (UNEP). This definition underlines that CP is a focused approach to manufacturing processes and products to maximise the efficient use of raw materials, energy and water, and minimise the output of waste and harmful substances. CP is applied to production processes and products, using a methodology which includes the following basic steps: planning, analysis of pollution causes, development of CP options, feasibility study, implementation of feasible measures and measuring of results.

The most successful was the Lithuanian/Norwegian CP programme, in which Norwegian CP methodology was efficiently adapted to the needs of Lithuanian industry and CP activities were practised widely by companies/participants. The programme started in 1996, and by 2001 five schools had been established. Fifty-six Lithuanian industrial companies participated in the programme and 626 CP proposals (269 of them “good housekeeping” measures with no or minor investments) were generated. Environmental, technical and economic evaluations of the proposals were made. The companies implemented 126 of the proposals during the programme using their own funds. Economic results show that the pay-back average during the programme of prepared CP projects was shorter than two years.

The fifth Lithuanian/Norwegian school was conducted on regional principles with the attempt to evaluate CP concept implementation impact on environmental improvement and industrial environmental compliance development in the Klaipeda region.

The summaries of the projects developed during the programme were presented to the Lithuanian Ministry of the Environment as case studies and motivation for other companies. In 1998 the Pollution Prevention Centre (PPC) at the Institute of Environmental Engineering (APINI) and Association of Engineering Ecology of Confederation of Lithuanian Industrialists developed the National Action Programme for the Development of Cleaner Production and Ecological Industry.

The final assessment report in Central and Eastern Europe conducted by OECD in 1998 concluded that Lithuania has achieved a basic capacity level for CP. Nevertheless, different actors that could play a role in promoting and implementing CP among enterprises (i.e. governmental institutions, industry, non-profit or non-governmental organisations, universities, private consulting companies, financial institutions) lack awareness, knowledge and resources to be fully effective in promoting and implementing CP. Generally, industry and other stakeholders are not familiar with preventive approaches and the potential benefits they could bring. There is a need to intensify efforts in promoting CP.

Experience from existing CP demonstration projects shows that dissemination of CP from one company to other companies does not come automatically, even though the early economic savings can be remarkable. To promote wide-scale CP application, there is a need to provide well-structured information on CP in a user-friendly manner supported by a set of local case studies demonstrating examples of successful CP implementation in industrial enterprises.

Environmental costs have been rising steadily for many years now. Initially, these costs did not seem to have a major impact on production. For these reasons, most companies ignore many of the direct, indirect or less tangible environmental costs in their investment decisions. Training on financial engineering was performed during the Lithuanian/Norwegian CP programme. The main goals were:

- to develop a sense of the distributional implications for different financing choices;
- observe the ways in which CP can provide alternatives and supplements to financing;
- to develop a greater appreciation for the benefits of regional and other inter-local approaches;
- to make the economic analysis of CP investments using a range of techniques, including
- investment appraisal;
- investment analysis: pay-back period, present value, internal rate of return;
- records of past economic performance: balance sheet, loss and profit account, manufacturing accounts;
- ratio analysis: Du Pont economic model.

Also, the project developers were given training in business planning, and shown how to develop professional, economically feasible CP investment projects. At the end of the project, 117 experienced CP experts had been trained and awarded with International CP Expert Certificates.

Financing constraints are often mentioned as a major barrier to the wider adoption of CP in Lithuania and, as practice shows, in small, traditional businesses or inflexible state-owned enterprises it is the fundamental problem for CP project implementation.

A special fund for CP investments, the Nordic Environment Finance Corporation (NEFCO) is operating in Lithuania. The fund has considerable catalytic effects by demonstrating to other financiers and enterprises that financing of priority CP investments yields environmental and economic benefits. NEFCO's revolving facility for CP investments started in Lithuania at the beginning of 1998. The main objective is to finance the implementation of high-priority CP investments, with rapid payback and favourable terms, which yield environmental and economic benefits (i.e. "win-win" projects).

The investments should be commercially viable with an identifiable and secure stream of earnings that can be used to repay the loan. The basis for providing a loan is the cashflow of the CP investment and the ability of the enterprise to repay the loan over the agreed period.

It is commonly accepted that a specialised fund for CP investments is required in Lithuania, to encompass most of the activities currently undertaken by, or with the support of, the international community. Although these strategies are commonly accepted, it has also been pointed out that the effectiveness of these strategies still need to be improved, in particular on the basis of evaluation of their practical application in various projects in different developing countries. It should be stressed that NEFCO's revolving facility is a unique and highly successfully operating credit line in Lithuania, and has now approved investments for 29 CP proposals in 26 Lithuanian companies.

Environmental appraisal of CP projects focuses on the following considerations:

- the location of the project with respect to population centres, sensitive local land use, and the existing levels and sources of pollution;
- the pollution category (air, surface water, groundwater, hazardous waste, etc.);
- the scale of the pollution impact;
- the effect associated with the pollution including possible toxicity to human health, possible impact on climate change, and damage to the natural ecosystems and habitat.

