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Preface

A first Environmental Performance Review of Estonia was undertaken in 1995 as a pilot project by UNECE. In September 2000, the UNECE Committee on Environmental Policy agreed to the Estonian request for a second review. Preparations for the second review began immediately thereafter.

During the pre-mission in March 2001, final decisions were reached on both the structure and the organizational details of the project, taking into account the results of the first EPR of Estonia as well as the considerable changes that had meanwhile occurred.

The review mission to Estonia took place in April 2001. The review team included national experts from Denmark, Finland, France and Hungary, together with the UNECE secretariat. The draft of the EPR report was finalized and assessed by the EPR Expert Group (19 September 2001) and submitted to a peer review by the UNECE Committee on Environmental Policy at its annual session in Geneva on 25-26 September 2001. The Committee approved the recommendations as they are set out in this report. A delegation from Estonia, led by the Minister of Environment, assisted the Committee in its deliberations.

Since this is a second review, it follows a different approach from other environmental performance review projects. The focus is placed on three themes: a broad overview of developments since the first review, an assessment of problems encountered and solutions sought with regard to five priorities for Estonian environmental management, and an evaluation of the progress made in implementing the recommendations of the first review.

The UNECE Committee on Environmental Policy and the UNECE review team wish the Estonian Government success in their important future tasks, including the implementation of the recommendations contained in the present report.

UNECE would also like to express its deep appreciation to the Governments of Denmark, the Netherlands and the United Kingdom for their support to this Environmental Performance Review.

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The preparatory mission for the project took place from 15 to 16 March 2001. The review mission was organized from 18 to 26 April 2001. The Peer review was held on 26-27 September 2001 in Geneva. The ECE Committee on Environmental Policy adopted the recommendations set out in this publication.

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ACRONYMS AND ABBREVIATIONS

	Environment Investment Centre
BAT	Best available technique
BOD	Biological oxygen demand
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EECONET	European Ecological Corridor Network
EEK	Estonian krooni
EIA	Environmental impact assessment
EIC	Environmental Information Centre
EMEP	Protocol to the Convention on Long-range Transboundary Air Pollution on the Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe
ENECONET	Estonian National Ecological Network of protected areas and assets
ENIMPAS	ENvironmental IMPact ASsessment database of the UNECE
EPR	Environmental Performance Review
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FDP	Forestry Development Plan
GEF	Global Environment Fund
GIS	Geographical Information System
GMOs	Genetically modified organisms
GOST	Former USSR standards organization
HELCOM	Convention on the Protection of the Marine Environment of the Baltic Sea Area
IPPC	Integrated Pollution Prevention and Control
ISPA	Instrument for Structural Policies for Pre-Accession
MoA	Ministry of Agriculture
MoE	Ministry of Environment
MoEconomy	Ministry of Economy
MW	Megawatts
NCSD	National Commission on Sustainable Development
NEAP	National Environmental Action Plan
NEMP	National Environmental Monitoring Programme
NES	National Environmental Strategy
NOx	Nitrogen oxides
NPAA	National Programme for the Adoption of the Acquis (of the European Union)
ODP	Ozone depleting potential
ODS	Ozone depleting substances
PIP	Project (Public) investment programme
PM	Particulate matter
SAPARD	EU Special Accession Programme for Agriculture and Rural Development
SME's	Small and medium sized enterprises
SO_2	Sulphur dioxide
ton	metric ton (1,000 kg or 2,204.6 lb)
TPP	Thermo power plants
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
VOC	Volatile organic compound

Currency

Monetary unit: Kroon (EK)

Exchange rates: The Estonian kroon was introduced in June 1992. It was pegged to the deusche mark (DM) at a rate of DM 1 = EK 8.00 and consequently, from January 1999, also to the euro at a rate of € 1 = EK 15.6466.

Year	1 US$	1 EURO (€)
1994	12.970	15.478
1995	11.464	15.189
1996	12.031	14.707
1997	13.881	15.437
1998	14.065	15.817
1999	14.695	15.647
2000	16.981	15.647

Source: Bank of Estonia.

Note: Values are annual averages

INTRODUCTION

I.1 Geography

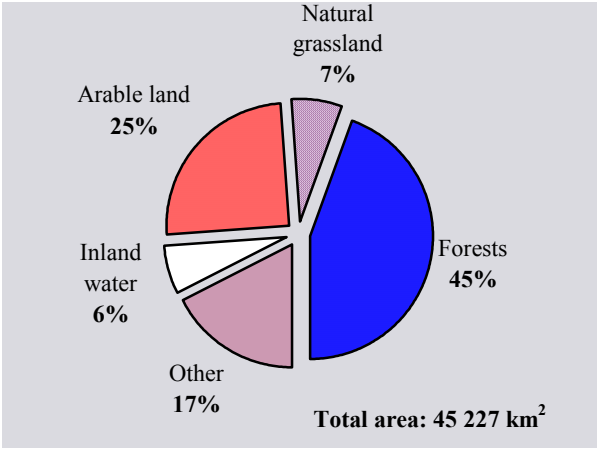
The territory of the Republic of Estonia, the northernmost of the three Baltic countries, covers 45,227 km^2 including the two large islands of Saaremaa and Hiiumaa. It has approximately 3,780 km of coastline and its maritime neighbours are Finland in the north, and Sweden to the west. Its eastern land border abuts the Russian Federation while to the south lies Latvia. Estonia is a lowland country, its highest point rising to only 318 metres above sea level. The landscape is varied, with plains (in particular karstic plains with their specific landforms) in the northern and western parts of the country and hills and numerous lakes in the southeast.

Hydrographically, the territory of Estonia lies entirely within the Baltic Sea catchment area. Most of its 420 rivers are short; the longest is the Pärnu River (144 km). Lakes are generally small, except for Lake Peipsi on the eastern border, which is the fifth largest lake in Europe. A decrease in the extraction of groundwater has restored aquifers and the chemical composition has remained stable. Rich mineral water resources abound in several places and are used in therapy and for drinking water.

Estonia has a moderate Atlantic-continental climate with frequent changes in weather conditions, warm summers and moderately mild winters, and milder temperatures on the islands. Southwesterly and southerly winds are typical throughout the year. Annual rainfall averages 500-700 mm. The temperature ranges from an average in January of –4.0°C to +18.8 °C in July; the annual mean is 6.5 °C. The winter snow cover lasts for about three months.

In terms of land use, 25% of the country consists of agricultural land, while forests cover 45%, twice as much as fifty years ago (Figure I.1). Swamplands, accounting for approximately 17% of the territory, are deep and hundreds of swamps have peat layers more than five metres in depth. The rest of Estonia consists of inland waters (6%) and natural grasslands (7%). The extensive system of agriculture has resulted in the preservation of a wide biodiversity. Although large glacial stones make farming difficult, central Estonia is the area most suitable for agriculture (cereals and potatoes).

Figure I.1 Land use, 1999



Source : Statistical Office of Estonia.

Estonia is rich in mineral resources and on its northern coast has the world's largest usable deposits of oil shale. Oil shale is a solid fossil fuel with a high sulphur content and high ash residue, and it provides raw material for power production and the chemicals industry. But, although in 1999 92% of electricity was produced from oil shale, since 1990 oil-shale production has almost halved and, at the current exploitation rate, reserves should last for another 150 years.

I.2 People and demography

Estonia is the smallest of the Baltic States, with a total population of 1.439 million (1 January 2000). Since 1993, the country has had a negative net population growth, due mainly to the emigration of Russian-speaking residents. In 1989, before Estonia gained its independence, ethnic Estonians constituted 61.5% of the population, Russians 30.3% and other nationalities 8.2%. As a result of emigration between 1989 and 1999 the total population diminished by 8%, and the percentage of Russians dropped to 28% of the total. The average population density is 32 inhabitants/km^2,

Table I.1: Demography and health indices, 1989-1999

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Birth rate *(per 1000)*	15.5	14.2	12.3	11.7	10.0	9.5	9.1	9.1	8.7	8.5	8.7
Fertility rate *(per 1000)*	2.2	2.1	1.8	1.7	1.5	1.4	1.3	1.3	1.2	1.2	1.2
Mortality rate *(per 1000)*	11.8	12.4	12.6	13.0	14.0	14.8	14.1	12.9	12.7	13.4	12.8
Infant mortality rate *(per 1000)*	14.8	12.4	13.4	15.8	15.8	14.5	14.8	10.4	10.1	9.3	9.5
Female life expectancy at birth *(years)*	74.7	74.6	74.8	74.7	73.8	73.1	74.3	75.5	76.0	75.5	..
Male life expectancy at birth *(years)*	65.7	64.6	64.4	63.5	62.5	61.1	61.7	64.5	64.5	64.4	..
Population aged 0-15 in total *(%)*	..	22.2	..	..	..	20.9	20.9	..	20.0	..	18.9
Population aged 65 and over in total *(%)*	..	11.6	..	..	..	13.0	12.9	..	13.6	..	14.2
Basic school enrolment rate *(%)*	96.5	95.3	93.8	91.1	91.4	91.5	92.3	92.6	93.5	95.0	..

Source: UNECE, Statistical Division.

which is well below the European Union (EU) average of 114 inhabitants/km^2. Over 70% of the population is concentrated in urban zones, and population density within the country therefore varies considerably from the highly populated northern coast to the sparsely populated rural south. The capital Tallinn, with its surroundings, has more than 550,000 inhabitants, which is more than 30% of the total population. The Tallinn area produces over 60% of the country's gross domestic product (GDP).

One of the indicators of the general well being of the population is the infant mortality rate. When compared with other countries of the former Soviet Union, Estonia has the second lowest infant mortality rate after Lithuania, and slightly higher than those of Poland, Hungary and Slovakia. In 1999, the mortality rate for infants under one year old was 9.5 per 1000 live births. In the same year, life expectancy at birth was 65 years for men and 76 years for women (Table I.1).

In 1995, the Human Development Index (HDI) of Estonia was 0.758 (on a scale of 0.0 to 1.0). Estonia ranked 77th among reviewed countries and enjoyed "medium human development". Since 1995, Estonia's HDI has risen steadily. The latest HDI (for 1998) ranks Estonia 46th out of 174 countries, and with an index of 0.801 Estonia is now listed among the "high human development" countries.

Estonia's literacy rate is 99% and the attainment quotient of post-secondary or tertiary education for adults aged 25 years and older is 27.6%.

Environmental awareness

Public awareness and concern over environmental matters have played a substantial role in the political process in Estonia. The general public interest in environmental protection helped stimulate an awakening national consciousness in the process of restoring the country's independence. There are numerous non-governmental environmental organizations, the largest and most active of which are the Estonian Nature Conservation Society, established in 1966, and the Green Movement. The keen public interest in conservation and environmental issues was demonstrated in early 1991 when the production of phosphorite was stopped under public pressure. Severe economic problems, however, diminished general interest and in recent years the environmental movement has waned.

I.3 Economy

The legacy

When the country regained its independence in 1991, agricultural production took place mainly on large state farms. Pesticides were used intensively on cultivated land, meadows were neglected and the vital drainage network was not properly maintained. Industry was material-, energy- and transport-intensive and production technology was outdated. The goods produced were generally of low quality and production generated considerable pollution especially in northeast Estonia and the Tallinn area. In addition to a neglected environment and inefficient production methods, there was also the legacy of abandoned Soviet army bases with their severe soil and groundwater pollution.

Transition to a market economy

Estonia's transition to a market economy occurred in two time phases. From 1991 to 1995 the country developed new political and economic institutions while simultaneously transforming its economic system into a market economy. Since 1995, the new institutions and market-based economy have become firmly established and new legislative and economic measures have concentrated on fine-tuning the system.

Before regaining its independence in August 1991, Estonia had been an integral part of the former Soviet economic, political and national security system and therefore had little control over its national economy. But in December 1989, before formal recognition of independence, economic reform was introduced along with price liberalization. This caused the consumer price index (CPI) to rise steeply, 18% from 1989 to 1990, as the distorted Soviet pricing system was dismantled. As inflation rose and the traditional intra-Soviet Union trade with other republics collapsed, Estonia faced a severe adjustment shock. In 1992, manufacturing and trade output fell sharply and the structural adjustment crisis began. In June of that year Estonia reintroduced a national currency, the Estonian kroon (EK), pegged to the German mark (DM), and broke away from the Russian rouble zone. During this crisis the Estonian government re-established the Bank of Estonia and acted firmly and consistently with tight monetary and fiscal policies. As a result, the Estonian economy stabilized and the annual inflation rate dropped dramatically from 1,078% in 1992 to 47.7% in 1994. Subsequently, the positive trend continued and in 1999 inflation measured by CPI was 3.3%. Since 1995, industrial production has steadily risen and the export trade has recovered although there is an ongoing foreign trade deficit.

Transformation of the economic system has changed Estonia's labour market significantly. The labour force participation rate decreased continuously after 1990 but remained stable at 68% from 1996 to 1998. Unemployment, on the other hand, grew quickly at the beginning of 1990 and jumped from almost full employment in 1990 to 9.7% in 1995 (according to the ILO definition of unemployment) and has hovered around 10% since then. Reasons given for the high unemployment rate are the inadequate qualifications and low mobility of the work force.

The new economic situation, however, has changed the nature of productive activity and increased the tertiary sector, which in 1998 employed 57.7% of the labour force. In 1998, the main industrial production came from the food industry (24.5%), the metal and machinery industry (16 %) and the wood, paper and furniture industry (16%) (Figure I.2).

Figure I.2: Industrial production by economic activity, 1998

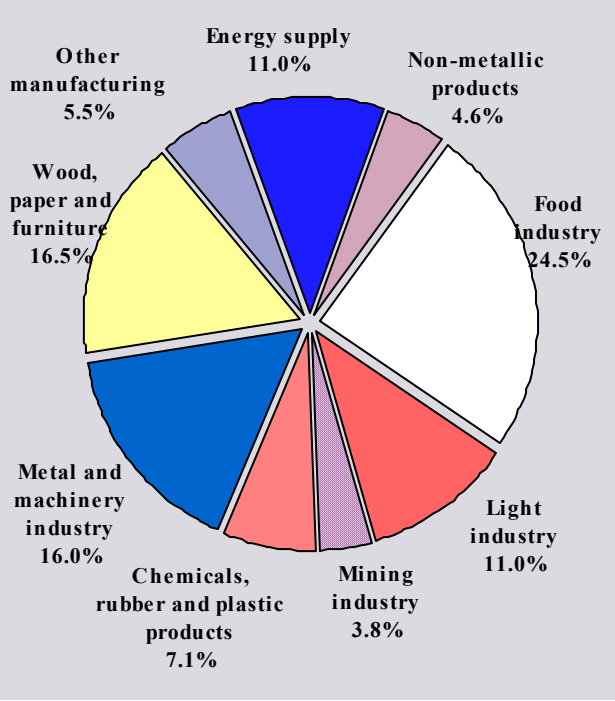


Table I.2: Selected economic indicators, 1990-1999

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
GDP in current prices *(Kroon, billion)*	6.0	9.0	12.9	21.6	29.6	40.7	52.5	64.3	73.3	75.3	83.2
GDP in current prices *($US, billion)*	0.6	0.8	1.1	1.6	2.3	3.6	4.4	4.6	5.2	5.1	4.9
GDP per capita *($US per capita)*	382	522	689	1,077	1,521	2,393	2,966	3,178	3,594	3,557	3,398
GDP *(% change over previous year)**	..	36.4	30.1	53.6	39.5	55.7	22.8	6.3	12.4	-1.5	-4.5
Share of agriculture in GDP *(%)*	..	..	..	..	..	..	..	6.9	6.3	5.8	..
CPI annual average *(% change over the preceding year)*	18.0	202.0	1,078.2	89.6	47.9	28.9	23.1	11.1	10.6	3.5	3.8
PPI annual average *(% change over the preceding year)*	19.3	208.4	1,208.0	75.2	36.3	25.6	14.8	8.8	4.2	-1.2	4.9
Unemployment rate *(%)*	..	..	4.5	6.5	7.6	9.7	10.0	9.7	9.9	11.7	..
Balance of trade in goods and non-factor services *(million US$)*	..	..	38	-94	-353	-702	-1,152	-1,507	-1,550	-1,170	-1,101
Current account balance *(million US$)*	..	..	36	22	-167	-158	-398	-563	-478	-294	-331
" " *(as % of GDP)*	..	..	3.4	1.3	-7.3	-4.5	-9.1	-12.1	-9.2	-5.7	-6.8
Net FDI inflows *(million US$)*	..	..	82	162	215	202	151	267	581	305	398
" " *(as % of GDP)*	..	..	7.7	9.9	9.4	5.7	3.5	5.8	11.2	5.9	8.1
Cumulative FDI *(million US$)*	..	..	82	244	459	661	812	1,079	1,660	1,965	2,363
Exchange rates: annual average *(Kroon / US$)*	..	..	12.11	13.22	12.98	11.46	12.03	13.88	14.07	14.68	16.97
Population *(1000)*	1 571	1 566	1 544	1 516	1 499	1 483	1 469	1 457	1 449	1 442	1 436

Sources : Trends 2001, UNECE; Economic Survey of Europe, UNECE and National Statistics.

Estonia's per capita GDP has risen steadily since 1990 and, especially at the beginning of the 1990s, growth was robust but has slowed down in the past two years (Table I.2). In 1999, only Croatia, the Czech Republic, Hungary, Poland, Slovakia and Slovenia had a higher GDP than Estonia's US$ 3,557 per capita.

Estonia is a member of the WTO. In terms of the trade percentage of GDP, Estonia is one of the most open economies in the world. In 1999, trade per GDP measured with purchasing power parity (PPP) was 58.5% (World Bank). Since independence, Estonia's foreign trade has turned towards Western Europe and currently 77% of total exports are to EU countries. Exports to the Commonwealth of Independent States (CIS) countries have been declining and accounted for only 4% of the total in the year 2000.

For per capita foreign direct investment (FDI), Estonia holds second place after Hungary among Central and Eastern European countries. However, foreign direct investments may slow down as Estonia's labour force becomes increasingly more expensive, and investors may turn elsewhere.

Privatization

Privatization involves two separate processes: firstly, privatizing enterprises formerly owned by the state and, secondly, privatizing state-owned land or restoring it to the former owners.

Privatization of enterprises was managed by the Estonian Privatization Agency (EPA). From 1993 to 2000 over 500 firms were privatized, the bulk of them in 1994-1995 when about 350 were sold into private ownership. The smaller enterprises were privatized first. When, after 1995, the privatization of the larger companies began, their acquisition value increased remarkably. For example, the value of 17 enterprises sold in 1997 was greater than that of 215 sold in 1994. To relate the privatization process to the general level of economic activity it should be borne in mind that over the period 1994-1999 the number of enterprises in Estonia increased from 28,000 to 42,000.

The Estonian Land Board manages privatization of the land. About 40% of the land area is to be retained as state property. Half of the remaining

60% will be privatized and the rest, restored to the former owners. By the end of 2001 about 50% of the non-state land area will either be restored or privatized, but there will be delays in the process due to land areas that are currently unclaimed.

Oil shale

Estonia has the largest accessible oil-shale deposits in the world. In the year 2000 these deposits totalled 1,488 million tons. Production peaked in 1980 with over 31 million tons extracted. Economic changes, however, with decreasing industrial production and collapse of the export market for electricity, reduced oil-shale production in 1995 to 12.1 million tons. With the current exploitation of 10 million tons annually, proven reserves could last for the next 150 years. Oil-shale mining physically alters and disrupts the environment by causing the ground surface to sink and by lowering the groundwater level. The extensive use of oil shale in energy production increases emissions into the atmosphere. At present, almost 100 % of Estonia's electric power is produced from oil shale but as a result of the reduced power output, nitrogen oxide emissions have dropped to the 1987 level.

I.4 Institutions

Administratively, Estonia is a unified country divided into 15 counties. Formerly, these counties were subdivided into 247 self-governing municipalities, of which 42 were towns and 205 rural communities. In June 2001 the Estonian government approved an administrative-territorial reform plan, whereby the number of autonomous units would be reduced to 108 and the number of counties to 8.

In September 1991, Estonia was accepted as a Member State of the United Nations. The country has a democratic constitution that recognizes the separation and balance of powers and the independence of the courts, and guarantees fundamental human and civic rights and liberties. The Parliament (Riigikogu) comprises 101 Members and its President is elected by Parliament for a five-year term. Parliament also confirms the Prime Minister and his cabinet in their functions, and the President approves their appointment.

The last presidential elections were held in 1996, and the next elections are due in 2001. The current centre-right coalition government was formed in October 1999 after the latest parliamentary elections, and its term of office extends to 2003, when new elections will be held. The current ministries are listed in Box I.1.