Technical appraisal of the project focuses on *inter alia* ensuring that the project is technically feasible, technical solution is cost effective, and that no experimental technologies are being applied; confirming that the environmental and economic benefits are achievable; establishing that the time scales are reasonable; and confirming that the procurement approach is acceptable and that the price estimates are realistic.

The Pollution Prevention Centre plays a crucial role in the identification, evaluation, implementation and reporting of CP projects:

- Prepares a loan application on behalf of the applicant, including assistance in calculation of costs savings and environmental benefits.
- Assists NEFCO in communication with the applicant and preparation of loan documentation, project description and reporting requirements.
- Prepares reports on project progress and completion reports to be presented as part of the borrower's disbursement request.
- Assists in project monitoring and supervision including supervision of procurement and project implementation progress as compared to budgets, the implementation plan and project objectives.

It can be concluded that BCL built in Lithuania ensures continuous improvement of the environmental and economic situation in Lithuanian industrial companies, stimulates CP promotion in economic sectors (industry, agriculture and transport) as well as in the political sphere (government, Lithuanian ministries of environment and economy, municipalities, regional environmental departments).

Particular attention should be given to the issues of CP promotion and its integration into the social and economic development of the country, education and training in CP, involvement of different stakeholders in CP programmes. Experience of other countries in this regard is particularly important. Therefore, exchange of experience among countries participating in the Baltic Agenda 21 process would be very valuable.

Adaptation to EU Environmental Standards

With full harmonisation of EU environmental legislation and particularly the implementation of the EU's Council Directive 96/61 on Integrated Pollution Prevention and Control (IPPC), IPPC will become an increasingly important driving force in the business environment in Lithuania.

The project to strengthen the framework and administration of Lithuania's laws on waste management and environmental management, implemented in 1997-1999, was the first step in introducing the IPPC Directive in Lithuania. In this project, a methodology for IPPC implementation in Lithuania was developed. However, there is a need to intensify activities in this area because industrial enterprises and other stakeholders lack information on the topic.

The permitting system is one of the core tools in the implementation of the IPPC Directive. The environmental permitting system currently existing in Lithuania will have to be replaced by an IPPC permitting system. As the current system has some features of IPPC (e.g. pollution emissions to air and water, as well as waste management, are covered by one permit), only adaptation of the permitting system will be required. A new permitting system based on IPPC requirements will be introduced in Lithuania on January 1, 2003. As a first step, new requirements will be applied to new and modernised enterprises (approximately 200). Other enterprises will have a transition period lasting until October 31, 2007. During this period, permitting procedures will be performed in accordance to the new IPPC permitting rules, but meeting the requirements will be postponed until October 31, 2007.

A number of measures will have to be implemented as a result of the IPPC Directive in Lithuania. These include integrating the EU's maximum permissible pollution levels into Lithuanian law; applying BAT and cleaner technologies; modernising equipment in regional environmental protection departments; modernising laboratories, setting up a public participation system in the environmental permitting process. All of these and some other measures related to the topic are covered in the draft programme on implementation of the IPPC Directive in Lithuania, which is currently being developed.

With regard to the transposition of other legislation relevant to industrial activity, a new legislation was adopted in 2000, when the transposition of the EIA Directive was finalised. In 2001, a ministerial order and law on packaging and packaging waste should be adopted.

New projects relevant to the topic, submitted to the PHARE 2001 programme, are the following:

- chemicals and GMO management (data inventories and development of databases as well as institutional strengthening);
- implementation of IPPC regulations; and
- climate change and gas emission control (inventories and development of regulation mechanism).

Capacity building activities are very important to ensure successful and effective IPPC implementation in Lithuania. Introduction of the IPPC Directive in selected branches of Lithuanian industry would be particularly useful.

Green products

Many projects concerned with technology have been implemented in Lithuanian companies by the Institute of Environmental Engineering (APINI), part of the Kaunas University of Technology, with assistance from various foreign institutions and financial support from several donor countries. However, the field of cleaner products is generally unexplored. No Lithuanian industrial enterprises are involved in the development of green products — defined as products with low resource consumption and environmental impact over their entire lifecycles.

Product oriented approaches such as eco-design and more generally, reduction of product impact to environment over its entire lifecycle, have yet to be considered in Lithuania. The main obstacles for development of green products are the following:

- lack of local capacity for training of industrial enterprises on environmental product development and assessment;
- low awareness and demand for green products from Lithuanian consumers;
- there is no environmental product development, and no assessment tools or methodologies developed or adapted for Lithuanian enterprises.

However, the interest in environmental product assessment and development is growing, especially in enterprises that have implemented EMS in accordance with ISO 14001 or EMAS. Some enterprises expressed interest in receiving training in environmental product development.

Recently, a research group on product-related environmental issues was established at APINI. The focus areas of the research group are the following: development of eco-design tools for Lithuanian industrial enterprises; environmental product assessment; eco-labelling; and extended producer responsibility.

Environmental Management Systems (EMS)

As one of the first steps in promoting environmental management systems (EMS) in Lithuania, APINI organised a conference, “Environmental Management Systems and Standards,” held in Kaunas, Lithuania, in September 1998. The aim of the conference was to introduce the concept of EMS to different stakeholders and to discuss the practical steps in its introduction in Lithuania.