Responsibility for environmental administration lies with the Ministry of Environment, set up in 1989. Currently there are four main administrative units in the Ministry (for administration, management, international cooperation and nature conservation and forestry), and several specialized research, information and development centres. The Ministry also has 15 environmental departments at the county level to manage local environmental administration.

When Estonia regained its independence, new legislation had to be drafted to govern environmental management. By the end of 1995 most of the legal acts necessary to regulate the use of natural resources, environmental protection and spatial planning had been prepared or had entered into force. While already active from independence to 1995, the legislative development accelerated with the EU approximation process. By early 2001, the bulk of the environmental laws had been adjusted to EU directives. In March 1997, the Parliament of the Estonian Republic approved the National Environmental Strategy for Estonia (NES), which outlines trends, specifies the priority environmental management and protection goals and sets out the main short-term and long-term priorities. To implement the Strategy, a detailed National Environmental Action Plan (NEAP) was worked out between April 1997 and April 1998. The NES is modelled on the main international environmental initiatives such as the Declaration of the Earth Summit (Rio de Janeiro, 1992), the Environmental Action Programme for Central and

Box I.1: Estonian ministries

Ministry of Education
Ministry of Justice
Ministry of Defence
Ministry of Environment
Ministry of Culture
Ministry of Economic Affairs
Ministry of Agriculture
Ministry of Finance
Ministry of Internal Affairs
Ministry of Social Affairs
Ministry of Transport and Communications
Ministry of Foreign Affairs

Eastern Europe (Lucerne, 1993), and other international agreements endorsed by Estonia.

I.5 The EU accession process

In 1995, Estonia signed an Association Agreement with the European Union that came into force in 1998 after ratification by all 15 EU member state parliaments and approval by the EU Council of Ministers. Before becoming an EU member state Estonia has to harmonize its legislation with that of the European Union, implement it, and ensure that its administrative system is fully in compliance with EU requirements. In 1996, the Estonian Government presented its Activity Plan to the European Commission, providing details of measures to integrate Estonia with EU institutions and structures.

In 1997, the European Commission published an Opinion recommending that the European Union open membership negotiations with Estonia. At a meeting in Luxemburg in 1997 the European Council created an Accession Partnership to provide assistance to the applicant countries within a single framework. Estonia drew up a National Programme for the Adoption of the Acquis (NPAA), which set out the timetable for achieving the Accession Partnership priorities. The Estonian government adopted the first NPAA in 1998.

The Accession Partnership is monitored within the framework of the European Agreement, which identifies short- and medium-term priorities on the basis of the Commission's Opinion. In 1998 the European Commission presented its first Regular Report to the Council, reviewing Estonia's progress. Estonia prepared updated versions of NPAA for the Commission in 1999 and 2000 while the Commission released its second Regular Report in 1999 and the third in 2000.

Estonia opened accession negotiations with the European Union on March 31, 1998. By the summer of 1999 the Commission's bilateral screening process, involving 31 negotiated chapters, had been completed. After the initial screening process, negotiations are conducted chapter by chapter and each chapter is closed when satisfactory results have been achieved. By April 2001 Estonia had closed 19 of the 31 chapters. So far, negotiations have proceeded according to plan and the Estonian government has set 1 January 2003 as its own target date for joining the Union.

Estonia has also expressed willingness to speed up the process and its readiness to finalize the remaining chapters by the end of 2001. Negotiations have moved on from the political to the more technical chapters. The chapter on environment, completed in June 2001, tackled problematic issues such as Estonia's modest environmental administrative capabilities, the energy sector, and the oil-shale industry. Estonia has requested four transition periods – two concerning water quality, one for the quality of the air and one for waste. The time-spans for the transition periods vary, the longest extending to 2013.

Figure I.3: Map of Estonia

PART I: EVOLUTION OF ENVIRONMENTAL POLICY AND MANAGEMENT FROM 1996 TO 2000

Chapter 1

OVERVIEW OF DECISION-MAKING FRAMEWORK

1.1 Major environmental policy orientations and management practices

Current environmental policy

Estonia adopted its first *National Environmental Strategy* (NES) in 1997. Based on internationally accepted principles, the Strategy takes into account international environmental agreements and the 1995 EU White Paper on the Preparation of the Associated Countries of Central and Eastern Europe for Integration into the Internal Market of the Union. It also incorporates the recommendations that the first UNECE Environmental Performance Review addressed to the Ministry of Environment (MoE) in 1995.

The Strategy identified as the main causes of environmental problems the use of out-of-date and environmentally harmful technologies, the rather low level of public awareness regarding environmental matters, the underdeveloped environmental-technical infrastructure, and an insufficiency of management instruments and financial resources. The Strategy highlighted ten principal policy goals (Box 1.1) of equal priority for which it defined short-term (2000) and longer-term (2010) tasks to be undertaken, goals to be reached and, in some areas, targets. The Strategy was immediately followed by the 1998 National Environmental Action Plan (NEAP) that set in motion the operations required to attain the short-term goals. The three-year action plan included 658 projects, two thirds of them short-term and involving an estimated total financial outlay of EK 8.2 billion. This was to be financed through different governmental and private sources and from international sources. About half of this sum was to be devoted to reducing the negative effects of the energy sector and to improving air quality; another 25% to improve usage and protection of groundwater resources and the protection of sea waters and fresh surface waters, and the rest allocated to the other six policy goals.

Towards the end of the year 2000 a second NEAP was prepared and in mid-2001 the final document was issued, following up on the previous NEAP. While NEAP 1 was worked out in close cooperation with the European Union, NEAP 2 has been managed entirely by Estonian experts. The broad involvement of all potential stakeholders that characterized the NEAP 1 was even more evident during the formulation of NEAP 2. More than 250 specialists combined their efforts to update and refine the action necessary to maintain progress toward achievement of the ten NES policy goals. The Internet was extensively used during this exercise as a communication tool between partners and also to familiarize the public with the NEAP 2 draft and invite their comments. The NEAP was also extensively publicized through the media to heighten public awareness.

Box 1.1: The ten policy goals of the National Environmental Strategy

- Promotion of environmental awareness
- Introduction of clean technologies
- Reduction of negative environmental effects of the energy sector
- Improvement of air quality
- Reduction of waste generation and improvement of waste management
- Elimination of past pollution
- Better use and protection of groundwater resources
- Protection of surface water bodies and coastal seas
- Maintenance of landscapes and biodiversity
- Improvement of the quality of the built environment

NEAP 2 follows from NEAP 1 and integrates the priorities and commitments of other national and international programmes and action plans (sectoral programmes as well as EU accession obligations and international conventions). A few new policy goals were included such as protection against radiation and strategic planning issues. During the elaboration of NEAP 2 it was strongly felt that the NES needed to be updated as the rapid progress achieved since 1998, in particular because of the approximation process, has made the ten goals defined at that time partly obsolete.

Integration into the European Union

Another important strategic action plan, the NPAA (National Programme for the Adoption of the Acquis) was adopted in 1998 as the concretization of the EU accession process into which Estonia was officially entering. The updated version of the NPAA issued in 1999 contains a Chapter on the environment, as negotiations began on this issue in December 1999. The NPAA objectives and implementation fields are narrower than those of the NEAP as some important issues of relevance to Estonia, such as strategic planning, past damage, oil-shale waste, and clean technology, are not covered by them.

In negotiations on the Chapter on the environment, concluded in June 2001, four transition periods were agreed: for volatile organic compounds (VOC) (2006), for landfills (2009), for waste-water (2010), for drinking water (2013), and for nitrates (2008). These transition periods relate to the directives that are difficult to implement for reasons of cost. The directives on drinking water, waste-water, waste and landfills necessitate heavy investment and involve a significant increase in the cost of the service paid by the consumer, if the polluter-pays and user-pays principles are applied. Similarly, the large combustion plants and the packaging directives will place a burden on the private sector.

Up until the end of 1999, attention was concentrated on adjusting the legislation to the Acquis Communautaire. In the year 2000, however, implementation of legislation and the restructuring of environmental institutions were emphasized. For example, new units able to deal with integrated pollution prevention and control (IPPC) and investments under the Instrument for Structural Policies for Pre-Accession to the EU **(**ISPA**)** were set up at the Ministry of Environment. The next phase will be devoted to implementation of the ISPA programme and achievement of the necessary infrastructural adjustments for air, water and waste.

In order to incorporate the EU directives into its legislation, Estonia made a tremendous effort to reorganize and strengthen its institutions and train staff. The transposition of directives and the elaboration of sectoral strategies is undertaken through ad hoc working groups in which all interested ministries participate, and organized under the leadership of a designated ministry. The EU Integration Bureau is involved in the organization of task sharing and ensures smooth coordination among ministries and partners.

The accession process placed a significant demand for new tasks on the ministries. Particular effort was therefore devoted to staff training, often with the support of or through twinning with EU donor countries. All EU legislation has been translated into the Estonian language and the texts made available on the Internet so that the administrative staff involved in the process and the local authorities may study the content of the directives and become familiar with their future tasks and responsibilities (in particular with regard to the management of the water, waste-water and waste infrastructures).

Sustainable development

In 1995, Estonia adopted an Act on Sustainable Development, the first of its kind in the ECE region. A National Commission on Sustainable Development (NCSD) was set up in 1996, headed by the Prime Minister, co-chaired by the Ministers of Economy and of Environment and involving representatives of all other ministries. The Commission meets once a year. There are currently no working bodies under this Commission (in the past, an ad hoc inter-ministerial board dealt with the coordination of CBD implementation). The mandate of the NCSD includes: (1) to assess the progress of sustainable development policy in Estonia; (2) to assess the impact of sectoral activities such as energy, agriculture, natural and mineral resource exploitation, water use, fishery and territorial marine zone exploitation; (3) to consult all relevant stakeholders on sustainable development problems; and (4) to propose draft legislation on sustainable development and for research on forestry and transport. So far, the Commission has played little part either in the legislative procedure, or in the main sectoral strategies that have been developed recently. Terms of reference for a National Sustainable

Development Strategy were approved in April 2001. Following the example of the NEAP, it will be formulated after a widespread democratic consultation process.

The *Estonian Agenda 21* process began in 1997. The overall objective of the project is to strengthen Estonia's capacity to develop into the 21st century, leading to sustainable economic growth, solving social problems and properly using natural resources. The project also aims at promoting Local Community Planning and Local Agenda 21 Development processes. As a first step, a guidebook for applying Agenda 21 locally was widely distributed throughout the country to local government officials, community members, and development groups. A sustainable development database was developed with a similar aim. The Ministry of Environment is coordinating Agenda 21 at the national level and participates in this process at regional levels (Baltic 21), while the Association of Estonian Cities coordinates local Agenda 21 processes.

By 2001, only two local agendas were developed: Kuressaare city was launched in 1997 and Tartu city in 1998. In 2000, a second booklet was issued to provide information on what had been achieved and to mobilize those communities that had remained inactive. The results were a fruitful exchange of information at grass-roots level. Websites were created that provided information on how to establish the process and a Web forum was set up. The eventuality of an administrative reform that would reduce the number of municipalities from 247 to 108 and counties from 15 to 8 has discouraged initiatives, however, as municipalities are reluctant to make medium- and long-term plans in such a context.

Launched in 1996, *Baltic 21* is the Agenda 21 for the Baltic Sea region. So far, it constitutes a unique experience of working out an Agenda 21 at regional level. The process involves the Nordic states and all other countries around the Baltic Sea. Regional co-operation and the environment are emphasized as well as their bearing on economic and social aspects of sustainable development. Seven sectors are covered: agriculture, energy, fisheries, forests, industry, tourism, and transport. Goals and scenarios for the sustainable development of each sector have been worked out as well as sectoral action programmes including time frames, actors, and financing. Estonia is co-lead party for tourism and energy, and a participant in all other topics. Partnership among cities of the Baltic region is developing through a network of twinning arrangements.

Environmental management in the privatization process

Land privatization is managed under the Land Reform Act of 1991. The state decided that 40% of the land would continue to be state property; 30% (now registered into 343,227 cadastral units) would be restored to the previous (pre-Soviet era) owners and 30% privatized. As of May 2001, a number of plots had remained unclaimed because the former owners had died and only half of the registered land was in private hands. Much of this land is wetland, natural grassland and bogs that cover 10-12% of the territory. Both the privatization of land, which is almost completed, and the land-use modalities are the responsibility of the municipalities. The Land Board is responsible for land registration, land reform activities, and cartographic and geodetic work. The Law on Protected Assets (1994) makes provision for lands that are of limited economic interest (such as those within protected or coastal zones) to be privatized. However, the state exchanges such property for other, unrestricted, land at the owner's request, although the process is particularly slow. With the implementation of the green corridors network and valuable landscape reservations, the state now envisages the acquisition of private land in order to set up areas with a strict protection regime (see also Chapter 4).

Begun in 1991 under the Act on Privatization, the privatization of industrial assets is also almost complete, and in November 2001 the work of the Estonian Privatization Agency is to be concluded. In the previous EPR, it was recommended that the privatization procedure would include environmental requirements in all privatization schemes, that environmental audits would be carried out, environmental liability be clearly defined and part of the purchase price allocated to finance clean-ups. From 1996 to 1999, a government decision specified that 5% of the funds from the sale of an enterprise were to be devoted to the environment. The money was channelled into rehabilitation projects, industrial waste water treatment plants and waste sites. During negotiations, a choice is made between the burden of past damage remaining the responsibility of the state, or becoming the liability of the new owner. In the latter case, the selling price is reduced and the new owner obliged to repair the damage. Such a deal was struck at the privatization of SILMET, a hydrometallurgy company; as a result, a lagoon

containing heavy metals, nitrogen compounds and radionucleides is being treated (see Box 2.1 in Chapter 2). There is no example of rehabilitation carried out by the state in cases where it retained the responsibility.

Spatial planning

Important changes have taken place since spatial planning was introduced as a common practice with the Planning and Building Act (1995). While spatial planning remained under the Ministry of Environment, at the beginning of 2000 the building division was transferred to the Ministry of Economy. The Act called for a National Spatial Plan, the EESTI 2010, and an action plan for implementation that were approved in September 2000. The Act also gave each county three years to devise its own spatial plan, an objective that was effectively reached in 1998 by all counties except two. The plans were worked out in close cooperation with the county authorities and the municipalities, as these in turn have to draw up their own municipal plans, i.e. land-use plans. An action plan for implementation of spatial planning, indicating the county's priorities, was also requested; and about half of the counties have so far complied. For 2002, county administrations have also been requested by the Ministry of Environment to formulate a policy on "Environmental Preconditions for Settlements and Land Use" that should integrate the nature conservation concerns, i.e. green networks and valuable landscape reservations (i.e. "green layers"), into spatial plans. The ultimate challenge will be to integrate the Estonian National Ecological Network of protected areas and natural assets (ENECONET) with the EU Natura 2000 (see Chapter 5).

Parallel to furthering the territorial aspect of spatial plans, each county was also requested (under the Planning and Building Act) to formulate a strategy and plan for the social and economic development of its territory (i.e. a County Development Plan). Such plans aim at redressing the country's social and economic imbalance that privileges the Tallinn area. The wealth derived from economic activities is drawn increasingly to the capital City, leaving rural areas underdeveloped. This problem is being tackled in particular through regional planning. While initially the economic success throughout Estonia was set as an objective, it is now replaced by a more human-needs oriented approach. Since 1998, a few positive changes may be seen in some rural areas (see the development of ecotourism in Southern Estonia).

1.2 Legal and institutional developments

Legal instruments

Since 1991, Estonia has been engaged in formulating new legislation to manage its environment. The new laws introduced in the mid-nineties were rather general, laying down the main principles but lacking implementing regulations. Once the decision was made to join the European Union, Estonia was obliged to adjust to EU legislation and introduce new environmental laws in fields not previously covered [such as that of genetically modified organisms (GMOs)] and amend those laws that were introduced in the mid-nineties but were not fully compliant with EU statutes.

The Environment Chapter of the negotiations for EU accession was opened in December 1999. In the following year, Estonia submitted a position paper regarding the EU environmental Acquis. Implementation plans for sectoral directives on air, waste, radiation, nature protection, and industry were also issued in 2000, accompanied by the related financing strategies; and in 2001, on urban waste water, drinking water, nitrates, Ozone Depleting Substances (ODS), large combustion plants, air quality, sulphur content of liquid fuels, landfills and packaging waste. Transitional periods were requested, in particular for those directives involving substantial investment in infrastructure (drinking water, waste water, landfills) or related to biodiversity protection (birds and habitat directives).

Since 1999, 17 laws, 101 governmental and 35 ministerial regulations, and five governmental orders have been adopted to harmonize Estonian environmental legislation with that of the European Union. The National Plan for Approximation to the *Acquis Communautaire* (NPAA) provides that by January 2003, 16 other environmental laws (including about 12 laws on ratification of environmental conventions), 18 governmental and 41 ministerial regulations will have been concluded.

These past ten years of intensive law enactment have resulted in frequent overlapping. A draft environment code that was formulated in 1998 should reconcile and consolidate the different pieces of legislation.

National legislation

Environment in general

The Nature Protection Act adopted in 1990 provides the overall framework for environmental legislation and is still valid although it needs to be modernized. Together with the Act on Sustainable Development, it will constitute the first section of the Environmental Code that was drafted in 1998.

More than a law, the Act on Sustainable Development adopted in 1995 was a political declaration that introduced the concept of integration of environmental, social and economic concerns into all sectors of activity. According to the Act, a National Strategy on Sustainable Development and a National Environmental Strategy and Action Plan were to be worked out. In 1997, the Act was amended in favour of the elaboration of master plans for the most important branches of the economy (energy, transport, agriculture, forestry, tourism, chemicals industry, building materials industry and food industry sectors). Almost all these sectoral strategies have been completed, except for tourism and the chemicals, building materials, and food industries. The Act also called for the introduction of physical planning into regions and municipalities.

The Environmental Impact Assessment and Auditing Act was adopted in 2000 and entered into force in January 2001. In compliance with EU Directive 85/337/EEC, amended by 97/11/EC, it provides for strategic environmental assessment of all plans and programmes, at all levels— municipal, regional and national, both public and private— that are likely to have significant effects. For instance, land-use plans at municipal level, as well as all sectoral plans – for energy, transport, etc. – are subject to the procedure. Auditing is also compulsory for a list of installations corresponding to those that will be submitted to the IPPC procedure (i.e. about 140 facilities). Every three years an audit of these facilities is to be undertaken that materializes into a statement (that so far has had no legal consequences). Six implementing regulations for this Environmental Impact Assessment and Auditing Act specify the requirements, procedures and activities involved.

The Integrated Pollution Prevention and Control (IPPC) Act has been drawn up and is currently before Parliament. Based on EU Directive 96/61/EC, it modifies the authorization system for large polluting enterprises in that a single comprehensive permit will now be issued covering all pollution discharges. It also introduces the concept of best available techniques (BAT) use. Thirty-five industrial enterprises, 21 combustion plants, 31 landfills and more than 50 industrial (pig and poultry) farms will be subject to such permits in Estonia; but the implementation of the Act will be difficult as industrial facilities are obsolete and the definition of BAT imprecise (see Chapter 7). Nevertheless, people have been specifically trained in the County Environmental Departments of the Ministry of Environment and in the inspectorate, and pilot applications launched in the chemicals industry, building construction, and energy sectors.

The Environmental Supervision Act (adopted in 1997) that sets out the responsibilities and procedures for inspections is being amended. The procedure will be clarified so that inspection decisions will not risk being rejected for procedural reasons. The Act on Pollution Charges (adopted in 1999) is also being updated and the charges revised and increased. The various environmental economic instruments that are now scattered among different legal acts will be brought together in the revised Act that will also provide details of tax collection procedures.

The Environmental Monitoring Act adopted in 1999 updated the 1993 Concept of State Environmental Monitoring and adapted Estonian legislation to conform to the numerous EU directives in the field, in particular the Directive on information. It provides a definitive legal framework for monitoring and includes provisions regarding sampling and analytical work such as laboratory certification, good laboratory practices, a quality insurance and accreditation system, intercalibration, inspection and auditing of laboratory work, etc. The Act defines the modalities for the dissemination of data and also determines how monitoring is financed: state monitoring being financed by the state budget, local monitoring by the municipal budget and self-monitoring by companies. The collection of data on air, when it is not mentioned in the laws on waste, water and nature protection, is covered by the Air Act in accordance with EU directives.

Air protection

The *Ambient Air Protection Act* was adopted in 1998 and entered into force on 1 January 2000. The previous law on air dated back to 1981 and was accompanied by a large number of quality standards (GOST standards). The new act reflects

the new problems that have emerged over the past twenty years. It regulates activities involving emissions of pollutants into the ambient air and damage to the ozone layer, as well as climate change factors, and incorporates all requirements of the Ambient Air Quality Framework Directive (96/62/EC) and the Directive for the Protection of the Ozone Layer (91/690/EEC). Procedures for the issue of an ambient air pollution permit have been established taking into consideration the regulations of the Integrated Pollution Prevention and Control Directive (96/61/EC). Emissions targets are set to the EU standards that also cover the limit values for the energy sector (electricity, heat production), which must become more environmentally friendly. To implement the Act, procedures are being worked out to determine the pollution levels and to report on activities related to ambient air pollution.