To build capacity in the area of EMS, APINI, in cooperation with Norwegian company Det Norske Veritas (DNV) and the Ministry of the Environment, carried out the “Capacity Building in Environmental Auditing in Lithuania” project, funded by the Norwegian government. In this programme, 19 environmental auditors were trained in accordance with EARA requirements. Currently, there are 18 companies in Lithuania certified to ISO 14001, nine of which have been consulted by APINI. However, the number of companies implementing EMS in accordance with ISO 14001 standard is rapidly increasing.

The number of companies providing consultations on environmental management in Lithuania is limited. At present, enterprises implementing EMS mainly use APINI for consulting services. The Institute of Environmental Management and Auditing (AVAI) is also involved in the consulting process to some extent. Some consultations on EMS are provided by the following companies: TUV-Uolektis, Telebaltikos konsultacija, Verslo sistemu grupe.

To identify areas where more measures are needed, APINI carried out a survey, which demonstrated that there is a shortage of training materials on EMS (ISO 14001/EMAS) and their implementation procedures in local languages. First of all, there is a lack of good quality materials on EMS, particularly those adapted to local conditions. There is also a need for general EMS training seminars. It is particularly important to familiarise enterprises with issues related to environmental protection in the context of modern business. Second, there is a need for more trained environmental management specialists — EMS managers — who can implement EMS (ISO 14001/EMAS) in companies. In this respect, there is a lack of specific training materials related to practical implementation of EMS, particularly on the training of internal auditors, procedures of internal auditing, management of accidents, identification of environmental aspects, etc. Brief and clearly presented information on EMS is also needed.

The lack of experienced EMS experts in Lithuanian industry is also an important need identified by enterprises surveyed by APINI. It is important to note that a higher number of experienced experts would enable them to work with fewer enterprises for a longer time period, which would help to ensure implementation of effective EMS.

Due to lack of information and practical experience, enterprises often need external assistance and advice in implementing EMS. However, the number of institutions providing consultation on EMS in Lithuania is rather small. Many enterprises also need financial support for EMS implementation.

So far, mainly foreign consultants have offered ISO 14001 certification services. The companies currently implementing ISO 14001 consider that the implementation of EMS standards today is hindered by the high costs of services from foreign consultants and certification bodies. EMS implementation and participation costs are particularly important in the case of SMEs.

Eco-labelling

In Lithuania, the system of environmental labelling was introduced by the “Order on the Environmental Labelling of Products” in 1996. This order regulates the environmental labelling procedure. The environmental label “water-lily” was also created in 1996.

Environmental criteria have been developed for the following product groups: building materials, ceramics, technological machinery, electro-technical equipment, toilet paper and paper-towels, textile products, leather, fertilisers, fluorescence lamps, refrigerators/freezers, detergents, and dishwashers. The criteria are based on environmental requirements of the EU eco-labelling scheme, Oko-Text, and some other documents.

The main obstacles to eco-labelling in Lithuania are the following:

- there is no institutional basis for eco-labelling procedures in place (e.g. environmental labelling commission is not established);
- lack of expertise in the environmental evaluation of products;
- high costs for enterprises to get their products labelled;
- there is no recognition of the Lithuanian eco-label in foreign markets;
- the capacity-building process in this area has to be initiated. The first step could be an awareness-raising campaign, in particular the translation and publication of materials on eco-labelling in Lithuanian and the organisation of seminars on the topic.

Environmental reporting at the company level

Environmental reporting by individual companies with the aim of making information on environmental impact and performance publicly available is not widespread in Lithuania. Only a few companies have started to publish information on environmental performance and their impact on the environment. In most cases, these are progressive companies, exporting significant amounts of their production.

In general, there are no materials available in Lithuanian, and the area of environmental reporting at the company level is unexplored.

Capacity building in this area has to be initiated. The first step could be the translation and publication of materials on environmental reporting into Lithuanian, and the organisation of seminars on the topic.

Development of eco-efficiency tools

In the area of development of eco-efficiency tools such as lifecycle analysis (LCA), lifecycle costs (LCC), lifecycle inventory (LCI) and performance indicators, only some research activities have started in Lithuania.

No examples of practical application of eco-efficiency tools are available and no measures to promote or initiate implementation of these tools have been carried out in Lithuania.

Eco-efficiency tools have yet to be analysed properly in Lithuania and the ways to get the most out of these approaches have yet to be found. Capacity building in this area has to be initiated. The first step could be the translation and publication of materials on eco-efficiency tools into Lithuanian and the organisation of seminars on the topic.

Once BCL has been created the country should designate its own national development strategy, based on needs and experience, both national and international. Therefore it should be stressed that two kinds of activities should be integrated: political activities (efforts on reform tax policies, use of market-based instruments, regulatory policy, education and other tools that motivate decision-makers to select CP); and industry activities (specific environmental projects, technical assistance and direct financing of environmentally sound projects in industry and organisations).