Nature protection

Over the past five years the legal framework for nature conservation (including forest protection) has also been regularly updated and consolidated. The *Act on Protected Natural Objects* of 1994, the Act on the Protection of Marine and Freshwater Coasts, Shores and Banks of 1995, and the Wild Fauna Protection Act of 1998 are to be combined into a single new act for nature conservation. This Act has been under elaboration since the year 2000. It will be in conformity with the EU Habitat and Bird Directives and accompanied by about 200 regulations for the protected zones that already exist. The Act on Hunting (adopted in 1994) is being revised. The Law on Fishing (adopted in 1995) was regularly and frequently amended until early 2001 (the last amendment raising the penalties on poaching). The Act will be entirely overhauled before 2003 to bring it into line with EU legislation. The Forest Act (adopted in 1998) is presently under revision, and amendments are being made, in particular, to the technical parameters regarding forest management. In 1999, an entirely new Act on Deliberate Release of Genetically Modified Organisms (GMOs) was adopted together with four regulations on enforcement. The Ministry of Environment will issue permits to regulate trading in GMOs and their release into the environment.

Water protection and management

The Water Act (adopted in 1994) was updated to comply with EU directives on water. The river basin management principle in water resource management was introduced to ensure optimal use and protection of water resources (see Chapter 5). The Water Act Amendment Act (adopted in 2000) will be accompanied by numerous implementing regulations, in particular regarding the management of river basins, the discharge of dangerous substances, the implementation of regulations on fertilizers (in particular the use of nitrogen fertilizers in agriculture), the requirements for water monitoring and analysis, implementation of the Geographical Information System (GIS), and the quality requirements for drinking and bathing waters. The application of the EU monitoring requirements for water will be costly: in the future, the budget for environmental monitoring that totalled 8.7 million EK in 2000 will need to be increased substantially, the highest cost relating to the implementation of the Public Water Supply and Sewerage Act (adopted in 1999) in conformity with the Urban Waste Water Directive 91/271/EEC and the Drinking Water Directives 80/778/EEC and 98/83/EC. In the draft budget for the year 2002, 14.6 million EK has been allocated for this purpose. That is why Estonia has negotiated a transition period to 2013 to allow time to adjust to the increased annual burden of 4 billion EK, i.e. three to four times more than in the year 2000.

Waste management

All of the present waste legislation was developed during the last decade. The most important pieces of legislation adopted after the first Estonian EPR in the waste sector comprise:

- The Waste Act (1998)
- The Packaging Act (1995)
- The Packaging Excise Act (1996)
- The National Packaging Register
- The List Specifying the Field of Activity Requiring a Waste Permit for Generation of Waste and Related Limit Values for Product Volumes and Waste Volumes (1998)
- The List of Products which Cause Damage to the Environment (1999)
- The List of Waste Categories, Waste Types and Hazardous Waste (1998)
- The Chemicals Act (1997)

The main framework directives concerning waste (75/442/EEC) and hazardous waste (91/689/EEC) and key EU policy instruments such as the EU waste strategy have been incorporated into the 1998 Waste Act. Various directives concerning certain types of waste or waste management have been

included in specific legislation. In keeping the legislation up to date, the rapidly evolving EU waste legislation has been taken into account but some of the most recent pieces of legislation, such as the new directives concerning incineration, end-of-life vehicles and ship-generated waste, as well as the Commission decision on the list of wastes and hazardous wastes, are still to be worked out. Additionally, there are new and amended directives in the pipeline such as those concerning waste from electric and electronic appliances, sewage sludge and biodegradable waste. New targets are being elaborated for the recycling and recovery of packaging and packaging waste.

Although the essential regulations of the EU waste legislation have been incorporated into Estonian legislation, several of them are still in the process of being enforced. Moreover, Estonia has had difficulty implementing the landfill and packaging directives. Two transition periods have been requested (1) lasting until 2013 to allow time to close the existing landfills that do not meet the requirements of the Landfills Directive 99/13/EC, and to create a network of new landfills; and (2) to 2009 to develop and implement new methods for the disposal of oil-shale ash resulting from the generation of energy. Twinning arrangements have been made between Denmark and Estonia regarding waste management.

Others

The incorporation of Directive 96/61/EC (the IPPC Directive) on cleaner production and waste management systems into Estonian law is well under way. A draft Integrated Pollution Prevention and Control Act enforcing related secondary legislation (regarding the list of specific activities subject to integrated authorization, integrated permits and permit applications, public notification, etc.) is now before Parliament.

The *Chemicals Act* was adopted in 1998 and amended in 1999. A Chemical Safety Commission and a Chemicals Notification Centre have also been established. The main objectives for 2001 will be to pass legislation relevant to the Act and to elaborate a Chemical Safety Development Plan. The *Radiation Act* was adopted in 1997 and, in 2000, two regulations on the transportation of radioactive substances and the management of radioactive waste generated during the processing of ores containing natural radionucleides. However, both the Radiation Act and its regulations need to be reviewed, amended and completed to fully comply with EU legislation. This should be achieved in 2002.

The use of mineral resources is based on the 1994 Earth's Crust Act. Under this Act, mineral resources are registered and protected by the State. Peat extraction is governed by the 1995 Law on Sustainable Development, which establishes the volume of usable peat deposits and the annual exploitation rate. Regulation No. 213 of 14 August 1996 determines the critical peat resources needed to maintain the natural balance, to guarantee sufficient incremental growth, and to preserve biological diversity and landscape values as well as maintain the status of protected areas.

Other pieces of legislation with important implications for environmental management are the Energy Act of 1997 and the recently amended Public Health Act of 1995.

International agreements

In the period 1990-1995 Estonia strove to re-establish cooperation with its nearer neighbours, beginning with the Baltic States. Its most important international obligations concerned the Baltic Sea, essentially under the HELCOM Convention. At the time, the limitations of the Ministry of Environment were considered an obstacle to further international environmental engagements, but as in other instances the EU approximation process triggered the ratification of other Conventions, as some of them are part of the Environmental Acquis (see the list of worldwide and regional international agreements in Annex IV).

Regarding *air protection*, in 1996 Estonia ratified the Vienna Convention on the Protection of the Ozone Layer and the Montreal Protocol and, in 1999, it also ratified the London and Copenhagen amendments to the Protocol. To implement the amendments it enacted the following legislation: Governmental Regulation No. 146 establishing requirements for controlling ODS and Ministerial Regulation No. 43 setting up a permit procedure for production, exportation and importation of ODS. A State Programme for the gradual elimination of the use of ODS was adopted in 1999, and no ODS are manufactured. In 1995, 131.2 ODP (Ozone Depleting Potential) tons were consumed; in 1999, only 16.4 tons, while it is envisaged that by early 2002 consumption will have ceased entirely. A National Programme for Phasing out ODS was adopted in 1999 and approved by GEF in September 2000. The cost of the Programme is

about US$ 775,000, mainly financed by GEF and with 3% contribution from Estonia. It aims at institutional reinforcement and introducing a system for recycling freezing agents, training maintenance operators and setting up a halon treatment centre.

At the regional level, Estonia has made a major step forward in acceding to several elements of the Long Range Transboundary Air Pollution Convention. In the year 2000, it ratified the Convention itself and three of its protocols (the 1985 Helsinki Protocol on the Reduction of Sulphur Emissions, the 1988 Sofia Protocol on Nitrogen Oxides, and the 1991 Geneva Protocol on Volatile Organic Compounds). The EMEP Protocol and the second Protocol on Further Reduction of Sulphur Emissions (Oslo Protocol) are currently before Parliament. Estonia is a significant source of sulphur and nitrogen oxides emissions that have a detrimental transboundary effect, acidifying the atmosphere. The inland water bodies and forests of the neighbouring Nordic countries are particularly affected by acid rain.

Estonia remains a net exporter of sulphur emissions (118,000 tons in 1995 and 104,000 tons in 1999) and of nitrogen oxides (42,000 tons in 1995 and 46,000 tons in 2000). With 104,000 tons of SO_2 emitted in 1999, Estonia is 30% below the 1980 emission level (287,000 tons) and thus well ahead of the target set under the Helsinki protocol of 200,000 tons per year. Estonia also fulfils the Sofia Protocol, as the year 2000 emissions (46,200 tons) are by far inferior to the 70,000 tons of 1987 that are the target value. In 1995, Estonia operated two EMEP stations, the functioning of which was unsatisfactory and needed improving. Today, thanks to financial assistance from Finland, the stations have been modernized. The transboundary air pollution programme is now implemented at three monitoring stations: Lahemaa, Vilsandi and Saarejärve.

Regarding *water protection*, Estonia has continued its participation in the 1992 HELCOM Convention for the Protection of the Marine Environment of the Baltic Sea (ratified in 1995) and took part in the implementation of its Strategic Programme. This Programme was the major pillar of international cooperation and assistance to the Country in 1995, and although EU accession matters became the major focus, the discharge of polluting and eutrophic substances from land-based sources during the period 1995 to 1999 was further reduced (by 17% for flow rate, almost 50% for BOD5, 20% for phosphates and 22% for nitrates). In part, this pollution abatement was achieved through the water infrastructures financed by foreign donors through the Strategic Programme.

Under the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes that Estonia ratified in 1995, a bilateral agreement was concluded with Russia regarding Lake Peipsi and its outlet, the Narva River. Regular exchanges of monitoring data, of scientific information and information of public interest now take place through the subgroups that were established under the joint commission. Estonia intends to ratify the Water and Health Protocol to the Convention in 2001. As oil damage in the sea is of growing concern, Estonia also plans to ratify the 1969 Convention on Civil Liability for Oil Pollution Damage and the 1971 Convention for the Establishment of an International Compensation Fund for Oil Pollution Damage.

Estonia has also ratified a series of other UNECE environmental conventions of regional importance. In the year 2000, the UNECE Convention on Industrial Accidents with Transboundary Effects was ratified. Coordination is ensured under the rescue board of the Ministry of Internal Affairs, but no such accidents have occurred over the past five years. In the year 2000, Estonia also ratified the UNECE Espoo Convention on Environmental Impact Assessment, in line with the Acquis legislation. Estonia plans to set up a database on environmental impact assessment that will be accessible on the Internet and consistent with the ENIMPAS database on transboundary impact assessment drawn up under the Espoo Convention. Estonia ratified the UNECE Aarhus Convention on Access to Information, Public Participation in Decision-making, and Access to Justice in Environmental Matters (2001). It reflects Estonia's continued efforts to increase transparency and democratic participation and stimulate the interest of the public in environmental matters. Further examples are the widespread participation in the elaboration of the second NEAP and the easy access to environmental information provided by the MoE Internet website. (Detailed information on environmental permits as well as on nature reserves will also soon be freely available.)

The Ministry of Environment now allocates seven times more resources to the Conventions than it did in 1995, which is why Estonia was able to ratify the Conventions necessary for accession to the European Union. However, the Ministry is once again in a position where its capacities are too

limited to permit it to take further steps. For certain conventions the financial obligations, in particular the membership fees, are relatively high (e.g. US$ 105,000 per year for the ODS Agreements), but there is the possibility of applying for special financing. Estonia is eligible under the GEF and has received funds for biodiversity conservation and for phasing out ODS. All the Conventions involve regular reporting, a task entailing as much work for a small country as for a large one, and a heavy burden for the Estonian Ministry of Environment.

Estonia has been active in concluding *bilateral environmental agreements* with other European countries. Eighteen such agreements have been signed since 1995, including agreements with Russia on the environment (1996) and on the protection and sustainable use of water resources (1997); with Lithuania on the control of transboundary movements of waste (1996) at a time when Lithuania was not a party to the Basel Convention; with Latvia on transboundary impact assessment (1997); with Sweden on cooperation on activities implemented jointly (1998); and with Hungary on biodiversity protection (2000). However, bilateral cooperation with European Union countries is likely to decrease as soon as Estonia becomes an EU member, as cooperation will then be internal to the Union. Finland and Sweden have already indicated their intention to channel their cooperation through the EU, while Denmark seems set to continue its direct cooperation and financial assistance.

Institutional arrangements

The Ministry of Environment

Since the first EPR, structural changes have occurred in the organization and distribution of environmental responsibilities at all levels. In the year 2000, the Ministry of Environment and the national bodies for which it is responsible were reorganized (for the organizational structure of the MoE see Figure 1.1). The responsibilities of the Ministry, however, remain unchanged: spatial planning, protection of air, management and protection of waters, mineral resources and nature (including forests, fish and game), and management of waste.

New units have been set up within the Ministry of Environment to strengthen capabilities in the areas of legislation and strategic planning as the EU accession process has been particularly demanding in these matters over the past four years. The legal department now counts ten highly specialized environmental law staff that, since 1999, have worked to adjust the country's legislation to EU directives. With economic activities picking up and the EU accession process accelerating, special attention was also given to integrated pollution prevention and control and the introduction of new technology, leading to the creation of technology and financial departments specializing in ISPA projects.

In 1999, the opening of the environmental Chapter in the EU accession process significantly increased the MoE workload. Unlike other countries that set up special integration units, Estonia chose to assign responsibility for adjustment to EU directives to the various departments themselves, each specialized unit – for water, waste, air, or technology – dealing with the integration process in its specific field, with overall coordination ensured by the international cooperation department. This task sharing has, so far, given full satisfaction.

Prior to 1991, the Ministry of Environment had no offices at local level, environmental management and protection being the responsibility of counties with special environmental offices. After 1993, they were administered by the Ministry but still financed by local budgets. In such circumstances it was difficult for the Ministry to ensure that national environmental strategies were implemented according to the priorities defined at national level. The restructuring of 2000 therefore put the county environmental authorities under the direct responsibility and budgeting of the Ministry of Environment. These offices are implementing agencies that deal with EIA, issue permits for natural resource use and pollution discharge, and manage the 290 local and regional protected areas. They are also required to work out county waste management plans.

Overall, the Ministry of Environment counts 150 staff at the Ministry level and 300 in the 15 county authorities (i.e. about 20 employees per county office).

The Environmental Inspectorate

Regarding law enforcement, the two inspectorates – the Nature Protection Inspectorate and the Marine Inspectorate – that in 1995 were attached to the Ministry of Environment have been merged into a single Environmental Inspectorate. This body

employs 270 staff, has a national headquarters office in Tallinn and seven regional departments (each of them covering two or three counties). The inspectorate checks compliance with environmental permits and enforces the law. Previously, inspections were carried out by the staff of the County Environmental Departments that also issued environmental permits. Following restructuring, this is now the responsibility of two separate and independent bodies, thus separating the authorizing and enforcement mechanisms and thereby minimizing potential conflicts of interest. The Inspectorate's tasks include air, water, waste, ODS, chemicals, marine and biodiversity protection. The central office helps the regional departments in their control, particularly when specific expertise is needed. In view of the implementation of the IPPC directive, important efforts have been made to train inspectors and engage new staff with relevant university backgrounds.

Since the restructuring process, the inspectors have become stricter in enforcement of the laws. While the permit is not yet integrated, inspections are made in a single operation by a group of inspectors competent in various fields. This is seen as a first step towards an integrated permit. In addition, these inspection teams comprise people with complementary technical and legal backgrounds. Under the new procedure, when a law is infringed for the second time the infringement becomes a criminal offence punishable by three years' prison. In a few regions, environmental cases are tried by judges specialized in environmental matters, the most frequent cases relating to illegal dumping of waste or pollution of soil with chemicals, or to illegal construction within the protected coastal zone (see Chapter 6, Table 6.4).

The local authorities

Municipalities also have responsibilities regarding drinking water, waste-water treatment and waste management. Soon they will be asked to prepare their municipal waste management plan in line with the provisions set up in the National Waste Management Plan 2000. Regarding drinking water and waste-water treatment and waste management, the market is opening to the system of concessions, and foreign and national private companies are competing to obtain contracts. Several towns have become severely indebted, since, in mid-1995, they developed their infrastructure and contracted heavy loans from abroad that they can no longer afford. The 1995 Law on local authorities is still in force today, but it is difficult for local authorities to comply with it as they lack resources. It will shortly be modified so as to regularize the situation throughout the country. At present most of the money is siphoned off by Tallinn City, leaving too little revenue for other Estonian regions.

Other institutions

About twenty other bodies, research centres and institutes concerned with meteorology, geology, forests, land management and environmental information, are under the direct supervision of the Minister of Environment (see Figure 1.1).

1.3 Environmental information

Monitoring

In 1994, Estonia launched a National Environmental Monitoring Programme (NEMP) but in autumn 1999 it was redrawn on the basis of the 1999 Environmental Monitoring Act. The monitoring programme for 2001 introduced four main changes: (1) strategic priorities were established for monitoring so that data necessary for decision-making at the national level are collected and analysed; (2) a single and integrated monitoring procedure will be implemented; (3) the monitored data will be fed into a Geographical Information System, and made available through the Internet; (4) a wider use of the data will be encouraged for research, student education and the training of environmental specialists. The total Programme will cost 8.9 million EK and includes 12 sub-programmes involving more than 1,600 monitoring stations throughout Estonia to carry out the following activities

1. Meteorological monitoring;
2. Air monitoring;
3. Groundwater monitoring;
4. Monitoring of inland water bodies;
5. Coastal sea monitoring;
6. Monitoring of biological diversity and landscapes;
7. Forest monitoring;
8. Complex monitoring;
9. Radiation monitoring;
10. Seismic monitoring;
11. Soil monitoring;
12. Ensuring the quality of data analyses;
13. Support programme.

Formerly the responsibility of the Environmental Information Centre, monitoring activities are now coordinated by the Monitoring Council. The sampling and analytical tasks are sub-contracted to

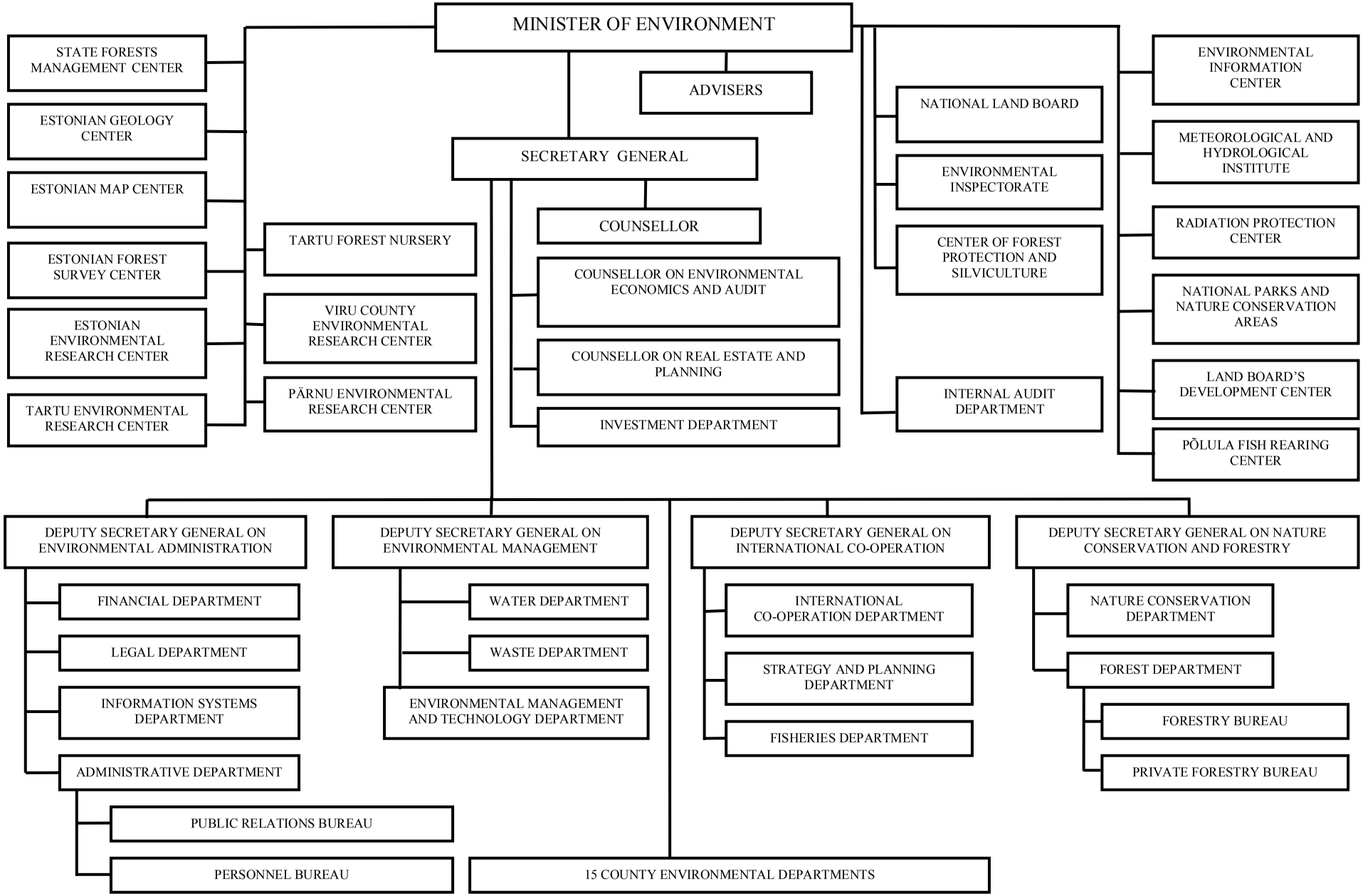


Figure 1.1: Structure of the Ministry of Environment: *Source*: Ministry of Environment of Estonia

laboratories through procurements given for a one-year period for which any certified laboratory is eligible. The Estonian Environmental Research Centre (into which the Viru and Pärnu Counties' Environmental Research Centres have recently been merged) and the Tartu Environmental Research Centre are the major monitoring institutions. The Estonian Environmental Research Center is currently the only organization in the environmental field that has an international quality accreditation for water and air, and is therefore the only one able to carry out sampling and analysis in compliance with EU standards and requirements. It also participates in large international monitoring programmes on transboundary air pollution, on climate change and on coastal seawaters.