The integration of political and industrial activities would:

- strengthen support for CP among policy-makers;
- promote the use of a wider range of policy instruments;
- emphasise regional and local “ownership” of CP programmes;
- further implement EMS and standards;
- establish and strengthen financing mechanisms to provide investment capital at affordable rates, and strengthen capacity to prepare financially viable environmental projects;
- develop methodologies to assess the impact of CP programmes, particularly in economic terms.

The financial services sector has the power to direct financial resources towards projects or companies that have demonstrated good environmental performance. A growing number of managers in the sector have now become aware of the need to systematically evaluate the environmental risk associated with their decisions. So the finance sector has one of the key roles in CP promotion. Environmental risks vary from one financial activity to another. Most such risks are linked to negative impacts on a company’s financial results, or factors such as financial liability, the need to comply with stricter regulations, the impact of accidental releases, or loss of market share due to a bad environmental image. Finally, the responsibility for financing projects with significant environmental impacts can affect the image of financial institutions.

From the above-mentioned factors it can be concluded that environmental performance, measured through the adoption of sophisticated CP processes, is increasingly regarded as an indicator of business health. Good environmental management reflects good management in general. To the extent that financial institutions share this perception, pressure on firms to adopt CP processes will be much greater in the future.

From the investment demand side, the companies which participated in systematically performed CP training (including capital budgeting, analysis of past economic performance, risk and sensitivity analysis of CP projects) will always develop economically feasible projects with comparatively short pay-back periods, and very small or eliminated environmental risk.

Conclusion

The key aspects of the long, knowledge-intensive process of integrating environmental concerns with rapid economic development are the following:

- understanding the environment and the processes that affect it by identifying the sources of environmental degradation, its consequences, and the costs of reducing it, as the foundation for effective policy;

- developing indicators of environmental performance that policy makers at the local, regional and national level can use;
- using environmental information to improve both public regulation and private decision-making;
- managing environmental knowledge by building the capacity to gather and disseminate knowledge, improving private sector environmental management and broadening public policy models to include environmental variables.

Effective development requires partnership among different levels of government, the private sector, donor groups and civil society. The major challenge in implementing the proposed approach of CP investment promotion is the country's ability and willingness to develop and implement its own national strategy. This would increase the effectiveness of possible external assistance and efficiency of the support it provides, i.e. support for BCL should increase. A comprehensive strategy is simply too demanding for any one level or area of government or for a single donor. National governments need to provide the guidance that agencies and organisations require to coordinate their efforts to remove bottlenecks to development.

Eco-efficiency Country Review Summary: Romania

Prepared by: Vladimir Gheorghievici, director of The Romanian Pollution Prevention Center

Eco-efficiency

Introduction

General economic context

In the last five years inflation has been relatively high in Romania, decreasing from 151.4 percent in 1997 to 30.7 percent in 2001. The GDP growth variation has been significant in the last few years after three years of decline.

Environmental legislation and policies in Romania

Romanian legislation regarding the environment is currently undergoing the harmonisation process with the EU. The framework law regarding environmental protection, no. 137/1995, includes the essential juridical aspects of the reform that are under way in this field. Among the aspects taken into account in the emerging legislation are pollution prevention, an integrated approach to the gradual elimination of dangerous and hazardous substances, the re-use and recycling of waste, and good water and energy management. The Chamber of Commerce does not currently have a specialised department to carry out eco-efficiency programmes.

Consulting capacities in Romania

Two traditional institutes related to water management and environmental protection, the Institute for Environmental Research and Engineering (ICIM) and the Institute for Industrial Ecology (Ecoind) offer training and audits for Cleaner Production (CP). Last year Ecoind was appointed as the focal point for the TEST (Transfer of Environmentally Sound Technologies) project for the Danube River basin. This project seeks to identify and implement CP projects and EMS in two or three industrial companies, with the help of a GEF grant and administrative and technical coordination by UNIDO. The project also provides an international CP trainer, appointed and paid by UNIDO.

A further two or three NGOs have been involved in CP projects financed by Ecolinks grants.

Around 200 SMEs and around 200 individual experts are currently offering expertise for the elaboration of environmental impact assessments and for environmental audits for particular economic and social activities.

Many organisations that specialise in training and consulting for ISO 9000 implementation and certification are currently seeking to adjust and adapt themselves for ISO 14001.

Eco-efficiency in Romania

Before 1990 there were very few eco-efficiency initiatives, mainly because the Romanian economy was very centralised and the Communist Party leadership had other priorities than environmental protection and economic profit. Eco-efficiency initiatives have grown steadily in the past five years. As Romania's economy has become more and more market oriented and the number of private or privatised industrial companies increase, more eco-efficiency initiatives have taken place, mainly in the private sector but also in the state-owned sector.

The main efforts have focused on the following types of eco-efficiency initiatives: waste minimisation, energy conservation, CP or pollution prevention programmes, EMS, and city-based sustainable development programmes.

World Environmental Center

Between 1992 and 1995, the World Environmental Center (WEC) carried activities to document economic and ecologic benefits that resulted from low-capital pollution minimisation ventures and implementation of CP technologies. The WEC programme was characterised by a methodological and reliable approach to the undertaken activities. During the realisation of the first part of the project, attention focused on quality rather than quantity.

All of the undertaken ventures were carefully documented, with particular attention being paid to the financial results. At least 17 demonstration projects have been implemented in eight large companies from the oil processing and chemical industries, and one from the steel industry, with a total benefit of more than USD 1,700,000. At the end of the process, information concerning the programmes was published and widely advertised. In Bucharest the WEC established a Pollution Prevention Center as a non-profit independent foundation, rather than as part of a university or business association.

The Pollution Prevention Center

The Romanian Pollution Prevention Center (PPC) was established in September 1995 with support from WEC and USAID financial support (from October 1995 until the end of March 1999).

The PPC approach was adapted to the evolving situation. In 1996-1997 there were several awareness-raising seminars and workshops on waste minimisation, energy conservation, pollution prevention and EMS (more than 500 representatives from more than 100 industrial companies and more than 50 experts from relevant ministries participated). In 1998-1999 implemented demonstration projects took place: three for waste minimisation and six for energy conservation.

Since 1998 PPC has provided services to monitor pollutant emissions and energy producing optimisation at several companies' thermal units. The economic benefits averaged USD 10,000 per year due to reduced fuel consumption.

In 2000 PPC, in cooperation with FIATEST, held introductory courses on EMS implementation and audit, and on pollution prevention. At least 80 people from about 10 companies and institutes participated in each course.

In the 2000-2001 PPC participated as consultant for two companies in a city-based sustainable development programme, in line with the Ecoprofit methodology at Ramnicu Valcea. The project was coordinated by Denkstatt Vienna and financed by the Austrian government; the local administrator of the programme was the UNDP Representative Office.

From October 2001 PPC has been involved in the POEMS EE programme of EMS implementation, and in the capacity building of internal audit in SMEs financed by the Czech government. This participation is in line with the methodology developed by the Czech Environment Management Center (CEMC) within the PHARE Partnership Project, coordinated by the International Network for Environmental Management (INEM).

Since this financing scheme started, more companies and municipalities have been able to finance eco-efficiency initiatives. In the five cycles of Ecolinks, 43 grants were awarded for eco-efficiency initiatives (the total amount awarded so far is at around USD 2 million). Access to financing and transfer of know-how from partners was the main source of the project's success.

Critical Overview

The slow pace of transition to a market economy has not entailed sustained economic development. There have been periods of deep recession interrupted by short recoveries in economic growths. The private sector is weak in an industry that is dominated by state-owned companies. Only in the past three to four years has a significant private sector appeared in industry. The attitude of the state-owned companies is reactive, ignoring any problem until it is pressed forward by environmental and health authorities and trade unions.

The main incentives for industrial plants to actively implement CP or pollution prevention programmes have been economic benefits, enhanced public image (especially for bigger companies), avoiding conflicts with environmental and health authorities (once again for the larger companies) and environmental and market pressure. In the private sector and for SMEs economic benefits have been the main incentives. If the management of a company is shown the short payback period and long-term results of CP, financial sources for implementing such projects can usually be found.

High interest rates (between 40-50 percent) pose a barrier to the proliferation of these initiatives. As inflation has been high for several years, most companies are de-capitalised and do not want to finance eco-efficiency projects. Thus the sole sources of financing for eco-efficiency are external ones.

The government's influence is mainly exerted by means of the local environmental protection inspectorates and environmental legislation. There are emission limits but it is no concern about how these limits are respected. There is no fiscal facilitation for companies that invest in eco-efficiency initiatives. In some cases the local authorities support city-based sustainable development projects (two municipalities supported projects in which PPC was, or is, involved: Ramnicu Valcea and Constanta).

There are several universities (University Polytechnica Bucharest, Bucharest Technical University for Construction, Technical University Iasi, Economic Studies Academy, and others) that provide courses in environmental sciences, and there are some faculties that have specialisations in environmental sciences (with even a few masters degrees). In some universities there are ecological centres that are NGOs: the Romanian Society for Protection of the Atmosphere (SOROPA), within the Bucharest Technical University for Construction; the Center for Research on Environment and Elaboration of Environmental Impact Studies (CCMESI), within the University Bucharest, Geography Faculty, and others.

Trade unions in Romania do not actively support eco-efficiency initiatives, but they can be powerful allies if the projects improve the health situation and/or the work safety at industrial companies. The NGOs' role in promoting eco-efficiency initiatives is still insufficient because of the information blackout.

There are new opportunities to apply pollution prevention (i.e. CP) ideas as part of the implementation of EMS according to ISO 14001 (there are at least five certifications in Romania).

Two groups of companies have implemented EMS: the first group is composed of medium and large companies that are owned by foreign private investors; the second is composed of big state-owned or private-owned companies that export to developed countries and thus EMS is a requirement for their export activities. More and more SMEs are interested in implementing EMS, but they are frightened by the complexity of the system and the costs involved.

Financing eco-efficiency initiatives

Due to the general deterioration of economic conditions, for the majority of industrial companies profits, and thus the availability of own financial sources, have dropped. Thus the importance of external financing in projects is high. Foreign financing was the main source of funding for eco-efficiency projects (USAID through the Ecolinks

Challenge Grants Programme, Austrian government). The sole exception is the EMS implementation and certification that has been financed by the companies themselves.