Estonia is developing a Geographical Information System that will become accessible on the Internet. Environmental data from sites throughout the country will be collected through the NEMP and processed by the Environmental Information Centre.

Dissemination of environmental information

The Act on Public Information, which came into force on 1 January 2001, has facilitated the availability of environmental data to the public. As one of the most advanced countries in the world in this matter, Estonia is compiling several environmental databases and making them available on the Internet. The existing state registers (for water and natural assets), and other public and informal databases will be combined into a National Environmental Register classifying all environmental data geographically and temporally. Data entered into the Register will be recognized as the only official data with legal status. All this information will be freely available for public use and cover natural resources, natural assets, biological and physical environment factors, environmental conditions and all data in connection with environmental management (pollution releases, water and waste management and treatment facilities, radioactive waste depositories, and environmental permits, etc). The schedule for collating and releasing this information is set out in the Environment Register Act currently before Parliament. In five years' time, this information will be fully available to the public.

The Estonian environmental information centre, a state institution employing 44 staff, collects and disseminates all data on natural resources, the state of the environment and cases of pollution. For instance, the environmental information centre is in charge of the national database on water and protected assets, and is shortly to manage the database on environmental permits, and later the waste and packaging registers. Some data may be released to the public only if justified (the location of highly valuable or endangered species of flora and fauna for instance).

The Environmental Information Centre is also in charge of international reporting and will become the national counterpart of the EEA. Estonia has applied for membership in the European Environmental Agency (EEA) in order to harmonize its environmental data collection and dissemination system with EU legislation. It is likely to become a member in the course of 2001. In the meantime, the Aarhus Convention has been ratified.

1.4 Conclusions and recommendations

Legislation and its implementation

Estonia passed a new set of environmental laws in 1995 but they were too broad, insufficiently precise and contained wide gaps. In 2001, the situation is quite different: Estonia has adjusted its legislation taking into account the EU accession process and now has more modern laws. All the major pieces of legislation are in place, but are often the culmination of a series of successive amendments made hastily to meet EU deadlines. In a number of cases, this has resulted in duplication and disparity between the provisions of different acts. Conscious of the problem, Estonia has begun ironing out the inconsistencies as it incorporates the acts into an environment code.

Institutions

The number of laws that were drafted, amended and adjusted within the space of ten years is impressive and is made possible, in part, by the strengthening of the MoE legal team to ten specialists. The current challenge for Estonia is to implement and enforce this series of laws. As implementation and enforcement are carried out mainly at the regional level, this requires the County Environmental Departments of the Ministry of Environmental to have sufficient staff with adequate training. This could be a problem when the implementation of new and up-to-date laws is at stake, such as the IPPC Act and the EIA and

Auditing Act, both adopted in 2000 and entering into force in 2001. The Environmental Management and Technical Department of the Ministry is providing methodological assistance on EIA to its County Environmental Departments. Regarding IPPC, staff of the inspectorate and of the Environmental Departments was trained systematically at both the national and local levels. The situation is less satisfactory for EIA and auditing in County Environmental Departments of the Ministry of Environment where capacity is lacking, whereas the bulk of implementation expertise should be concentrated there.

Recommendation 1.1:
The Ministry of Environment should ensure that the County Environmental Departments of the Ministry of Environment have sufficient capacity in staff specialized in Environmental Impact Assessment.

At the local level, the environmental capacity of the municipal authorities is weak, in particular in small cities and villages. Municipalities are not equipped to work out their environmental solutions by themselves, since for the most part they have no environmental specialist. Nor are they organized to tackle problems together. This is particularly problematic at a time when the implementation of important laws and programmes on waste and water management in particular will generally be assigned to them. Municipalities need guidance to decide when it is more beneficial for them to work out solutions separately and when in common with other municipalities; and given their specific situation, what type of management systems for their utilities better match the interests of their citizens. In this process, it is important that they be guided by the County Environmental Departments, a function that tends to be neglected by these bodies that are overly involved in paper work.

Recommendation 1.2:
The Ministry of Environment should initiate a governmental programme to help the municipalities cope with their environmental problems, as well as with the new and enlarged responsibilities assigned to them through the EU directives. The programme should help the municipalities develop tailor-made responses to their specific circumstances and facilitate coordinated action among them, as appropriate. This Programme should be implemented with the help of the National Municipalities Association and County Environmental Departments of the Ministry of Environment. The Programme should also ensure that municipalities have access to sufficient technical and legal advice.

The restructuring undertaken early in the year 2000 rationalized the structure of the environmental institutions by dividing the responsibilities of implementation and enforcement between separate bodies, thus ensuring more objectivity in their respective work. This is the case of the County Environmental Departments that issue permits and the local inspectorate offices that oversee their enforcement. However, a matter of concern is that of communication of the information contained in permits from the County Environmental Departments (that not only issue the permits but also collect the fees) to the inspectors when they make an inspection. While the permit contains helpful information for conducting an efficient inspection, it is made available only following a formal written request, a lengthy process. With the upcoming database providing permit details and conditions, the inspectors will possess all the elements necessary for cross-checking their information. Conversely, the County Environmental Departments that issue the permits may consult the inspection reports, useful references when permits come up for renewal.

Recommendation 1.3:
The Ministry of Environment should evaluate the organization and work of the inspectorates and County Environmental Departments to ensure that they work efficiently and coherently, especially in implementing and enforcing the permitting system. Every two to four years, the Ministry should organize independent auditing activities of the County Environmental Departments and regional Inspectorates in areas related to air, water, waste, and nature protection.

Monitoring

The 1994 National Programme for Environmental Monitoring and the Law on Environmental Monitoring of 1999 are two cornerstones of the progress made in environmental monitoring. A monitoring programme was set up in the year 2000 and a national monitoring system (NMS) is being developed in 2001. Plans for 2001-2003 provide for other progress in the field, from the repairing of laboratory facilities, laboratory accreditation and inter-calibration, and improvement of laboratory methodologies, to staff training and the introduction of software for laboratory management. The financing of these measures has been arranged but efforts still need to be made

regarding the sharing of responsibilities for data collection and reporting, in particular the requirements for self-monitoring and environmental data reporting by the business sector. While the new Ambient Air Protection Act gives precise guidelines on who should measure and report on what and how, the Water and Waste Acts seem too vague and leave the polluter too much room for subjective interpretation.

Recommendation 1.4:
The Law on Environmental Monitoring (1994) should follow the example set in the 1998 Air Protection Act with respect to data reporting and collection issues. In addition, the Water Act and the Waste Act should specify the respective data-reporting responsibilities of Ministry of Environment and the business sector, indicating clearly who should report on what and to whom. Reporting from business should be formalized so as to become clear and compulsory.

Chapter 2

ENVIRONMENTAL CONDITIONS AND MANAGEMENT OF POLLUTION AND NATURAL RESOURCES

Since the first Environmental Performance Review of Estonia was carried out in 1995-1996, the environmental conditions of the country have continued to improve in parallel with the upturn in economic activity. The situation regarding air, contaminated sites and the use of water and mineral resources is described in this chapter, while the waste and biodiversity situation is described in Chapters 4 and 5 respectively.

2.1 Air management

Air quality and emissions, 1995-1999

Table 2.1: Trends in anthropogenic emissions of selected pollutants, 1990-1999

thousand tons

		1990	1994	1995	1996	1997	1998	1999
CO_2	**Total**	**37,797**	**22,883**	**20,860**	**21,422**	**20,716**	**19,231**	**15,878**
	Mobile sources	2,656	1,786	1,700	1,534	1 097	1,236	963
	Stationary sources	35,141	21,097	19,160	19,888	19,619	17,995	14,915
	Energy production	34,528	20,882	18,938	19,682	19,265	17,653	13,473
SO_2	**Total**	**252.1**	**149.2**	**118.6**	**125.2**	**119.0**	**110.1**	**104.0**
	Mobile sources	13.1	8.1	8.3	8.0	8.0	9.2	9.4
	Stationary sources	239.0	141.1	110.3	117.2	111.0	100.9	94.6
	Power plants*	178.8	112.2	83.7	90.9	87.0	82.1	78.8
NO_X	**Total**	**67.7**	**41.1**	**42.1**	**44.4**	**44.8**	**46.0**	**46.2**
	Mobile sources	45.1	26.5	27.2	28.1	29.2	31.1	31.7
	Stationary sources	22.6	14.6	14.9	16.3	15.6	14.9	14.5
	Power plants*	13.3	10.4	11.1	11.9	11.2	10.9	10.5
VOC	**Total**	**88.4**	**44.7**	**47.5**	**50.2**	**53.9**	**53.7**	**53.5**
	Mobile sources	70.4	39.9	41.0	44.6	47.6	48.0	48.5
	Stationary sources	18.0	4.8	6.5	5.6	6.3	5.7	5.0
Solids	**Total**	**268.5**	**161.5**	**113.1**	**98.9**	**78.7**	**69.9**	**70.5**
	Stationary sources	268.5	161.5	113.1	98.9	78.7	69.9	70.5
	Power plants*	181.0	102.2	69.6	74.4	67.0	60.4	61.3
Lead (Pb)	**Total**	**233.5**	**..**	**88.0**	**80.5**	**73.5**	**55.0**	**45.0**
	Mobile sources	149.1	55.8	39.6	30.3	21.9	10.6	3.9
	Stationary sources	84.4	..	48.4	50.2	51.6	44.4	41.1
	Power plants*	72.6	..	42.3	43.6	43.1	37.4	34.3
	Other fuels	10.8	..	5.6	6.2	8.0	6.6	6.5
	Cement production	1.0	..	0.5	0.4	0.5	0.4	..
	Industry	..	..	0.03	0.04	0.03	0.02	0.0

Source: Ministry of Environment.

Note:
* Oil shale.

Table 2.2: Main air polluters, 1997-1999

thousand tons

	Solid			SO_2			NO_x			CO			Dust		
	1997	1998	1999	1997	1998	1999	1997	1998	1999	1997	1998	1999	1997	1998	1999
AS Narva Elektrijaamad	65.7	59.2	60.5	74.6	67.4	67.0	9.6	8.8	8.5	7.0	6.5	5.6	0.3	0.2	0.2
AS Kiviter*	0.6	0.7	0	7.3	5.2	3.5	0.2	0.2	0	1.2	1.0	0	2.8	1.9	0.6
AS Kohtla-Järve Soojus	1.2	1.2	0.8	7.4	8.6	6.4	0.4	0.6	0.4	0	0	0	0	0	0
Kunda-Nordic Tsement AS	2.4	1.3	0.5	2.2	0.3	0.3	0.5	0.6	0.5	0	0.7	0.6	0	0	0
Eesti Energia AS Iru SEJ	0.1	0	0	3.4	3.5	3.1	0.6	0.9	0.9	0	0	0	0	0	0
Silmet Grupp AS	1.0	0.5	0.8	1.6	1.6	1.4	0.3	0.3	0.1	0.9	0.9	0.5	0	0	0

Source: Ministry of Environment, 2000.

The heavy pollution emitted into the air has continued to diminish (see Table 2.1). Since 1994, sulphur dioxide (SO_2) has decreased by 30% and particulate matter (PM) by 56.3%, although NOx has increased by 12.4% due to the growth of transport. In 1999, 104,000 tons of SO_2, 70,000 tons of particulate matter, 46,000 tons of NOx and 15,878,000 tons of CO_2 were emitted. Compared with other countries, Estonia is a prodigious air polluter (see Figure 2.1) with CO_2 emissions almost twice the OECD amount. Its SOx emissions are double the OECD figure due to the contribution of oil-shale production, and although air emissions from stationary sources are declining, those from mobile sources are increasing.

The energy sector bears the main responsibility for air pollution. This sector still depends fully on fossil fuels, mostly domestic oil shale. However, a decrease of related air emissions has been observed since 1996 due to both the economic decline and the decrease of domestic electricity demand and electricity exports to Latvia and the Russian Federation. Sulphur dioxide (SO_2) and particulate matter (PM) from oil-shale combustion are the dominant air pollutants. In 1999, the two biggest power plants burning oil shale (the Baltic and the Estonian Thermal Power Plants) were together responsible for 77.8% of SO_2 and 94.1% of particulates (see Table 2.2). It is not only the combustion process that contributes to the pollution, but also the other associated activities such as the transport and storage of raw and processed materials.

In 1995, another big stationary air polluter was the Kunda Nordic Cement plant, responsible for 30% of particulate emissions. Since 1999, following the introduction of abatement technology, it has made enormous progress and the emission of particulates has now ceased completely (see Table 2.2).

The transport sector also emits air pollution, mostly NOx (27,200 tons in 1995 and 31,700 tons in 1999), CO (215,100 tons in 1995 and 254,300 tons in 1998), and VOC (27,200 tons in 1995 and 48,500 tons in 1999). In the meantime, Estonia has introduced fuel with a low lead content. The present lead content is 0.013 g/l and will drop to 0.005 g/l in 2003. The policy of introducing unleaded fuel resulted in a sharp decrease of 73.23% of lead emissions from transport between 1995 and 1999. Between 1995 and 1999, all other emissions from mobile sources increased: NOx by 15%, CO by 15% and VOC by 75% (see Table 2.1).

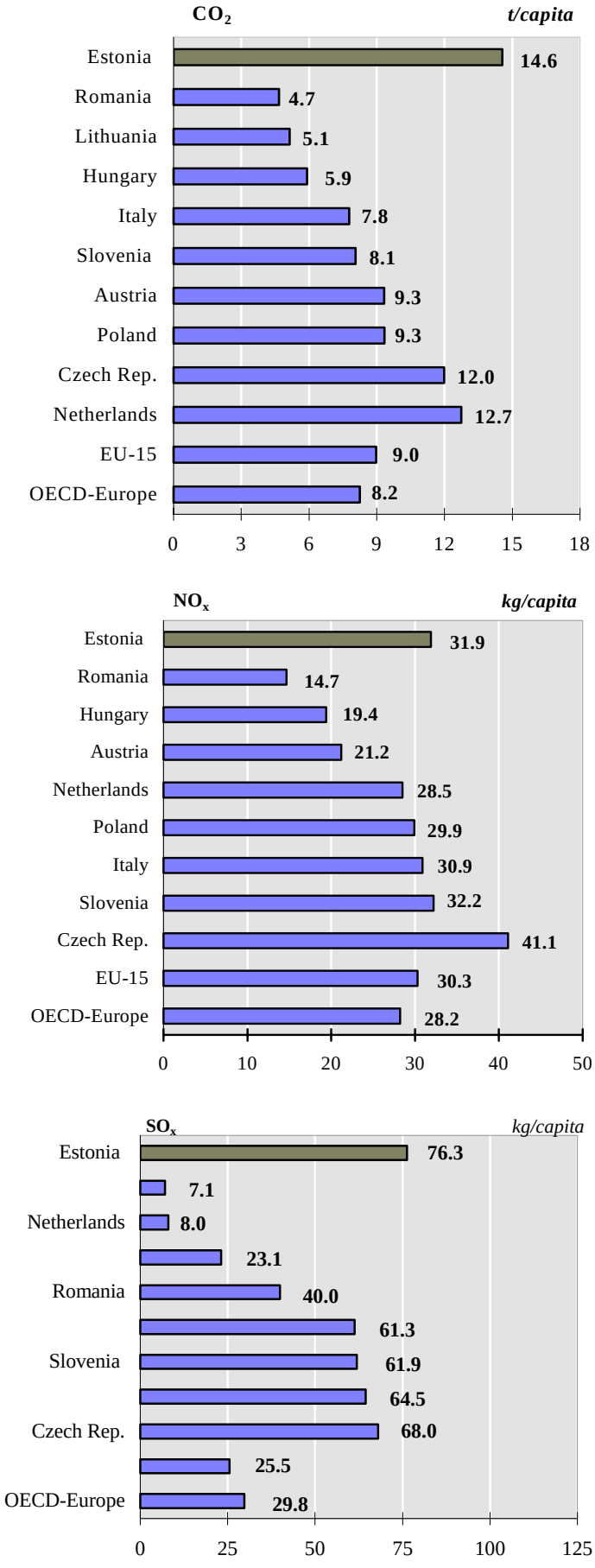
The quality of the urban environment is mainly affected by the NOx pollution from transport and by SO_2 from stationary sources (see Table 2.1). The increase of transport facilities (Box 7.1) such as cars, trucks and special vehicles in urban areas is also of great concern because of the emission of pollutants, particularly since the majority of the cars are not fitted with catalytic converters (see Table 7.1).

As in 1995, the most serious pollution is in the Narva Region (SO_2 from oil-shale exploitation and burning) and in the Tallinn and Narva Regions (NOx from the heavy traffic and transport activities).

Policy, strategies and objectives

The 1997 Estonian National Environmental Strategy set two policy goals aimed chiefly at protecting and improving the quality of the atmosphere. Estonia has implemented a vigorous policy on ozone-depleting substances and attempted to reduce the negative impact of the energy sector turning towards clean technology development and the use of renewable resources.

Figure 2.1: Emissions of $C0_2$, $N0_x$ and $S0_x$, late 1990s



Sources: OECD, Environmental data, 1999; EMEP data; EPR reports.

Table 2.3: Consumption of ozone depleting substances, 1986-2001

ODP tons

	1986	1991	1994	1995	1996	1997	1998	1999	2000 forecast	2001
Total	**210.9**	**222.7**	**153.8**	**131.2**	**36.5**	**43.6**	**25.1**	**16.4**	**8.2**	**3.8**
Total A1	**189.0**	**199.0**	**135.0**	**127.5**	**29.3**	**36.8**	**16.5**	**11.0**	**5.5**	**2.8**
Annex A group 1 CFC 11	12.0	20.0	23.0	9.7	-	0.3	-	-	-	-
CFC 12	177.0	179.0	95.0	110.5	26.9	36.5	15.0	10.0	5.0	2.5
CFC 113	0…	0…	0…	0.9	-	0…	0…	0…	0…	-
CFC 114	-	-	17.0	6.4	2.4	-	1.5	1.0	0.5	0.3
CFC 115	-	-	2.0	-	-	0…	-	-	-	-
Total A2	**15.8**	**17.5**	**16.8**	**1.5**	**4.6**	**0.4**	**2.3**	**1.2**	**0.6**	**-**
Annex A group 2 halon 12 11	0.9	0.9	0.9	0.9	0.9	-	0.3	0.2	0.1	-
Halon 1302	7.7	7.7	7.7	-	-	-	-	-	-	-
Halon 2402	7.2	9.0	8.2	0.6	3.7	0.4	2.0	1.0	0.5	-
Total B1	**-**	**-**	**-**	**-**	**-**	**0.3**	**-**	**-**	**-**	**-**
Annex B group 1 CFC 13	-	-	-	-	-	0.3	-	-	-	-
Other CFC's	-	-	-	-	-	-	-	-	-	-
Annex B group 2 Carbon tetrachloride	0.2	0.4	0.2	0.7	0.2	0.1	0.2	0.1	0.1	0.1
Annex B group 3 1.1.1.-trichloroethane	0.1	0.3	0.1	0.1	0.2	0.1	0.1	0.1	-	-
Annex C group 2 HBFC	-	-	-	-	-	-	-	-	-	-
Annex E group 1 Methyl bromide	-	-	-	-	-	0.1	-	-	-	-

Source: Health Protection Inspectorate, Customs Board, Board of Statistics in State of Environment in Estonia - on the threshold of XXI century, 2001.