Conclusions and Recommendations

The potential of Romania to develop eco-efficiency projects has not been fully exploited. The slow pace of reform has hindered the development of this type of project.

The high interest rates block any temptation to use bank credits for eco-efficiency projects. A national environmental fund was established recently and is not yet functional.

The implementation of a national environmental information system is important because the information about this type of initiative is scarce. The results of the monitoring of pollutant emission could be combined with the monitoring of eco-efficiency projects.

It is important to provide fiscal incentives for investments in eco-efficiency projects. At least the monitoring equipment and the equipment for technological improvement (or upgrade) should be exempt from profit tax if not considered as an expense.

Eco-efficiency Country Review Summary: Slovakia

Prepared by: Mgr. Renata Kruppova, Slovak Cleaner Production Center, Bratislava

Eco-efficiency

Introduction

ABEI II discussions in Slovakia took place at a computer supported and facilitated conference. Discussion focused on present needs for action and the planning priorities in business and environmental spheres. The goal was to identify present eco-efficiency practices in Slovakia.

The Slovak Cleaner Production Centre addressed around 50 experts from different sectors in the country, mainly from public administrations at the governmental, regional and local levels, interested NGOs, state and financial institutions, some of which were familiar with CP and EMS. Ten experts participated in the discussion. The email discussion forum was divided into three rounds and started in July 2001 and ended at the beginning of September 2001.

Overview

Some of the first eco-efficiency projects in Slovakia were CP projects started in 1994. They were implemented according to a good methodology and strategy. However, as these projects relied fully on donations, they were not valued by businesses and the money savings were not appreciated.

To obtain an efficient pay-back period for projects, the general public and business needs to understand the meaning of eco-efficiency. If economic and environmental efficiency are not connected, there is no chance for real change. These systematic approaches do not exist in Slovakia: more attention is paid to industrial wastes than to the prevention of waste generation.

Financing eco-efficiency projects

In the discussion about eco-efficiency, all contributions confirmed the insufficient support of eco-efficiency projects. This is caused not only by low environmental awareness, lack of investment and insufficient legislation, but also by low interest in promoting and creating links between economic profit and environmental benefits.

Results/actions related to financing of eco-efficiency projects

Public finances are already overstretched (investment from the State Environmental Fund and from the Ministry of the Environment). There are not enough resources available to allow decision-making and the application of the correct solution to actual, acute problems. The state needs to play a more active role in promoting eco-efficiency projects, to popularise them. For example, environmental technologies should be tax-free. It is necessary to start a dialogue among various public and business sectors at different levels, although the coordination of this progress is not always effective.

The State should not interfere with water and energy prices. If it does, many potential eco-effective projects are made non-profitable and unlikely to be financed by commercial banks, such as municipal waste-water treatment plants.

Eco-effective projects vary in profit return; thus the commercial institutions prefer to finance highly profitable projects. Financial institutions approach eco-efficiency as an investment; they are not a charitable institution. Investment availability is divided by the profitability of companies and projects. The profitable company enhances eco-efficiency through loans from commercial institutions and through foreign investors.

Non-profitable domestically owned companies are a problem. Banks are wary of Slovak businesses that do not have a track record of profit or sufficient skills. Fortunately companies are very often sold to foreign investors, and after internal structural changes there is a real chance for a company to be secured.

Companies with foreign capital usually have sufficient investments and internal resources. The foreign investor is likely to want to be in compliance with EU standards, while minimising costs and taking care of equipment. The continuity of progress follows by dealing with waste and energy savings.

The ideal status is when companies are profitable and certified to ISO standards, which facilitates obtaining loans. A problematic situation arises when there is a lack of interest, lack of loans and lack of motivation.

Legislative position

Access to financial sources is also limited by current legislation in the field of the environment. New regulations have made a difference, for example the IPPC Directive 96/61/EC on integrated pollution prevention and control. As part of the EU accession process, each of the applicant countries needs to either fully implement the EU environmental directives before accession or to have developed detailed and credible implementation and financing plans to support a request for a transition period for the implementation of specific directives. To be in compliance with EU standards creates a variety conditions in the field of environmental investment.

EU accession also presents some obstacles to eco-efficiency, as the investments required to bring Slovakia in line with EU countries are estimated at EUR 3 billion.

The other point of view is that large companies are applying for certificates of various standards, although EU compatible legislation for SMEs, especially engineering and metalworking, is still missing.

Proposals for Further Action

In the current stage of eco-efficiency, or rather “non eco-efficiency” in Slovakia’s case, the main issues are the old environmental burdens and a failure to address environmental problems.

According to participants, success in eco-efficiency requires the following activities:

- Elaboration of case studies, which would persuade government officials and financial institutions about the economic return of eco-efficiency projects. The case study should obtain best practices from Slovakia and abroad with investment figures and returns for each industrial sector. There should be a chapter on legislation and methods of eco-efficiency project promotion in countries already dealing with this issue. This could be based on projects already available in SCPC.
- Contribution at national and international levels, and the building of partnerships among public and private sectors, associations of enterprises and industry instead of continuous emulation.
- Recognise the need to develop a strategy for the implementation of the Directives. To develop the first step towards full implementation and help to clarify effective approaches through eco-efficiency.