Taking into account the social problem linked with oil-shale activities, the goals were set as follows:

- To ensure political and economic independence of the state by considering the oil-shale sector as a vital strategic branch of the Estonian economy;
- To ensure a higher efficiency in the use of oil-shale while reducing its environmental impact through clean or pollution-abatement technologies; and
- To use oil-shale resources in a more rational way.

In the early nineties, it was not possible to implement clean technologies in the energy sector due to the severity of the economic constraints. Through the privatization process and the implementation of the 1998 Ambient Air Protection Act, current and future measures are planned to reduce pollutant emissions. Taking account of EU Directive 88/609/EEC, the 2000 national programme on the Reduction of Pollutant Emissions from Large Combustion Plants covers:

- Technological measures, such as the replacement of purification equipment;
- A shift to cleaner fuels (gasification);
- The use of fuels with lower sulphur content; and
- The monitoring of emissions via permits.

There is neither a strategy on sustainable use and mining of oil shale nor one for the phasing out of its use as fuel. Estonia has officially decided to continue exploiting this strategic resource for the next twenty-five years, as it is essential for its production of electricity.

The National Programme for phasing out substances that deplete the ozone layer, financed at 97% by the GEF and 3% by Estonia, was launched in 1999. It includes the following sub-programmes:

- Institutional Strengthening Project;
- Recovery and Recycling Programme;
- Training in Refrigeration;
- Regional Halons Management Bank.

No ozone-depleting substances (ODS) are manufactured on Estonian Territory. Consumption is shown in Table 2.3. According to law, Estonia also abandoned the consumption of ODS, but there is still a problem of import, export and transit of these substances. Since Directive 2037/2000/EC

entered into force on 1 October 2000, Estonia plans to amend legislation in conformity with this directive. A programme will strengthen relevant legislation and the treatment of substances that deplete the ozone layer.

Instruments

Pollution permits on ambient air regulate emissions into the air. Ministry of Environment regulations N59 (1994) and N32 (1995) specify the permitted limits of pollutants in the atmosphere as well as the emission intensity. A permit is usually valid for five years. Without significant changes, the permit can be extended; otherwise, a new proposal must be submitted. The permit is issued by the County Environmental Department, or by the Department of Environmental Technology of the Ministry of Environment if the facilities have stacks higher than 100 m. If the quantity of emissions into the ambient air exceeds the level of minimum calculated emissions or the permitted limit, a penalty should be paid by the physical or legal person responsible.

Estonia adapted all requirements of the EU Directive on roadworthiness tests for motor vehicles and their trailers (96/96/EC), and periodical roadworthiness inspections are compulsory for all motor vehicles. Check periods are every 6, 12, 24 or 36 months, depending on the age and category of the vehicles. In addition, police and experts of the Estonian Motor Vehicle Registration Centre carry out random roadside checks. Visual checks ensure, for example, that vehicles do not emit dark smoke.

Economic instruments may serve to reduce pollution (see Chapter 6). Air emission charges are levied on the following pollutants: sulphur compounds, nitrogen compounds, CO, CO2, particulate matters, volatile organic compounds and heavy metals. Charges are adjusted according to the location and the nature of the source. Enterprises may negotiate charge abatements in order to invest the corresponding funds in equipment that reduces the air emissions. In 1999, EEsti Energia, a state energy company, invested almost EK 90 million. The biggest investment was the installation of an electrostatic precipitator that enabled fly ash emissions to be reduced more than tenfold.

Air Monitoring

One sub-programme of the national environmental monitoring programme is based on the new Directive 99/30/EC. Besides the obligation to inform the public on air pollution levels, the following instruments and practices are applied:

- Requirements for EU directives and international conventions and their possible protocols-such as EU Directives on Air Quality (96/62/EC) and on Ozone pollution of troposphere (96/72/EEC);
- UNECE Convention on Long-Range Transboundary Air Pollution;
- Convention on the Protection of Marine Environment of the Baltic Sea Region (HELCOM);
- Urban monitoring of pollution levels and dissemination of the information in towns with air quality problems.

To provide information for the Government of Estonia and other European countries on transboundary air pollution, three EMEP stations monitor the air quality for long-range transport emissions under the UNECE Convention on Long-Range Transboundary Air Pollution. Air monitoring is not carried out under HELCOM, but countries that have acceded must report data on air pollution. Urban monitoring is carried out in towns such as Tallinn where the air quality is subject to analysis, pollution levels are registered and information is disseminated through media channels. Air quality is also monitored in the industrial region of East-Viru.

Institutions

The Ministry of Environment works to prevent and control air pollution through diverse mechanisms. Through the County Environment Departments the Ministry enforces policies established at the Government level through training and information. The Environment Information Centre compiles an air emission database to provide data to national and international bodies; information is also available on the Internet for public consultation.

Table 2.4: Water abstraction by sources, 1990-1999

million m^3 / year

	1990	1995	1996	1997	1998	1999
Total	**3,300**	**1,850**	**1,700**	**1,698**	**1,670**	**1,533**
Surface water	2,720	1,430	1,373	1,306	1,284	1,228
Groundwater	495	350	257	322	316	299
from aquifers	…	*103*	*94*	*85*	*73*	*65*
mine drainage water	…	*247*	*163*	*237*	*243*	*234*
mineral water	…	*0.007*	*0.007*	*0.009*	*0.011*	*0.008*
Sea water	85	70	70	70	70	5.6

Sources: Statistical Yearbook of Estonia, 2000; State of Environment in Estonia, 2001.

Table 2.5: Water consumption by sectors, 1990-1999

million m^3 / year

	1990	1995	1996	1997	1998	1999
Total	**2,990**	**1,567**	**1,504**	**1,434**	**1,403**	**1,274**
Domestic	112	88	87	76	61	53
Industry	172	62	61	63	57	52
Cooling	2,440	1,237	1,221	1,187	1,176	1,124
Agriculture	45	8	7	6	5	5
Fish-rearing	…	154	115	90	92	33
Other	221*	18	13	12	11	7

Sources: Statistical Yearbook of Estonia, 2000; State of Environment in Estonia, 2001.

Note:
* Including fish-rearing

2.2 Water management

Situation during 1995-1999

Water abstraction and use

Water abstraction amounted to 1,533 million m^3 in 1999. It has more than halved since 1990 and continues to decrease steadily, dropping 17% over the period 1995-1999 (see Table 2.4). The bulk of abstracted water comes from surface-water bodies (80%), the rest from underground (15% mine drainage waters and 4% from aquifers). While marginal, the use of seawater has nevertheless been reduced to less than 0.5%.

Water consumption has also diminished more than twofold since the 1990s. The quantity of water consumed by the different sectors of activity is shown in Table 2.5. In 1999, almost 90% was cooling water, a category that has also reduced consumption twofold since the 1990s. The rest is shared among industry (53 million m^3 or 4.1%), households (52 million m^3 or 4.1%), fish farming (2.6%) and agriculture (less than 1%).

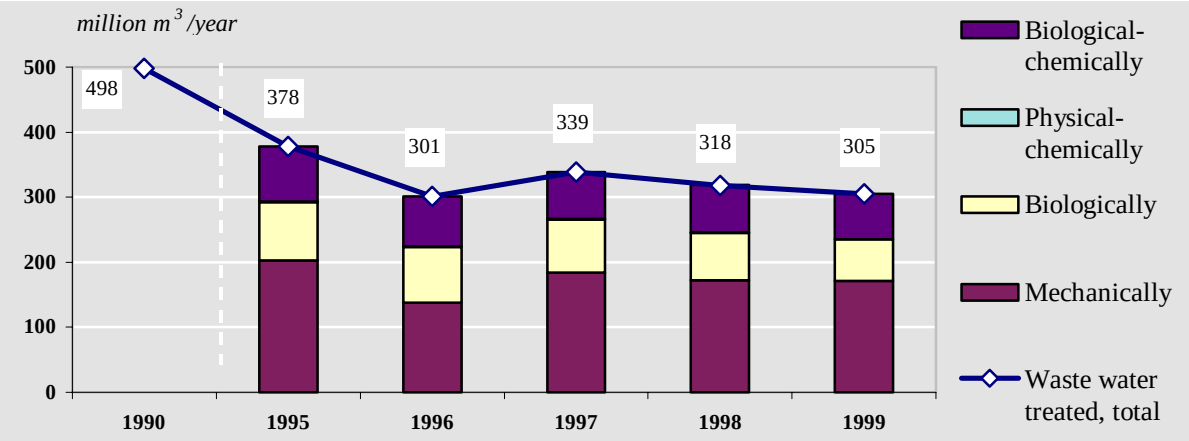
Drinking water supply

Sixty-six per cent of drinking water is extracted from groundwater aquifers, the rest from surface waters (34%). In general, groundwater supply is sufficient and of high quality, i.e. the groundwater for drinking purposes is supplied without needing treatment. Surface water is used for drinking purposes both in the city of Tallinn, which uses a large surface reservoir fed by the upstream watershed, and in Narva city. Sometimes past pollution sites cause drinking water resources (surface as well as underground) to be contaminated locally with petroleum products. Drinking water sources can also be contaminated by nitrogen compounds that result from past overuse of fertilizers that are slowly released from soils. There are no data concerning the content of agricultural pesticides in water, but there are likely to be consequences from their overuse during the Soviet period. Use of pesticides declined from almost 1,000 tons in 1991, to 150 tons in 1993 and 75 tons in 1999.

Table 2.6: Waste water discharge and treatment, 1990-1999

	1990	1995	1996	1997	1998	1999
Waste water discharge, total *(million m^3/year)*	**3,258**	**1,849**	**1,692**	**1,686**	**1,671**	**1,532**
No treatment needed *(as % of total discharged)*	83.4	78.5	81.3	79.3	80.4	79.6
Treatment needed *(as % of total discharged)*	16.5	21.4	18.7	20.7	19.6	20.4
Untreated *(as % of total needed treatment)*	*7.3*	*4.5*	*4.7*	*2.9*	*2.4*	*2.2*
Waste water treated, total *(million m^3/year)*	**498**	**378**	**301**	**339**	**318**	**305**
Mechanically *(as % of total treated)*	…	53.7	45.8	54.3	54.1	56.1
Biologically *(as % of total treated)*	…	23.5	28.2	24.2	23.0	21.0
Physical-chemically *(as % of total treated)*	…	0.3	0.3	0.3	0.3	0.2
Biological-chemically *(as % of total treated)*	…	22.5	25.6	21.2	23.0	22.6

Sources : Statistical Yearbook of Estonia, 2000; State of Environment in Estonia, 2001.



Notes: Waste water physical-chemically treated is 0.2% in 1999.

Small settlements frequently take drinking water from shallow quaternary aquifers exposed to bacterial and agricultural pollution. In such cases, the drainage area of wells needs to have some minimum protection and simple disinfection treatment (chlorine or UV) or be connected to main networks. Many municipalities use several wells disseminated over their distribution network, which may make treatment difficult.

Distribution networks for drinking water are old and made of iron, which is particularly sensitive to the corrosiveness of natural underground water and causes leakages in the pipes. Distribution losses are therefore important (usually between 30% and 60%) and the iron content in distributed water exceeds the limit.

Individual metering is now common, although it was almost non-existent in 1995, and provides for efficient and equitable charging. Water fees are steeply rising in a move to get closer to the true cost of drinking water (see Chapter 6, Table 6.1).

Wastewater discharge and treatment

The water that is discharged results from the water consumed plus the water drained from mines, and has consequently followed the generally decreasing trends mentioned above. About 80% of these waters do not need any treatment as they are mostly cooling waters (see Table 2.6). Of the 20.4% needing treatment, only 2.2% are not treated at all. Of the rest, i.e. 305 million m^3, 56.1% is treated mechanically, 21.0% treated biologically, 22.6% biologically and chemically, and 0.2% physico-chemically. This results in the elimination of a substantial part of the pollution. Table 2.7 shows the important reduction in the total discharge of organic matter (BOD_7) since 1995 due to the

Table 2.7: Pollution discharged into surface water bodies, 1990-1999

tons

	1990	1995	1996	1997	1998	1999
Organic substances, BOD_7	49,000	4,481	4,174	3,838	3,122	2,308
Suspended solids	27,900	7,490	6,330	5,641	4,856	4,071
Total nitrogen	7,530	3,503	3,200	3,173	2,976	2,739
Total phosphorus	792	321	304	303	279	256
Sulphates	…	92,940	64,650	85,225	85,724	93,722
Chlorides	…	14,000	10,550	12,011	8,432	7,082
Oil products	322	93	70	70	68	52

Sources: Statistical Yearbook of Estonia, 2000; State of Environment in Estonia, 2001.

Table 2.8: Environmental expenditures and investments in water sector, 1993-1999

percentage

	1993	1994	1995	1996	1997	1998	1999
Environmental expenditures of enterprises and local governments							
Total *(as % of GDP)*	1.4	1.2	1.1	1.8	1.5	1.4	1.2
Water and soil protection *(as % of GDP)*	0.8	0.7	0.7	1.1	1.0	0.9	0.6

Sources: Statistical Yearbook of Estonia, 2000.

decrease of industrial pollution and the renovation and building of treatment facilities. Overall, within five years (1995-1999) the quantity of BOD_7 discharged into surface water bodies was reduced by 48%, the suspended solids by 46%, total nitrogen by 22%, total phosphorus by 22%, chlorides by 50%, and oil products by 44%. Only sulphates have not decreased (see Table 2.7). The removal of nitrogen and phosphate, however, is still not sufficient to meet the HELCOM objectives. Point pollution of total nitrogen still amounted to 2,597 tons per year in 2000, of which 641 t/y were from the Sillamäe production plant (624 from the tailing pond). The reduction in nitrogen and phosphorus until now was obtained concomitantly with the elimination of organic matter at the biological treatment stage. Further abatement can be obtained only through new treatment steps specifically designed for nitrogen and phosphate removal (tertiary treatment). Such facilities are not yet widespread in Estonia and are very expensive.

Seventy per cent of the population is connected to a public sewerage system. Since 1995, many Estonian towns have built new, or have improved existing, wastewater treatment facilities, and the efficiency of treatment has improved as biological treatment has often been added to the mechanical step. Most of the problems tend to be found in rural areas. The large collective farms of the former regime have been split up into smaller units, and their wastewater treatment plants are no longer functioning. These plants also received the domestic wastewater of the rural population, so that as the number of treatment plants in rural areas decreases, less domestic wastewater is treated. Wastewater discharges from medium-sized and small industries are usually connected to public sewerage systems.

Policy, strategies and objectives

In 1995, the water policy pursued the goals set out under the HELCOM Convention. A Water Protection Programme for the period 1995-2000 was adopted in 1994 incorporating the goals and targets of HELCOM and specifying water investments for 1995-1998. In 1997, water policy, strategies and objectives were reformulated in the NES, and further spelled out into specific projects in the 1998 NEAP. Two policy goals focus on water in the NES. The first concentrates on the better use and protection of groundwater resources, thus putting emphasis on this resource mostly used as drinking water. The second goal focuses on the protection of surface-water bodies and the coastal sea in order to ensure that the fish stock as well as aquatic flora and fauna may be preserved for the future. The related tasks for the year 2000 are to comply with the recommendations of HELCOM regarding the treatment of industrial and domestic wastewaters and the abatement of pollution (BOD,

phosphorus, etc.), and by 2010, to remove nitrogen compounds, in particular from the wastewater of all municipalities of over 5000 inhabitants.

In the 1998 NEAP, 139 projects were devoted to implementing these strategies. Of the estimated EK 8.2 billion needed for implementing the NEAP, 25% was for action on water. From 1998 to 2001, i.e. the period covered by the NEAP, the expenditures devoted to protecting water amounted to US$ 12.4 million (i.e. EK 200 million). In addition to the domestic funds, Estonia benefited from foreign financing through the implementation of the HELCOM implementing action plan. Since the Country is engaged in the EU accession process, financing also comes from the European Union through the Phare and ISPA programmes (see Tables 6.5 and 6.6 in Chapter 6). In 1999, a Water Programme was elaborated that monitors the progress of the work already done on water infrastructure investments in the different cities and regions and lists the projects and investments still to be carried out.

Instruments

In 1994, a regulation introduced a water permit system based on a combination of command-and-control (emission standards, permit for water use and discharge, and inspections) and on economic instruments (abstraction charges and pollution charges). As permits were issued for a duration of five years, they are now in the process of being renewed. Originally, permits were issued and enforced by the same people in the Ministry of Environment, but since the beginning of 2000, the two tasks have been assigned to two different entities, thus ensuring more objectivity to the whole process (see Chapter 3).

The decentralization process after independence transferred an important part of water management to the local authorities. While water supply and wastewater treatment are the responsibility of municipalities, the 1990 Act on Local Government is too general and will soon be revised, together with the restructuring of the whole territorial administration. However, in the meantime, local authorities had to invest in, operate and maintain their water supply and wastewater treatment infrastructures, a task that was difficult to fulfil as most of the time the capacities at the local level are weak in this field. Moreover, the complexity of privatization of water assets and the concessions granted through a wide variety of contracts is difficult to grasp for non-specialists. As a result, several medium-sized towns are now seriously indebted.

The introduction, over the past five years, of user charges for drinking water and for wastewater treatment in 1994 has given positive results. The charges were regularly raised (see Table 6.1) and increased fivefold within five years. For instance, in 2000, the average price for drinking water was 6.6 EK/m^3 and for sewage treatment 8.8 EK/m^3. The important increase in water prices has stimulated the introduction of flow meters and the economizing of water at home. This explains the noticeable reduction in domestic water consumption observed since 1995.

2.3 Contaminated sites

Situation during 1995-1999

Most of the existing contaminated sites are former Soviet military sites (see the previous EPR, section on waste and soil contamination). In 1994, the Russian army withdrew from Estonia leaving sites contaminated by chemicals, metals, minerals, construction waste, wood waste, domestic waste and oil pollution. Estonia took a number of steps to minimize the pollution, including the cleansing of groundwater and surface water, rehabilitation of the land and treatment of hazardous wastes. The Commission for Liquidation of Military Damage at the Ministry of Environment was created in 1993 and abolished in 1999. It decided where work, coordinated and supervised by the Environmental Research Laboratory, had to be done. Due to the fact that past pollution often affects underground water, the water department of the Ministry of Environment formulates the policies and strategy on past pollution. Among different projects, the most important are the eradication of oil pollution at the Tapa military base, where 16 km^2 of groundwater were polluted and are being biologically treated in-situ; the Paldiski site where the former USSR regime constructed two concrete sarcophagi around hull sections containing reactor vessels but paid less attention to the surrounding contaminated areas; and the rehabilitation of the waste tailing pond of Sillamäe where radioactive wastes were deposited and from where huge quantities of nitrogen oxides leak into the sea. This project, begun in 1999, should be completed by 2006.

By law, soil contamination may be tackled if it is likely to cause ground or surface water pollution or if waste management is neglected on a site. Chemicals or other contaminants present in soil

without direct relevance to water pollution or waste management are not regulated and do not belong clearly to the jurisdiction of any authority. Legal instruments are thus lacking, which is a definite shortcoming. As a result, such land is abandoned and left as it is.

An inventory of military sites has been completed, listing almost 2,900 sites. Information on practically all sites has been briefly evaluated and classified, the risks of selected sites assessed in more detail, and preliminary measures undertaken to eliminate the likelihood of further spreading of contaminants from the most urgent sites. Further remedial action will be based on more detailed investigations, risk assessments and cost-benefit analysis.

Industrially contaminated sites are becoming subject to greater concern, but information collection, investigation and simple risk assessment are still in their early phases. Some attention has been paid to oil terminals and other oil storage facilities, and altogether some 200 sites have been partly or completely reconditioned. The limited availability of funds for remedial action is a huge and unsolved problem for both private and publicly owned land. Liability problems are also frequent. Property ownership is often unclear because of privatization, complicated property transactions and previous state and military ownership of large land areas. According to the Waste Act, remedial action will always have to be taken at the expense of the polluter.

Policy, strategy and objectives

It is not possible to identify all pollution areas contaminated in the past owing to the secrecy and restrictions imposed by the Soviet Union, but, as mentioned above, an inventory was completed (see Table 2.9). By the year 2000, the main tasks had been achieved. However, in order to continue the elimination of past pollution, the Ministry of Environment is implementing a procedure for reporting possible past pollution damage whereby the owner of the land, whether a municipality or a private citizen, may apply for remedial action. An authority of the water department will classify projects, ranking them from 0 to 7 in order of priority. The main goals are to regenerate damaged areas and eliminate dangerous substances. Owing to their radioactive character, the Paldiski and Sillamäe sites are also covered by the Radiation Act.

Instruments

Besides the self-reporting discussed below, permanent monitoring as well as assessment of radioactivity and radiation doses are currently undertaken on the two radioactive sites, Sillamäe and Tammiku, both radioactive waste repositories.

Box 2.1: Rehabilitation of a polluted site: the radioactive tailing ponds in Sillamäe

The radioactive tailing pond in Sillamäe is located in the Ida-Viru County, in the western part of Sillamäe, directly on the coast of the Gulf of Finland. The depository is located on a territory of approximately 40 hectares and contains about 12 million tons of uranium process tailings and oil-shale ash, deposited there since the construction of a secret uranium production factory in 1948 by the former USSR.

After the privatization of Silmet Grupp Ltd., the government and new owners of the company started negotiations to join forces in order to solve the Sillamäe environmental problems. Hazardous wastes generated from the tailing pond are the following:

1. Rain and water flowing from the mainland from time to time seep slowly through the mass of tailings and carry dangerous substances (uranium, thorium, barium, strontium, arsenic, nitrogen) into the tailing pond. However, the pond discharged 624 tons of nitrogen in the year 2000 due not only to rain flows but also to pollution generated by Silmet Grupp Ltd activities. Silmet Grupp Ltd. still continues to use the tailing pond as a waste disposal. In comparison, from 1991 –to 1995, nitrogen discharges into the sea totalled 2,400-1,500 tons annually;
2. In the summer, almost the whole surface of the depository is dry and wind carries dust to the surrounding residential areas of Sillamäe, located approximately 1.5 to 2 km from the depository;
3. The radioactive gas, radon, also emanates from the depository and tends to drift across the town.

In cooperation with Silmet Grupp Ltd., Estonia launched the Sillamäe tailing pond project in the summer of 1997 and applied for international financing. It is estimated that the project will be completed by 2006.

Table 2.9: Contaminated sites, 2000

	Number
Contaminated sites	**842**
of which: Investigated sites	195
With a sanitation need	200
of which: Clean-up processes started	110
	ha
Area	**87,128**
of which : Contaminated area	2,212
	1 000 tons
Amount of waste	1,741.2
of which: Hazardous waste	~873

Source: Ministry of Environment, 2001.

2.4 Mineral resources

Current situation

Estonia's mineral resources have traditionally been considered an important national economic asset. In particular, Estonian oil-shale reserves still support the energy production and chemical industries (see Table 2.10). The percentage of oil-shale in the energy balance in 1995 was about 62% and is expected to decrease to 52%-54% in 2005 and to 47%-50% in 2010 (see Table 7.3). Deposits of the most important mineral resources such as oil shale, phosphate, dolomite and limestone, are located in the north, while reserves of peat, sand, clay and gravel are spread all over the country. Due to the decline and restructuring of the economy, the extraction of mineral resources has decreased (Table 2.11), but in the case of dolomite, sand, and limestone, extraction has resumed. Well-decomposed peat is extracted for export, although poorly decomposed peat is used for heating at the national level.

Oil-shale is found in a single layer 2.5 to 3 metres thick at a depth of 7 to 100 metres over an area of 2,700 square km. Forty per cent of the oil shale is mined in opencast and 60% in underground mines. Mines are located in Ida Viru and Lääne Viru counties. Almost 86% of the oil shale produced is used by the energy sector. It is also used as a raw material by the chemicals industry (Table 2.10), as follows:

- Shale oil has a relatively low percentage of sulphur (no more than 0.8%), little viscosity and a low solidification temperature. Some of the lighter fractions of shale oil are used for their antiseptic qualities. Heavy fractions are used for producing electrode coke. Shale oil is also a valuable fuel oil.
- Oil-shale (phenolics) liquid tar: phenols separated from the liquid tar are a valuable raw material for chemistry (especially alkyl resorcinol). So far they have been used to produce epoxide resins and various glue resins.
- Generator gas.

Although exploitation of oil-shale is decreasing, and declined by almost 25% from 1995 to 2000, mining operations and the industrial exploitation of oil-shale still cause serious environmental problems. Opencast mining is physically altering the landscape and disrupting local ecosystems. Mining areas cover 32,207 ha. Underground mining causes the subsidence of the surface, which leads to the formation of bogs, the death of forests and the deterioration of the topsoil of agricultural areas. Another adverse impact is the lowering of the groundwater table, which leads to the exhaustion of wells and aquifers and can ultimately damage the vegetation and landscape. Because of its high sulphate content, discharged drainage water damages water bodies in different localities. A further impact is the pollution of the northeast of the country by various chemical compounds resulting from oil-shale mining and processing (see Chapter 4).

Policies and strategies

Policy goals are twofold: (1) the introduction and use of the best available technology (BAT) for oil-shale extraction, and (2) a

Table 2.10: Use of oil shale, 1995-1999

TJ

	1995	1996	1997	1998	1999
Energy	107,788	110,970	109,633	98,839	93,635
Chemistry	28,698	30,286	30,847	20,877	15,326

Source: Ministry of Environment, 2000.

Table 2.11: Exploitation of mineral resources, 1995-2000

	1995	1996	1997	1998	1999	2000	Resources (01-01-2001)
Oil shale *(million tons)*	12.10	13.07	12.86	10.91	9.60	10.00	1,488
Peat *(million tons)*	1.01	1.12	1.07	0.33	1.27	0.90	1,121
Phosphorite *(million tons)*	-	-	-	-	-	-	-
Limestone and dolomite *(million m^3)*	0.65	0.77	0.79	1.18	1.00	1.60	738
Clay *(million m^3)*	0.05	0.05	0.09	0.13	0.15	0.13	270
Sand and gravel *(million m^3)*	0.59	0.70	1.13	1.43	1.08	1.30	722
Curative mud *(thousand tons)*	1.00	0.30	0.80	0.30	0.90	1.30	3,516

Source: Statistical Office of Estonia, 2001; Ministry of Environment, 2000.

limitation on the use of oil shale. The reduction of the extraction capacity is closely linked to energy sector activity, but also to the socio-economic consequences of oil-shale mining in the region. Companies that exploit mining must find technical solutions to reduce its impact on the environment.

Estonia has no environmental strategy for oil-shale mining, although it plans to continue to exploit oil-shale resources for energy production for the next twenty years while at the same time seeking alternative renewable resources for the future. The issues linked to oil-shale mining are well known, and the lack of a clear policy is due to the economic importance of oil shale as the country's major and almost unique domestic energy resource. Reclamation of land disturbed by mining is slow and often of insufficient quality.

In the near future, GIS monitoring will provide precise topographic images of mining sites and show their evolution. It will be a useful tool for deciding where an exploitation permit can be given and for checking permit compliance. Before delivering a mining permit, the authorities will easily be able to anticipate the likely impact of a new mining area on land, forest, and landscapes.

Instruments

Regulatory instruments: Geological research, exploration and mineral extraction are regulated through environmental permits issued by the Ministry of Environment and its regional departments. Local authorities grant extraction permits for the poorer quality minerals. The validity is three years for geological exploration, with three years' extension, and 25 years for the extraction of mineral resources. Provisions of the permits can be revised after five years. Supervision falls to the Environmental Inspectorate. Permits are issued for the following:

- Geological research,
- Mineral Extraction,
- Extraction of earth material.

Economic instruments: Mining taxes increased by 360% from 1994 to 2000 (see Table 6.1, Chapter 6). The Government levies extraction taxes according to the location of the site, the level of nature protection and the quality of the minerals. Taxes are used either for environmental purposes in the case of mining in water bodies and economic zones, or 30% for environmental purposes and 70% to raise revenue on mining at deposits of national importance (Box 6.2). The company exploiting the

mining area must operate a compensation scheme. This could finance the cultivation of new forests, for example, or the creation of an artificial lake. In agricultural areas, the owner can ask for the restoration of the land after mining operations, particularly if the topsoil was damaged, as well as for the rehabilitation of irrigation infrastructures.

2.5 Conclusions

Air

Air pollution is still an important problem in Estonia. Estonia remains an important net exporter of acidic air pollutants. The two major sources of pollution are transport and the burning of oil shale. While road traffic is increasing, the big polluter in Estonia remains the oil-shale industry. Measures both to reduce pollution and to make the necessary investments are planned. The technical solutions mostly rely on end-of-pipe abatement technology and could be effective once all the investments have been made. A problem that would then need to be solved is that of dust pollution arising from combustion ash that is simply heaped up in the open and later scattered by the wind, particularly in the northeast part of the country.

Estonia has taken and continues to take steps to reduce air pollution, employing regulatory measures and economic instruments. In addition, Estonia facilitates investment in environmental protection during the privatization process. It is also applying measures to limit traffic pollution, has increased gasoline prices and introduced measures such as new motor technologies and mandatory inspections to reduce car emissions.

Water Management

Estonia has been very active over the past ten years in its efforts to improve the way it manages water. It has modernized legislation, set up policies and strategies, and implemented regulatory and economic instruments, the latter having clearly proved their efficiency as water consumption has drastically declined. Consistent with both the HELCOM Convention and more recently the European Union, clear objectives and targets have been set up for the improvement of water supply and the abatement of pollution discharged into water bodies. Substantial investments have been made in water infrastructures, focusing in particular on water supply and wastewater treatment in the larger towns. The results are clearly positive even if there is still a need for further abatement of nitrogen and phosphorus discharges into water bodies.

The problems now lie more in those low-density urban or rural areas, where municipal water services are not available and alternative solutions need to be worked out. The management of the discharge of industrial wastewaters should also be noticeably improved through a stricter enforcement of permits for industries that discharge their effluents directly into water bodies and the use of stricter contracts with municipalities when the discharges flow into municipal sewerage (see Chapter 3). The efficient functioning of the water services, whether in terms of the supply of high quality drinking water or the abatement of pollution from wastewater, cannot be achieved without a real commitment on the part of the municipalities and greater competence in managing their facilities, since their capacities in this matter require improvement (see Recommendation 1.2 and 1.3 in Chapter 1 and Recommendation 3.5 in Chapter 3).

Soil contamination (past pollution)

The inheritance of contaminated sites has been a heavy burden for Estonia. Rehabilitating the sites is a costly and lengthy process that cannot be tackled all at once. Since 1995, Estonia has inventoried the sites and is registering them. The most dangerous sites polluted by inflammable or toxic products were treated first, and Estonia continues to allocate funds towards completion of the task. A major problem lies with the attribution of responsibilities. Soil contamination legislation should be clarified to cover soils contaminated by chemicals or wastes and to define the responsibilities of the competent authorities. Estonia should also specify the related liability of new property owners to take remedial action to repair past damage to the land. See Recommendation 4.7 in Chapter 4.

Mineral resources

Estonia's major mineral resource in the years to come will still be oil shale, and mining activities will continue. Mine tailings, piled in outdoor heaps, impact on the landscape, and the different chemical compounds they contain contaminate underground water, seawater and air. The increase in mining taxes that are reinvested to solve or mitigate mining-related environmental problems is slowly improving the situation. Research to find new solutions to diminish the impact of oil-shale mine tailings, in particular where they exert a toxic effect, is to be encouraged.

PART II: CURRENT PRIORITIES OF ENVIRONMENTAL POLICY AND MANAGEMENT

Chapter 3

WATER MANAGEMENT TRENDS AND WATER BASIN SCHEMES

3.1 Water management framework

Towards water basin management

A candidate for membership of the European Union, Estonia is particularly committed to following EU policies for managing water resources and is to introduce a system of water management by river basin areas (i.e. catchment areas). This move is in accordance with the EU framework directive for water management (2000/60/EC). The concept of management by river basin is an integrated approach that covers not only the protection of the quality of the water bodies but all of the elements that characterize them (such as aquatic and river bank ecosystems including flora and fauna) and affect or contribute to maintaining their integrity (i.e. pressures that in Estonia are essentially agricultural and hydro-infrastructures). The introduction of this new type of management will affect every aspect of the process from the monitoring, controlling, authorizing, financing (in particular), and operating of water facilities, to the users and other stakeholders involved in decision-making. Its implementation will require additional technical and administrative means (in terms of competence and work force) and new sources of funding.

The initial step is to amend the national legislation and harmonize it with EU directives and standards. As explained in Chapter 1, numerous laws have been enacted: the 1994 Water Act, amended in 2000; the 1995 Law on the Protection of Marine and Fresh Water Coasts, Shores and Banks; the Public Water Supply and Sewerage Act (1999), and the new drinking water quality requirements (2001). These laws are complemented by a series of regulations and provisions in other laws: Government Order introducing requirements on waste-water discharged into water bodies or soil (1998); regulations for the use of sewage sludge in agriculture, green area creation and recultivation (1999); procedure for the issuance and revocation of special water use permits (1996, amended in 2000 and 2001); the Pollution Charge Act (1999) and Environmental Monitoring Act (1999). A key feature of the newly amended Water Act regards the detailed provisions for the drafting of water management plans of catchment areas (i.e. river basins). This is an essential first step toward water management by basin rather than according to the present administrative division of the territory by counties.

Estonia has no major rivers, but a number of short rivers that flow into the Baltic Sea. Their catchment areas are too small to justify a basin management concept being developed for each of them. It is therefore envisaged that the full territory will be managed administratively as one river basin, subdivided into eight surface water basins and one specific sensitive groundwater area. Water resources management plans should be drafted for each of these sub-basins and further consolidated into one general water resource management plan that will encompass the content of the eight sub-basin plans. The sub-basin plans will be elaborated from 2001 to 2005, the general plan in 2005. The costs are estimated at EK 13.2 million for the elaboration of the sub-basin plans and EK 3 million for the general plan.

Other trends in water management

Another current trend in EU water management policy is to combat eutrophication to reduce the discharge of phosphorus and nitrogen components into water bodies. These components have two origins: the discharge of municipal and other waste waters, i.e. point source pollution; and the use of fertilizers, i.e. diffuse pollution. The Baltic Sea is particularly sensitive to eutrophication problems, long recognized and integrated into the HELCOM Convention and its Strategic Action Plan, with specific targets assigned to each Baltic country. Point sources were to be tackled first and diffuse pollution sources later, in a second step. Estonia gave priority to domestic waste-water treatment plants in main cities (of over 2,000 inhabitants, and most national and international financing was

Figure 3.1: Hydrographic Network of Estonia

therefore directed toward this priority. The next objective was to further reduce nitrogen and phosphorus from concentrated and diffuse sources. This task will be pursued under the EU Directive on Urban Waste Water Treatment and will necessitate the building of tertiary treatment plants for domestic waste waters, which is particularly expensive. Combating diffuse pollution caused by the use of fertilizers will also stimulate the introduction of best agricultural practices. The newly amended Water Act provides for the reduction of agricultural pollution.

Planning and management

Current organization of water institutions

At present, water management in Estonia is organized according to the administrative division of the territory into counties. At State level, all functions of water management are the responsibility of the Ministry of the Environment (MoE). The Ministry elaborates the legislation on water and aligns it with the legal framework of the European Union. Equally responsible for national strategies and programmes, the Ministry draws up the Annual Programme on Water based on the NES and the Environmental Action Programme. Furthermore, the Ministry organizes the water monitoring and water authorization systems and the implementation of the various economic instruments. Implementing tasks are managed at county level by the County Environmental Departments. They are the operational arm of the Ministry of Environment, issuing permits for water extraction, use and discharge and collecting water charges on their respective territories. A separate inspection body ensures enforcement of the legislation. Municipalities are responsible for supplying drinking water and treating waste water before discharging it, and charging for these services. They can also subcontract the tasks to specialized companies. The control of drinking water quality is entrusted to the Ministry of Social Affairs.

The various bodies having some responsibility for water (the MoE water department, County Environmental Departments, the Environmental Inspectorate, the municipalities, the monitoring centres, research and technical centres, and Ministry of Social Affairs for drinking water monitoring) function independently of each other. This division of responsibility is complex to manage and necessitates cross contracting between the different entities. The coherent management of water resources in catchment areas belonging to more than one County territory depends entirely on the County Environmental Departments and their ability to apply general policy objectives collectively. But there is no comprehensive upstream-downstream management framework with set quality objectives and concerted water use strategies, and the different users (industry, agriculture, hunters, fishers, municipalities) and the general population have no access to the strategic and decision-making processes.

Local management and planning schemes

Since water management was decentralized (1990 Act on Local Government), assets, operation and maintenance of drinking water and waste-water treatment facilities are managed and planned at the municipality level. The municipalities are the owners of or shareholders in the local water company, and can subcontract a private company to operate the facilities. Over time, a difficulty for the smaller municipalities in particular has been to establish fair and efficient contracts with these private water companies, as municipalities often lack the capacity to negotiate good contracts. Municipalities urgently need training and advice as well as standard contract reference and consulting assistance (legal, financial, and technical) to guarantee that fair and efficient contracts are drafted, and periodically amended, with private water companies. Standard accounting and auditing rules would enable municipalities and government authorities to follow up the contracts and water service operations. Periodical independent auditing should become mandatory.

When villages are small, it is often not economically viable for them to administer their own water facilities. In many countries and in the European Union in particular, small municipalities are encouraged to delegate the responsibility to a municipal syndicate or association (benefiting from an economy of scale) and enjoy more efficient facilities, better planning, financing and operating even if facilities and water fees vary for each municipality. Moreover, this is useful in the case of technically linked municipalities (e.g. agglomeration perimeters in the EU Urban Waste-water Directive) in order to have a strong and coherent legal authority to deal with the water companies.

In most cases, municipal planning is limited in scope and time and lacks a comprehensive long-term appreciation of discharges (domestic and

industrial, whether or not connected to a sewerage system); of pollution reduction objectives; of the whole collective and individual scheme for abstracting and supplying drinking water and collecting and treating waste-waters; of used water treatment, distribution, and collection; and of the financing and charging equilibrium. Currently, in many cases, the planning work is done to validate a projected investment with specific scope (e.g. a wastewater treatment plant, or sewerage renovation) without a good enough general and coherent view of all the interdependent water and water body issues. The Ministry of Environment could define the terms of reference for such water surveys at municipal level and provide extensive technical and financial help to municipalities to elaborate global long-term plans on water management in coherence with the coming national and sub-basin water management plans.

Water permit and charges

The County Environmental Departments issue water permits and establish the charges that should be paid by the users. In a river basin management approach, rivers are classified by the administration according to the quality of their water and the quality objectives to be reached or maintained in the different sections of the rivers. The authorized level of pollution discharges is determined so as to comply with these quality objectives. In Estonia, the water requirements are not precise enough and need further development. For instance, the limits for metallic or toxic pollution are defined as concentrations and are the same for any type of industry whether it is connected to public sewerage or operating according to the best available techniques. Moreover, there is no definite method to take into account the sensitivity or quality objectives for receiving bodies, leaving too much scope for uncontrolled negotiation between the polluter and the administration and inconsistency regarding permits and charges in different counties, and even within the same county. The authorization process should be clearly linked to the acceptance capacity and the quality objectives of the receiving water body. This requires a better quality-class scheme: definition of quality classes, monitoring methodology, evaluation by actual sections of river as well as quality objectives for rivers. This should be considered a major aspect of the future water management plans by basin. The new regulation on Waste Water Discharges sets requirements according to recipient water bodies. The draft regulation on 'Water permits issuing, changes and cancellation' will set water quality standards of the recipient water body after waste water treatment.

Any efficient enforcement of permits is based on performance measurements. In Estonia, the method of monitoring and evaluating real pollution of discharges requires improvement. Regular self-monitoring and reporting by the polluter to the administration is virtually non-existent and not compulsory. Too few evaluations of the discharge quality (once a month or once a quarter as permits require) are made, and there is a lack of the necessary specialized equipment available for sampling and flow measurement before and after waste-water treatment. An alternative method would be to try to evaluate the discharges using easily available details of production processes (quantities of raw material processed, product produced, and water and energy used). More frequent measurements through a well-defined and compulsory self-monitoring schedule would be necessary.

An efficient enforcement also requires that controls be made regularly. This is the task of the now-independent inspectorate. At present, the decision to conduct an inspection at a specific industrial site at a definite time seems based on unclear criteria. The inspectorate offices seem to act without any definite policy, mainly on the basis of neighbours' complaints. The fines they can impose are quite low.

In the year 2000, the tasks of granting pollution permits and of checking permit compliance were divided and given respectively to the County Environmental Departments and the inspectorate. This measure aims at ensuring more objectivity in the enforcement of laws and is effective. However, it seems that this division of responsibilities is currently disrupting the relationship between the two bodies and complicating the information flow. An efficient implementation of the system would necessitate that both the MoE staff issuing and re-issuing permits, and the inspectors know exactly what is contained in the permits, the charges, fees and fines collected, and the extent to which the permit holder complies with the permit provisions and limits. Improvement requires measures to ensure that inspectorates and county environmental departments cooperate efficiently and coherently to achieve clearly stated objectives. After some reorganization, the implementation of MoE guidelines should be monitored every two or four years and the water-related activities of county departments and inspectorates audited

independently. The permit register, which is expected to be operational in 2002, should improve the exchange of information between the departments and the inspectorate.