- Accession to the Euro-Atlantic structures and European Union for the purpose of integration and forms of new legislation and enforcement of existing laws.
- Take active part in the development of eco-effective legislation and influence this process. Decision-makers should be sufficiently informed and involved in the comment phase.
- Gather financial support, raise funds and make a profit, without relying too heavily on foreign investment.
- Participation in the global market with emphasis on mutually coordinated cooperation to retain competitiveness.
- Be well informed about foreign grants, e.g. the UNEP project;
- Pay more attention to fair rules of privatisation and prevention of corruption;
- Focus on prevention, education in the state and private sectors, with training centred on the environment and CP.

Eco-efficiency Projects: Comments

“One good example of eco-efficiency projects in Slovakia is the SCPC project ‘Fuel switch in the Slovak Republic,’ which was established for the mature forestry products industry. This project received grant contributions from the Slovak and Norwegian governments. It showed significant potential to reduce national CO₂ emissions by converting boilers to lower CO₂ emitting fuels, and environmentally friendly fuels, and through the re-use of biomass waste sawdust and wood chips.”

(Tomas Laurinc, SCPC)

“The ‘People and Water Group’ elaborated a study about two models of investment in the field of purification plants. The first was an up-to-date model with central planning and state-funded donations; the second was introduced as a reform of municipality responsibility. The result was that the time of realisation for purification in the first instance was 15-20 years, and in the second case 2-3 years. Reformed access could solve any environmental burdens in a period of 10 years, even without international help, and also is not vulnerable to corruption or speculation of funds.”

(Michal Kravcik, People and Water Group)

“For further promotion of eco-efficient projects the appropriate financial incentives should be created and promoted, especially within SMEs. This should include:

- A CP revolving fund aimed at smaller projects in SMEs, which should provide soft loans starting from a few thousand US dollars.
- Development of a national strategy to promote the transfer of environmentally sound technologies including financial considerations.
- National and eventually regional (CEE region) scheme to promote innovative businesses on their way towards sustainable development.
- Creation of local/municipal/district environmental funds including a CP/eco-efficiency promotion line in the form of modified ESCOs: free training and consultancy to companies and a dividend developed as a share of savings achieved.

Considerable experience with different tools has been gained worldwide. Therefore, in Slovakia it is necessary to learn from this experience, and adopt and implement the most suitable tools. This requires not only mutual discussions and cooperation of all stakeholders involved, but extensive work to improve awareness and education and training activities, as well.”

(Viera Feckova, SCPC)

Eco-efficiency Country Review Summary: Slovenia

Prepared by: Mgr. Renata Kruppova, Slovak Cleaner Production Center, Bratislava

Eco-Efficiency

Introduction

In Slovenia, care for the environment in the industrial sector is on the increase: there are no significant variations between the various branches of industry or between larger and smaller enterprises.

Export-oriented companies introduce eco-efficiency to a higher degree into their work processes, because it has a direct influence on their competitiveness.

The three most recognised mechanisms in Slovenia are:

- ISO 14001
- Responsible Care
- Energy Efficient Enterprise

Since 1997 the number of companies with ISO 14001 certificates has increased:

Year	1997	1998	1999	2000
Number of certificates	2	8	14	64

Source: Chamber of Commerce, Service for Technological Development

By April 2001 a total of 114 Slovenian companies had acquired ISO 14001 certificates and three companies had prepared a report on Responsible Care.

In June 2001 the Cleaner Production (CP) project was started, co-financed by the Ministry of Economy, Chamber of Commerce and Austrian government. The project involved 13 companies from different industrial branches.

Slovenian companies that are voluntarily preparing annual environmental reports include: Gorenje, Petrol, Henkel, Cinkarna, Melamin, Sava, Danfoss, Revor, Krka, Lek.

Financing Eco-efficiency Projects

Loans

The Slovenian Eco-fund grants loans for:

- devices and technologies that protect the environment;
- environmentally friendly technologies and products;
- realisation of ecological sanitation programmes.

Purpose of the loan	1999			2000		
	Number of investments	Amount of the loans (SIT mn)	Share %	Number of investments	Amount of the loans (SIT mn)	Share %
Devices and technologies for protection of the environment	8	346.8	15	9	361.2	10
Environmentally friendly technologies and products	16	1,568.5	71	14	3,262.6	87
Realisation of ecological sanitation programmes	8	303.2	14	1	101.5	3
Total	32	2,218.5	100	24	3,725.3	100

Source: Annual Reports 1999, 2000, Ecological Development Fund of Slovenia.

Water pollution taxes

Introduced in 1995, the target for the annual price per unit increase is SIT 8,000 in 2007. The State (Ministry of the Environment) stimulates eco-efficiency through investments for reduction of water pollution; companies that invest are exempt from paying taxes or the amount is reduced.