3.2 Quality of water resources

Overview: The general amelioration of the water bodies observed between 1990 and 1996 continues but at a slower rate. While the overall improvement of the early nineties resulted mostly from the decline of economic activity in most sectors, the progress since the mid-nineties is due to the considerable investment made in domestic pollution treatment infrastructures. Waste-water discharges and the performance of treatment infrastructures are described in detail in Chapter 2. The treatment of industrial pollution flows has not been improved to the same extent, and further progress should be expected as financing becomes available. There is also evidence of past pollution still seeping towards coastal, surface and underground waters, pointing to a likely increase in future remediation costs.

Rivers: The quality of river water has greatly improved for all factors except sulphates, following the diminution of pollution discharges (see Table 2.7). Regarding BOD_7, in 1999 the quality was good or very good for all monitoring stations. Phosphorus content diminished at 20 stations and worsened at 10 stations. Nitrogen has improved at 14 stations; and heavy metal concentrations are in general low as most measurement figures are below the detection limit (although this limit is rather high in Estonian laboratories due to the methodology and equipment used). With the exception of the northwest part of Estonia, the water quality is rather good and keeps improving. However, the ecological quality of the rivers (condition of the river biota) is not sufficiently monitored.

Lakes: The majority of lakes in Estonia have a wide diversity of trophic status. Most were subject to eutrophication due to an excessive use of fertilizer for agriculture and to the discharge of urban waste water. Human activities had such a strong influence on their chemical and biological quality in recent decades that some changes in the lakes' ecosystems are probably irreversible. With the reduced use of fertilizers during the 1990-1994 economic recession, their quality improved slightly. Phosphorus is usually the limiting factor for eutrophication in the Estonian lakes. However, the situation seems to have deteriorated somewhat in the period 1995-1999 and without careful management of agricultural and domestic pollution, the situation can be expected to worsen with the revival of economic growth.

Groundwater: Estonia is well endowed with underground resources. The chemical composition of water intakes has remained stable in recent years (except at Kopli Peninsula where salinity has increased). Most drinking water (about two thirds) is abstracted from underground – in very deep aquifers. Groundwater abstraction has been dramatically reduced over time, from 103 million m^3/y in 1995 to 65 million m^3/y in 1999 (Table 2.4), resulting in a slight general increase in the water-table levels. Quaternary aquifers used by small or individual settlements are subject to agricultural pollution (nitrates and pesticides) as well as military pollution from the Soviet period. In deeper geological layers, underground water is protected from pollution (old, unused and abandoned deep wells can be a hazard for such aquifers), but its renewal rate is low (abstraction may exceed renewal). It often contains iron, fluorides and manganese that have to be treated before distribution. In the Tallinn and Pärnu regions, the saline zone is expanding, probably as a result of excessive abstraction and consequent salted layer intrusion instead of vertical surface water feeding.

Coastal water: The economic importance of sea products as well as the HELCOM programme explains the detailed information on seawater quality. This quality depends not only on discharges into the Baltic Sea but also on the dynamics of water exchanges with the North Sea and year-to-year climatic variations. Generally speaking, the conditions along the Estonian shore remained stable regarding nutrients (nitrogen and phosphorus), while the decrease of the general pollution load and of nutrients from rivers still continues. The content of toxic organics and heavy metals in fish tissue improved (i.e. was reduced) and remains within the FAO standards. Unpredictable toxic micro-algal blooms seem to appear more frequently (as along most European shores).

3.3 Water monitoring

The Environmental Information Centre is responsible for monitoring the quantity, quality and use of water bodies. It is directly in charge of data management, analysis, and dissemination. But fieldwork, chemical and biological analysis, and data validation are performed by a diversity of

institutions contracting with the Environment Information Centre. Tartu University is the main responsible body for organization of monitoring programmes and contracts. Usually, monitoring programmes are prepared by academic institutions, elaborated together with the water department of the Ministry of Environment and the Environmental Information Centre, and then approved by a Monitoring Council lead by the MoE Secretary-General.

Rivers: The chemical quality of water is monitored at 58 stations. The monitoring authority is the Institute of Environmental Technology of Tallinn Technical University. Twenty parameters are measured monthly (at 29 stations), every two months (at 24 stations) or every three months (at 5 stations). The monitoring has three objectives: to establish data references, measure the downstream effect of major point source pollution, and evaluate the downstream effect of main polluting compound concentrations. Heavy metal measurement is undertaken at 7 stations once a year and at 7 stations every month. There is no monitoring of heavy metals or toxic products accumulated in sediment, algae or aquatic fauna but concentrations are likely to be very low given water analysis results and those from known discharges. The classification of river water quality is established in a regulation of the Ministry of Environment and is based on the following indicators: pH, dissolved oxygen, content of organic substance, ammonium, general nitrogen and general phosphorus.

Biological monitoring is carried out every five years (at 52 sites) on a river-by-river basis. The monitoring authority in charge is the Institute of Zoology and Botany. There is no regular appraisal of river ecosystems (water, bed and banks) and fish populations, nor is there general monitoring of water in the main canals of the drainage network.

Lakes: With 1,200 lakes in Estonia, lake monitoring is quite complex. A representative sample of 10 lakes, reflecting an average typology of Estonian lakes, was selected for monitoring. The water quality of lakes is classified by biological, chemical, physical and hydromorphological parameters and is based on a regulation of the Ministry of the Environment. Thirty parameters derived from this classification are measured from two to twelve times per year. In addition, various scientific institutions carry out abundant general and local studies. Limits are set on pH, general phosphorus, general nitrogen, chlorophyll-a, water transparency, content of organic substance, sulphate content and extent of metalimnion in the summer stagnation period depending on the type of lake.

Coastal water: Coastal water monitoring is part of the HELCOM maritime programme and is carried out by the Estonian Marine Institute. The monitoring programme is prepared by Tartu University. There are three sub-programmes:

- Basic coastal water monitoring at 36 stations, 4 times a year, measuring standard parameters and heavy metals in bottom sediments.
- The eutrophication programme, consisting of a seasonal surveillance of micro-algal summer blooms (sampling along the Helsinki and Oslo ferry lines).
- Toxic substances in fish and molluscs that are monitored at three stations, five times a year.

A monitoring programme for coastal erosion is projected. In order to implement the EU Water Framework Directive, a typology of coastal ecosystems will lead to a broad coastal segmentation that could become the geographical basis for shore monitoring and integrated management plans. A better understanding of the coastal morphodynamic intrication between vegetal and animal populations and human activities is necessary and should be studied.

Groundwater: The Estonian Geology Centre monitors groundwater table levels and water quality. Levels are measured for seven observation regions (defined according to hydrogeological, discharge and abstraction conditions). In 1999, the levels were measured at 345 points every 10 days for upper aquifers and once a month for deep aquifers. Chemicals in samples collected at 44 points were monitored with the same frequency, but in the year 2000, for budgetary reasons, the numbers of observation points and measurement exercises were reduced. The groundwater monitoring scheme seems well designed and of adequate extension. The continuity of measurement is important in order to be able to draw historical analyses. For this reason the monitoring network should, rationally, be modified only to extend its term (i.e. to ensure a good description of the status of the aquifer over time) and not to reduce cost, as was the case in the year 2000.

Discharges and abstractions: These are monitored through the permitting and charging system: a pollution or abstraction volume is permitted and a quarterly declaration of the real pollution load or quantity of abstracted water is used to control the

activity, compute the water charge and evaluate pollution loads to the receiving body.

3.4 Pressures on water resources

Past pollution

The previous regime left behind a very large number of polluted military, industrial and agricultural sites. Most of them pollute sea, surface and underground waters and will continue to do so if important reclamation work is not done. The underground water pollution situation is quite worrying since it is still deteriorating and in most cases is irreversible.

The large industrial tailing pond of Sillamäe in northeastern Estonia is a main source of nitrogen pollution for the Baltic Sea as well as for heavy metals and nuclear pollution (see Chapter 2). A satisfactory three-phase remediation programme has been designed. The first phase is about to begin and, provided the financing is adequate, the source will be under control within a few years. Other large deposits of oil-shale ash that pollute water also need remediation work.

Numerous small, scattered sites, consisting of old industrial, railway, or collective farm oil deposits or agricultural or military chemicals sites are still leaking and polluting underground water. Most of them have been identified and assessed, and remediation costs evaluated. About a third of MoE pollution treatment financing is directed to restoration of such sites through the above-mentioned three-year remediation programme, and are clearly a strong MoE priority. The annual outlay and the total financing are about EK 10 million to EK 14 million per year.

Industrial pollution

The industrial pollution situation is described in Chapter 2. The management framework regarding water pollution from industry is not optimal, and the existing legal scheme for defining, monitoring, and charging for permitted discharges in water bodies cannot provide for a sufficiently precise appreciation of the real pollution loads. Regular compulsory self-monitoring by the polluter is not sufficiently enforced, so that the scheme offers no real incentive to reduce pollution, and statistical data are likely to be unreliable. However, the fivefold increase of pollution charges for loads exceeding the permitted level that has occurred since 1994 (see Table 6.1) could be an excellent way to cover the marginal cost of pollution in management decisions. Usually, the external cost of pollution is much higher than the pollution charges; applying the real level of charge (external costs) to induce rational behaviour of polluters with regard to the consequences of their pollution would have unacceptable social and economic repercussions. Such negative consequences can be avoided by charging the external costs only on pollution loads in excess of some appropriate level (and eventually compensation when the pollution load declines). Therefore, the charge multiplier (and not only the charge itself) of the Estonian charging scheme may have to be differentiated for each type of pollution. At the present time, the base level is still too low to make the charge a real incentive according to the polluter-pays principle. In addition, in recent years permit enforcement in Estonia has been lax (see Chapter 7).

Agricultural pollution and pressure

The geography of Estonia (soils, relief and hydrography) makes drainage a necessity for soil reclamation in most of the country whether for forestry or arable land. Under the previous regime 738,000 ha were drained, but there was no correlative maintenance programme, and a large part of the drainage system is currently in poor condition. Irrigation was only practised in May and June during the dry period. In the seventies, over 16,000 ha were equipped with sprinkler irrigation systems, but 95% of the equipment is now out of use due to poor technology and lack of maintenance. The restitution of land to former owners who in many cases are not farmers increases the lack of maintenance of such infrastructures.

With the decrease of agricultural activities pollution pressure has lessened. The steep decline of cattle herds, pigs and poultry is now stabilized, although manure is still incorrectly managed and constitutes an important point source of pollution for underground and surface waters. After a sharp decrease between 1987 and 1996 (from 110,000 tons to 18,000 tons), the use of mineral fertilizers increased slightly to over 20,000 tons together with a slow decline in organic fertilizers. This evolution had a noticeably favourable effect on surface and ground water quality until 1996, since when it has not changed. Further progress can be made in Estonian agricultural policy if sustainable agricultural development and good agricultural practices are introduced (see Chapter 7).

Box 3.1: Which agricultural policy for the future?

A document on sustainable water management strategies for the land drainage and irrigation sectors has recently been elaborated by FAO together with the MoE and MoA. This document contains excellent strategic objectives and policy elements for the future of agriculture in line with Estonian political, social, geographical, and historical realities. It indicates:

- The necessity of pursuing agricultural activities and maintaining the drainage system to protect rural activities (agricultural production, landscape conservation, tourism development);
- The necessity to organize land and water management and protection on a watershed basis though farmers' associations (with adequate incentives) and acknowledge forestry, agriculture and tourism as connected activities and sources of revenue for the rural population;
- The necessity to engage in good agricultural practices;
- The social, environmental, and economic interest of traditional agricultural activities;
- The necessity to articulate the water basin management plans with agricultural and land use plans and with the general national spatial plan.

However, this document is mainly focused on land reclamation and agricultural production and should be made more precise for water management (quality, river runoff, resource and aquatic ecosystems protection). An action plan should now be devised by the MoA, MoE, and the Ministry of Economic Affairs and be endorsed by the government. It should include an agricultural development plan containing technical and financial data consistent with economic, social, and environmental strategies, together with a schedule of operations. The FAO document is a good basis for that.

Dams and hydroelectricity

Although the topography of Estonia is clearly inappropriate for hydroelectricity production, most of the rivers have been harnessed by dams towards the end of their course to the sea. Most of the power plants are no longer in use but remain a factor limiting the migration of fish populations in Estonian rivers (see Chapter 5).

Public water use

The pressure on water resources arising from domestic use has lessened, as explained in detail in Chapter 2. Another pressure on water bodies is the access of the public to the shores, an access (particularly to seashores) that was largely forbidden before independence. The 1995 Water Act provides for public use of the shores of water bodies, but it is not clear about whether this applies only to the seashore or to lake and river banks as well. There is no detailed definition of public use, nor does the Act explicitly encompass regulated access for all kinds of leisure activities. The waterside path meant for public use is 10 metres wide for navigable water bodies and 4 metres wide for all other water bodies. So far, most riversides in Estonia have not been modified by human activity, and this is a valuable heritage. Although public access to rivers and lakes provides an interesting opportunity for leisure or tourism development, it should be kept under control to protect the natural river ecosystem.

The 1995 Act on the Protection of Marine and Fresh Water Coasts, Shores and Banks provides the possibility of a good protection of sufficiently wide land areas alongside water bodies. The future national and sub-basin water management plans present an opportunity to define precisely the land management techniques appropriate to these areas as parts of the aquatic ecosystem. The one-metre-wide restriction zone along the main drainage canals (i.e. the intervention zone used for maintaining and protecting the banks and the canal) might need some widening according to the size of the canal.

Fishing

Professional or leisure fishing in lakes and rivers requires a permit from the County Environmental Department. There is statistical data on the fish catch in the biggest lakes but there is no real control on effective practices and monitoring of fish populations. Widespread artificial replenishing of fish stocks may be a sign of an excessive catch. It would be useful to have a general appraisal of this activity and of fish populations in particular (see Chapter 5). With economic growth, a more efficient regulation of freshwater fishing will become necessary, probably within the next ten years.

3.5 Conclusions and recommendations

Since 1995, Estonia has clearly improved its water management legislation. The Ministry of Environment has been successful and productive in drafting laws and regulations and adjusting them to

EU requirements. There is still a lot to be done on this issue but the Ministry is now endowed with sufficient capacity (in particular qualified and competent staff) to meet its objectives. What is now missing is the capacity to effectively and correctly implement these regulations. Strong action should be taken at local level to train more people, conduct pilot projects, define standard terms of reference, and draft procedural guidelines, in order to implement the authorization, control and water fees scheme, to prepare the water basin management plan, to organize public debate on water issues, to raise awareness of the relevance and importance of hydrobasin systems among the Estonian people, and to develop better aquatic ecosystem management and better agricultural practices. Some of these capacities are needed within government bodies; others should be developed within professional associations and private environmental engineering firms.

Water basin management

To follow the EU directives, Estonia is now switching from traditional water management by administrative units to a more integrated approach by catchment areas. The division of Estonian territory into eight surface-water basins and one specific sensitive groundwater area (i.e. nine sub-basins) is a smart measure. Due to the small size of Estonia, the Ministry of Environment considers that efficiency requires that a single general water management plan should be worked out for the whole country, which is also a positive decision. It is equally important that water planning be consistent with national objectives and that specific and detailed sub-basin plans are elaborated locally and identified as forming part of the general water management plan.

As a consequence, at the ministry level there should be a comprehensive basin project with a single team and a single budget for the country as a whole. This project should be divided into sub-projects for each of the nine sub-basins delimited at territorial level for Estonia. As problems are better identified, and more appropriate solutions are found close to their origin, i.e. at local level, objectives, management plan, and monitoring should first be worked out at the sub-basin level and then further consolidated into a larger national framework.

A real difficulty in this approach will be to ensure the coherence and integration of the water planning with the existing national and local land use plan managed by the strategy and planning department, as the local water resource management plans will include components on water protected areas, protection belts along rivers and canals, protection of aquatic flora and fauna, and drainage and irrigation infrastructure. Interference might therefore occur with the spatial planning and land use-planning systems.

Recommendation 3.1:
As required by the amended Water Act, the Ministry of Environment should elaborate a comprehensive national water basin plan, subdivided into nine hydrographical sub-basins plans, with specific objectives according to the local features of the water basins (including their surface, underground and coastal waters as appropriate), management plan and monitoring for each sub-basin.

The success of a water basin management approach necessitates that all segments of civil society of the related territory are well informed and involved in decision-making. Rivers are still too often understood to be water and pollution vectors rather than natural aquatic ecosystems with real economic and social value. A general policy of the Ministry of Environment is to make environmental data and technical and regulatory documents widely available to the public through the Internet and accessible to a majority of the population. Open public debate and real public participation in water issues and decision-making at the local level are needed but still too rare at present. All citizens are affected daily by water policy options and the elaboration of water management plans requires a system of communication with the general population (through exhibits, public debates, press coverage, and school material) that both informs the public and takes public opinion into account. Estonian local administrations, elected officials, and water users need some training before becoming involved in the drafting and approval of local water resources management plans and their implementation. The working commissions have already been set up but have insufficient information on the issues, while their members have no formal mandate from the different segments of the population concerned with the project. It is recommended that the scheme of committees, consultations, and approvals proceed from legal and regulatory documents giving them official roles in the decision-making process.

Recommendation 3.2:
The Ministry of Environment should ensure the involvement of civil society, including industry and agricultural communities, local authorities, and the administration, in the process of elaboration and approval of water management plans at the sub-basin and national levels and in decision-making. The Estonian Water Association (NGO) could form a good partner in this regard.

Besides the above-mentioned Committees, a permanent institutional section should ensure the day-to-day operations of water basin management. It would be in charge not only of the planning process but also of supervising the actual implementation of the plan with the involvement of the stakeholders. It would be involved in the determination of the level of water fees, in technical and financial programming of investments and actions, and in the evolution of monitoring. This would give more legitimacy to the plans and later to an effective implementation of water management by basins.

This operating body (with the role of a water basin agency) would have the responsibility to organize water data collection, set up quality objectives, work out projects, and manage the charging, financing and permitting at the level of the nine sub-basins. It would operate under the decisional or consultative authority of the sub-basin and national water committees. A government water committee could complement the scheme with representatives from government bodies involved in water matters.

Recommendation 3.3:
Consistent with EU Directives and good water management practices, the national plan for water basin management should establish permanent institutional arrangements for management at the national and sub-basin levels with extended responsibilities. These responsibilities should include taking charge of the actual implementation of the water management plans, and being involved in setting the level of water fees in programming investments and projects, and in the development of monitoring.

Monitoring of water bodies

Apart from the monitoring of pollution discharges, the current water monitoring system is well organized. Contracts are negotiated between the Ministry of Environment and a number of specialized organizations, which provides for cost-effectiveness and flexibility in a competitive market.

In the context of water basin management, the monitoring certainly needs to be extended as it should not simply be strictly limited to measurement of the water element, but should include the entire ecosystem. Estonia has many valuable lakes, rivers, and on-shore aquatic ecosystems that deserve better knowledge and protection. Monitoring must be viewed and organized as a necessary tool to devise and administer water policies and control rivers appropriately. A general survey and diagnosis of the water bodies should be performed and a more detailed monitoring of river ecosystems (including river bed, banks, and riverside space) organized. A progressive increase of the number of monitoring stations and measured parameters as well as of the sampling frequency should be a priority in order to achieve parity with EU countries within ten years.

The method of evaluation of rivers and water quality classes should be refined and, in conformity with practices in EU countries, used to set quality objectives for stretches of river, and introduced as a management tool in future water basin management plans. The setting of objectives, planning, and financing for the protection and use of this national heritage should be major issues in the national and sub-basin water management plans.

Recommendation 3.4:
The Ministry of Environment should make a general survey of the present monitoring of river ecosystems. This survey should be used to:

- *Reconsider the number and location of the monitoring stations in order to ensure a better coverage of the water quality of the hydrographic network;*
- *Help classify the river stream segments according to the quality of their water;*
- *Design appropriately the water policies and river management objectives according to the uses and purpose of the rivers.*

Capacities for water management

At municipal level: With the introduction of the water basin management approach and the introduction of other EU directives, the decision-making process will be increasingly transferred to the local level. The municipalities

should develop the competence to better assume these new responsibilities by:

- Providing for drinking water and waste-water disposal;
- Managing the complete or partial ownership of water companies;
- Sub-contracting water companies.

Municipalities should have sufficient technical understanding of regulations and water engineering in this field to be able to provide for good quality long-term general planning for drinking water and used water. The general long-term plans should be worked out between neighbouring municipalities or with municipal associations if appropriate. In line with EU practice, before designing, financing, or implementation, such public projects should be appraised and approved at government level.