Year	1995	1996	1997	1998	1999	2000	2001
SIT/unit	640	800	1,200	2,100	2,800	3,600	4,600

Source: Decree on water pollution tax (Official Gazette RS, nos. 41/95, 44/95, 8/96, 124/00);

Resolution on the price per unit for water pollution (Official Gazette RS, nos. 45/95, 77/95, 2/97, 84/97, 90/98, 110/99, 125/00).

CO₂ taxes

The CO₂ tax is State budget income, but is not used for the purpose for which it was introduced.

State budget income from CO₂ tax:

Year	1997	1998	1999	2000	2001
SIT million	8.1	17.7	15.1	7.6	8.8
% State budget income	1.1	2.2	1.6	0.8	0.8

Source: Margita Stariha, *Taxes on CO₂ Emissions*, graduation thesis, 1999; Proposal for State Budget for 2001, Parliament Reporter no. 16/II, March 2001.

Critical Overview

The Environmental Protection Act, adopted in 1993, defines the principle of prevention. In implementing this principle the best concepts, technologies, equipment, and production methods available on the market and practically tested are preferred, as are replacement, recycling, and regeneration, even if higher costs are involved.

In 1999, the National Environmental Action Programme (NEAP) was adopted. The programme aims to achieve a more balanced relationship between the environment and industry by:

- substituting raw and other input materials (the use of less toxic substances and long-lasting materials);
- changing technological procedures (new technologies or modified production processes);
- modifying equipment (to increase efficiency and reduce losses);
- improving procedure management (the application of standard working procedures and instructions for work with machinery and appliances, effective supervision and accounting to ensure more efficient and more environmentally-sound production processes);
- improving the management of resources (optimal maintenance of appliances and machinery);
- recycling of waste within the company;
- producing useful by-products (adaptation of procedures where waste is generated so that it can be re-used outside the company);
- modifying products (to reduce the consumption of natural resources and emissions of substances and energy into the environment).

The NEAP states that the system of economic incentives has to be designed in such a way that it encourages manufacturers and consumers to use resources in a more “environmentally successful” manner. Among the economic instruments, the following measures could be introduced: specific tax relief for the introduction of energy-efficient technologies and for highly profitable investments in environment-friendly equipment; other relief for the support of “win-win” solutions, e.g. the efficient use of energy, the introduction of low-emission technologies.

Protection of the environment is becoming an inseparable part of business. There are an increasing number of voluntary activities (e.g. certification according to ISO 14001, Responsible Care programmes in the chemical industry, energy-efficiency programmes). Eco-efficiency is mainly the result of the introduction of the Environmental Management System (EMS) according to ISO 14001. The number of issued ISO 14001 certificates is increasing rapidly. More than 120 certificates have been issued so far. Eco-efficiency is being implemented in Slovenian companies; evidence of the companies’ positive experiences related to eco-efficiency already exists, although systematic information on the measures implemented and the benefits (environmental and economic) is not available.

The Clean Production project started in June 2001, and involved 13 companies from different industrial branches. The results of the project, which is being implemented with the cooperation of an Austrian consulting company, will be available in 2002.

The tax on waste-water discharge, the CO₂ tax and the tax on waste disposal are prescribed. A company offering a sanitation plan to reduce discharges/emissions may be exempt from paying the tax if it spends the money on the proposed activities (tax exemption differs for public and private companies). While the tax on waste-water discharges has encouraged companies to invest in environmental programmes, this is not the case for the CO₂ tax (an integral part of the State budget). There is no experience with the tax on waste disposal since it will be introduced from January 1, 2002.

Companies themselves finance the introduction of CP; the Eco-fund supports the introduction of clean technologies by offering loans for their implementation. The Eco-fund has developed criteria on the basis of which the integral approach is taken into account in the evaluation of the project; this influences the level of the loans.

Conclusions

- Eco-efficiency and the integrated approach is a result of the implementation of EMS in companies. EMS is mainly introduced by companies themselves; consultancy assistance is especially needed in the early stages.
- Financing/stimulation is a crucial problem for the broader application of eco-efficiency measures. Environmental taxes are not stimulating. Greater support from the government to encourage the implementation of environmental programmes in industry is required. At present, this is left too much to industry itself.
- Eco-efficiency is not supported by banks. Banks lack knowledge about the benefits of eco-efficiency. The same is true of insurance companies. Loans are not favourable. The only institution supporting environmental projects in Slovenia is the Eco-fund.
- Slovenia has an adequate expert base in the field of eco-efficiency; the problem is the lack of experience in practice and cooperation among the experts. Exchange of information, knowledge and experiences and facilitating the cooperation of experts could have a positive impact on SMEs too.
- There is no sufficient awareness about eco-efficiency and its promotion in Slovenia, although the situation is changing; the awareness of industry is increasing due Slovenia's EU accession process. Experiences and good practices should be promoted.
- Most companies still consider money spent on environmental protection as a cost rather than a long-term investment that could bring a market advantage. This way of thinking has started to change recently. Mainly as a result of EMS, the implementation of environmental measures is already considered as a tool for gaining profit and competitiveness. The benefits of eco-efficiency should be promoted.