In low density urban or rural areas, where municipal water services are not available, it may be more effective to organize used water disposal at a very local or even individual level. Appropriate techniques are available and may be more efficient and less expensive than collective solutions. Were such techniques to be selected for some areas however, they would still require some form of public organization and control. For instance, local or individual drinking wells subject to low-level treatment would need their sanitary protection zones to be effectively protected from domestic and agricultural pollution. This local option should be assessed in general long-term water management plans.

A national programme to organize technical and legal advice for municipalities should be implemented with the help of national municipalities' associations and the County Environmental Departments. See Recommendation 1.2 in Chapter 1.

At the level of industry: The management of the discharge of industrial waste waters should also be improved. Waste-water discharges from small and medium-sized enterprises are usually connected to public sewerage systems. Some legal and regulatory provisions exist that shape waste-water pre-treatment, monitoring, and treatment contracting conditions for those discharges, but they are not sufficiently precise. Therefore, some sort of mandatory form and minimal terms for the contracts between waste disposal companies and industries discharging polluted water into public sewerage systems would be needed. The technical content of such contracts should be similar to the permit system. The County Environmental Departments should get copies of the contracts and of the reports on discharge monitoring of connected industries.

At County Environmental Departments and inspectorate level**:** The authorization process should be clearly linked to the acceptance capacity and the quality objectives of the receiving water body. Today, the procedure for permit management by the Counties' Environmental Departments is not standardized. Firstly, the method of monitoring and evaluating the real pollution emitted requires improvement. It should not be based only on a single selective measurement of the pollution flow by the inspectorate, but in the absence of regular self-monitoring and reporting obligations, pollution can also be evaluated from the quantities of product processed.

Recommendation 3.5:
The Ministry of Environment should define more precise permit procedures by the County Environmental Departments. The permitting process should be clearly linked to the capacity and the quality objectives that have been defined for each respective water body (e.g. sea, rivers, lakes, or underground water) and should provide for the evaluation of the actual pollution discharged into it.

In addition, some details of institutional reorganization need further refinement. As mentioned in Chapter 1, another weakness of the authorization system is the insufficient level of information exchange on permits between the County Environmental Department that issues the permits and the inspectorate that controls them. The situation should be evaluated and organizational steps taken to develop efficient and coherent cooperation between inspectorates and County Environmental Departments within stated objectives. An effective implementation of the system would necessitate that the staff of the Ministry of Environment issuing and reissuing permits and the inspectors both know exactly what the permits allow, what the charges, fees and fines are, and the extent to which the permit holder complies with the permit provisions and limits. Their close cooperation is a necessity, and it would be opportune to improve the overall coherence of their action through precise ministerial directives and to undertake independent auditing every two or four years of each body charged with implementing an aspect of MoE water-related activities. See Recommendation 1.3 in Chapter 1.

Chapter 4

WASTE MANAGEMENT

4.1 Waste generation and handling (1993-1999)

Data on waste generation and management are collected and processed by the Environmental Information Centre of the Ministry of Environment and provided to the Estonian Statistics Board. Data are collected on an annual basis from waste permit holders via the County Environmental Departments.

Waste definition, classification and statistics

Towards the end of the 1990s, legislation on waste definition and classification was brought into line with respective EU legislation. However, between 1993 and 1999, a different system of classification was used. For one year, 1999, statistical information was classified according to both the old parameters and the new EU parameters. This use of parallel classification systems in 1999 has likely caused some discrepancies in data that appears in the State of the Environment report and draft preparatory documents of the National Waste Management Plan. Beginning in 2000, waste data have been collected only on the basis of the EU classification system.

Total waste production

The total waste generation of Estonia has decreased by 25% (Table 4.1) since 1993 and by 20% since 1995. This is explained mainly by a decrease in wastes produced in the oil-shale-related power production and chemicals industry. At the same time, the quantities of municipal waste and other wastes have increased significantly, but oil-shale-dependent power and chemicals industries alone comprise 85% to 93% of waste generation. Overall, one of the goals of the National Environmental Strategy, which was to stabilize waste generation in industry and in households at the 1995 level by the year 2000, has been reached.

Municipal waste

Due to rapidly changing consumption patterns, the quantity of municipal wastes has increased more than 60%, most of which occurred between 1993 and 1995. The increase in municipal waste seems to have stopped towards the end of the 1990s. However, it is difficult to say whether this is a result of true waste prevention, developing waste management systems and changes in production processes, or if it is dependent on economic factors. Today, Estonian citizens produce approximately 380 kg of municipal waste per capita, a figure comparable to many European countries (see Figure 4.1). The share of municipal wastes is only 4-5% of the total waste production. The 1997 National Environmental Strategy specifies that municipal waste per citizen should stabilize to a maximum of 250-300 kg by 2010.

Industrial waste

The most important sectors of industrial activities in Estonia are the production of food and beverages; wood, paper and furniture industries; metal and machinery industry; textile industry; chemicals industry; and energy production. Most industrial waste is generated by oil-shale mining and related downstream activities (in 1999, this was 87% of total waste). The production of oil-shale energy and oil has decreased and the generation of wastes from these industries has decreased accordingly (from 12.7 million tons per year in 1995 to 9.4 million tons in 1999). Ashes from the burning of oil shale at power plants further generate water pollution as hydraulic methods are used to dump them on the ash fields. Semi-coke, also generated from the oil-shale industry, has been heaped on industrial landfills, from where it contaminates the underlying aquifers with oil products, phenols, and aromatic compounds. These semi-coke hills constitute one of the major adverse environmental challenges in Estonia.

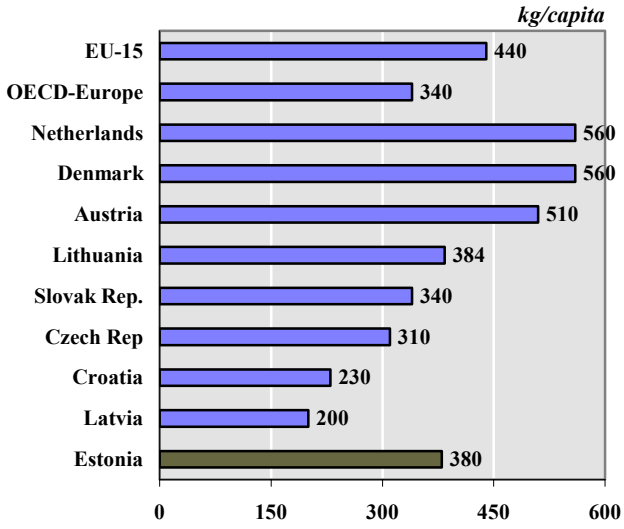
Table 4.1: Generation, export and import of wastes, 1993-1999

million tons per year

	1993	1994	1995	1996	1997	1998	1999
Generation of waste total	**14.51**	**13.82**	**13.41**	**14.69**	**14.40**	**12.98**	**10.85**
Oil-shale wastes total	13.52	12.65	12.07	13.11	13.18	11.39	9.40
Slag, fly-ash and dust	6.16	6.00	5.71	5.93	5.81	5.19	4.96
Fuse and semi-coke	1.23	1.27	1.23	1.29	1.37	0.93	0.63
Gangue and road-metal waste	6.13	5.38	5.13	5.89	6.00	5.27	3.81
Hazardous waste from oil-shale industry (included in oil-shale wastes total)	*7.38*	*7.26*	*6.93*	*7.21*	*7.17*	*6.11*	*5.59*
Municipal waste	0.34	0.47	0.52	0.56	0.59	0.56	0.57
Hazardous waste (excluding oil-shale waste)	0.35	0.22	0.34	0.46	0.19	0.16	0.27
Other wastes	0.30	0.48	0.48	0.56	0.44	0.87	0.61
Import of waste	0.0001	0.00	0.03	0.00	0.011	0.16	0.80
Export of waste	0.23	0.05	0.32	0.21	0.18	0.53	0.39

Source: State of Environment in Estonia - on the threshold of XXI century, 2001.

Figure 4.1: Municipal waste generation in selected countries, late 1990s



Sources: EPR reports; OECD Environment data 1999.

The quantity of waste from other than oil-shale related industry (0.61 million tons in 1999) is comparable to the order of magnitude of municipal waste (0.57 million tons in 1999). Due to increased industrial production, the quantity of non-oil-shale industrial waste has increased by more than 20% since 1995. Waste prevention does not yet appear to be an issue of great relevance in Estonian industry. As the main producer of wastes, the oil-shale related industry will have to look for new possibilities of waste recovery. Other considerable waste streams are timber waste (300,000 t/a), clinker dust (in Kunda Nordic Cement, 100,000 t/a) and metallic waste (635,000 t/a, according to estimations of authors of the draft National Waste Management Plan).

The Estonian Waste Act limits the responsibility of producers to those end-of-life products that endanger health or the environment. The EU waste legislation calls for putting the responsibility more extensively on the producer. Currently, mechanics' workshops where scraps are recuperated have a serious environmental impact in the Harju County, for instance. In Estonia, the environmental requirements for the processing of car metals are less strict by far than in the European Union. Producers are not held responsible for products that are dangerous to health and environment. Currently, the Waste Act is being amended to regulate the responsibilities of producers more strictly.

Hazardous waste

The quantity of hazardous waste is not directly comparable with most European countries because, until 1998, Estonia had been applying a system of classification that does not correspond to the EU system adopted in 1999. The vast quantities of fly ash from oil-shale power production and semi-coke are classified as hazardous mainly because of their alkalinity and chemical composition. Oil-shale-related industry produces on an annual basis 94% to 98% of all hazardous wastes produced in Estonia. The quantity of hazardous waste generated outside the oil-shale industry has been

reduced from 0.34 million tons in 1995 to 0.27 million tons in 1999. Using the Estonian classification, hazardous waste would represent 50% of all wastes generated (Table 4.1). Currently efforts are being undertaken to change the hazardous properties of oil shale ash. This new technology will be introduced by 2009 at the latest, and the EU has accepted a transition period for the implementation of the Landfill Directive concerning liquid and corrosive slurry of oil shale ash.

Compared with the situation in 1995 when Estonia was mainly co-depositing hazardous waste together with other waste in municipal landfills, the organization of hazardous waste handling and disposal is much better organized at present. The common practice is to collect used oil and other hazardous waste of industrial origin at source in the enterprises. Besides, a network of hazardous waste containers and stations has been set up to collect hazardous waste from households and small enterprises, i.e. old drugs, mercury bulbs, used oil, paint, lacquer and solvent residues, used oil filters and car batteries. Fifty-four hazardous waste collection stations have been put into operation around the country and there is additionally a possibility for citizens to leave municipal hazardous wastes at gasoline stations in Tallinn and Tartu.

Two hazardous waste transfer and reloading stations and one hazardous waste landfill site have been established. The first transfer station was opened in Tallinn in 1998. The second transfer station and the first landfill were established and put into operation in Vaivara (in Ida-Viru county) in the year 2000. The latter has the capacity to dispose of 30,000 t/a of mainly inorganic hazardous wastes, including asbestos waste. The capacity is deemed to be sufficient for 30 years. Organic hazardous waste, except waste containing halogens, can be treated in the oil-shale industry and cement kilns of Kunda Nordic Cement Ltd.

Other dangerous waste such as obsolete pesticides and radioactive waste are also on the way to finding a proper way to be managed. The problem of extremely hazardous outdated and abandoned pesticide wastes was inherited from the former Soviet period when big farms (sovkhozes and kholkoses) were automatically attributed huge yearly quotas of pesticides by the central authorities in Moscow. At the time of independence the agriculture activities sharply decreased and the surplus of pesticides accumulated, remaining unused. This resulted in piles of obsolete pesticides that were a big problem in the early nineties. These surpluses are now stored in a safe way. Some pesticides have been sent abroad for safe destruction. Radioactive wastes of medical and laboratory origin are now handled and collected separately. The depot of industrial and radioactive waste in Sillamae is now on the way to being cleared up (see Chapter 2).

Agricultural waste

According to statistics, agricultural waste generation is 475,000 t/a. However, this figure seems to be incomplete since three counties do not report animal waste generation figures. About 90% of agricultural waste is manure that is mostly recycled (as fertilizer) at the generation site. However, agricultural and forestry wastes (when utilized) fall outside waste legislation and waste statistics.

Animal carcasses also fall outside the scope of waste legislation. There are no enterprises to process dead bodies of animals that, so far, are simply buried. The EU directive on veterinary rules for the disposal and processing of animal waste (90/667/EEC) was transposed in 2001. A central rendering plant for animal waste –including carcasses– has been designed and is expected to be operational in three years.

Construction and demolition waste

The total amount of construction and demolition wastes in Estonia is 330,000 t/a. This figure may not reflect the situation exactly, since the quantities of construction and demolition waste are not easily controlled and a lot is disposed of at source, dumped illegally or taken to municipal landfills. Construction and demolition waste is mainly used for replacing virgin soil materials in landfill construction. A minor proportion of construction and demolition wastes is probably included in municipal waste quantities. However, on-site use and illegal dumping are not visible in waste statistics.

Waste-water sludge

In 1999, 450,000 tons (wet weight) of sludge and sewage waste were generated. The estimated sludge quantity today is 360,000 to 500,000 t/a and is increasing as new wastewater treatment plants are constructed and the operation of present treatment plants is upgraded. Sludge is composted in some locations, and there are plans to extend this activity.

Yet in some instances, sludge is simply discharged into the environment. In general, systematic sludge treatment and organized disposal are at their early development phases and sludge quantities are estimates, partly due to varying dry matter contents (sludge quantities are expressed in volume with no measure of their dry matter concentration that varies from 3% to 85% according to the case; therefore quantities cannot be expressed in tons of dry matter), partly because of unmonitored disposal practices. In addition, the quantities of sludge accumulated in the oxidation ponds of WWTP are not known. There is no handling strategy for waste-water sludge at present; it is either discharged into WWTP polishing ponds, spread over river flood plains, directly discharged into surface water bodies, or dumped into landfills (about 15% in 1998). Since 1999, sludge is increasingly being composted in the largest new WWTP.

Waste export and import

Export and import of waste form a relatively small proportion of Estonian waste management. It is carried out in accordance with the adopted national programme of implementation of the Basel Convention.

Import of waste has represented on average 0.33% of waste generation (see Table 4.1). Scrap metal and metal waste make up 93% of imported waste. On the other hand, exports account on average for 2.1% of the total waste generated. Exports of waste consist of miscellaneous waste types, including scrap metal and metal waste. The latter appear both in import and export statistics partly because some metal waste has been imported into Estonia for dismantling and pre-treatment.

4.2 Policies and strategies

Legal framework

All of the present waste legislation has been developed during the last decade and based on the EU integration programme. Although the essential regulations of the EU waste legislation have been incorporated into Estonian legislation, several regulations of the legislation are not enforced in practice (see Chapter 1 for more details).

Waste Management Plans

The waste management planning system comprises three levels:

- National waste management plan
- County waste management plan
- Rural municipality and city waste management plan.

The national waste management plan was to be prepared within two years of the entry into force of the Waste Act, i.e. by 1 December 2000. The process has been delayed due, among other things, to attempts to incorporate the most recent EU legislation into it, and the large number of stakeholders involved in the planning process. The main policies, strategies, principles and materials have been collected and discussed and are available. However, the final policy considerations and fine-tuning of the plan depend upon the Ministry of Environment and acceptance on a high political level, although the plan is not legally and directly binding.

The planning instrument addresses the relationship among the various levels of planning. In principle, the county plan (extensible to several counties) will have to be prepared on the basis of the national waste management plan within one year of the adoption of the national plan. In practice, however, a total of 23 plans, programmes and projects have been listed in the draft description of the present waste management situation in Estonia. In fact, various county and regional plans have been drawn up since 1994 under the initiatives of the counties or municipalities as a response to this increasing problem. These plans and programmes cover more or less the whole territory of Estonia. Some of the plans comprise several counties and contain selections of landfill sites, and some touch upon questions of national importance for general infrastructure development. Quite obviously, county or regional plans will not be opened again for fundamental discussion when the national plan is adopted. However, they will have to be adjusted to some extent in order to fit in with the final national plan framework and targets.

The “lowest” level of planning takes place on a municipal level, i.e. that of rural municipalities and cities. These plans will have to be prepared by the local government as a part of the development plan of the municipality or city. The municipal waste management plan, on which there is no time limit, will have to take into account what is expressed in the county plan. Additionally, a local government may request any undertaking in its area to submit a waste management plan for the purpose of preparing the municipality or city plan.

As far as hazardous waste management is concerned, there is one additional planning

instrument worth mentioning. According to the Waste Act the Ministry of Environment has the obligation to prepare a national development plan for hazardous waste management. The first facilities (a network of waste collection stations and one specific landfill) for hazardous waste management have already been constructed and the planning of further measures and facilities continues. Estonia has elaborated a national programme to implement the Basel Convention on hazardous waste, now under implementation.

The waste management plans are significant to the extent that a waste permit application can be refused if the activity of the applicant does not conform to the waste management plan of the local government.

Management of waste

A waste generator (be it an enterprise, a municipality or a simple household) has to manage collection of its waste and organize its delivery to a licensed or registered waste handler. Waste transportation has to be organized by waste holders unless organized municipal waste transport is available. The latter is organized by the local government unless it decides not to include a certain territory in the transport scheme. Waste holders will have to subscribe to the organized municipal waste transport unless they are exempt because they manage the transport or handling of the waste by themselves.

Local authorities have to co-operate with each other for managing their waste, if necessary. They can be obliged to cooperate if such cooperation is prescribed in the national waste management plan or if refusal of such co-operation could cause a hazard to health or the environment. Consistent with national legislation, local authorities should have established waste management regulations within their territories before 1 December 1999. By March 2000, 47 local waste management regulations had been established in 247 municipalities.

The Waste Act defines the waste management obligations for the producer or importer of a product, if waste generated from a product can cause danger to health or to the environment. This obligation is not as extensive as the so-called producer responsibility in the EU waste legislation, nor does it cover so many industrial branches.

In general, waste management fees for organized municipal waste transport should take into account (but in fact not necessarily cover) construction, operation, closing and aftercare of waste management facilities. The maximum fee is determined by local government decision.

A local government has the right to establish and collect a real encumbrance for the purpose of organizing waste management in its territory. However, real encumbrances have not been established in Estonia so far.

Management of hazardous waste

According to the 1998 Waste Act, the Ministry of Environment organizes the network of hazardous waste management facilities. Local governments organize the collection of hazardous wastes from households and their delivery to waste handlers. Collection and transport of hazardous wastes, apart from household waste, requires a waste permit. However, collection of hazardous waste generated in households is exempt until the waste arrives at a licensed waste handler.

The Estonian hazardous waste handling system, initiated at the beginning of the 1990s, does not envisage a centralized incineration plant for hazardous waste, due to its cost and the quantity of hazardous waste requiring treatment. Sufficient capacity for inorganic hazardous waste and less hazardous organic wastes can be achieved in Estonia. Since a dedicated hazardous waste incineration plant is not expected, Estonia will have to rely on foreign assistance in treating organic halogenated hazardous wastes. However, organic non-halogenated hazardous wastes have to some extent been incinerated in the oil-shale industry and cement kilns. Such a procedure can be continued only if the plants are able to comply with the most recent directive on incineration of waste – which may be unlikely.

4.3 Development needs

Packaging waste

Legislation for the management of packaging and packaging-waste in Estonia comprises two statutes:

- The 1995 Packaging Act and six regulations adopted based on the act;

Table 4.2: Municipal waste landfills, 1996-1999

number

	Total	*of which:*							
		In operation	Operation ceased	Closed	Closing down	Inactive	Under establishment	Establishent cancelled	Planned
1996	**341**	282	50	1	0	0	5	0	3
1997	**349**	252	56	33	0	0	2	5	1
1999	**351**	221	71	41	6	2	3	4	3

Source: State of Environment in Estonia - on the threshold of XXI century,2001.

- The 1996 Packaging Excise Duty Act and three regulations adopted based on the act.

The Packaging Act transposes the principles and requirements of the EU Packaging Directive (94/62/EEC) to Estonia. The act sets minimum targets for recovery by 30 June 2001, i.e. 50% of packaging to be recovered totally; 25% to be totally recycled, 15% recycling for each packaging material.

The Packaging Act requires, among other obligations, that:

- Local governments direct the packaging reuse system;
- Manufacturers and distributors collect packaging of their own goods at the place of distribution of such goods;
- A packaging deposit system shall be established by the Minister of Economic Affairs;
- Deposits shall be charged from consumers of packaged goods;
- Sanctions can be imposed on those packaging manufacturers who do not deliver requested annual information to the packaging register.

Many of the above requirements have not been implemented. Several important sections of the Act are ineffective because practical steps are not in place. For instance, there is no list of returnable packages with corresponding deposit fees; most of the used packages cannot be returned because the local authorities have not set up the package collection sites; there is no information in the shops or other places where packaging can be returned; and the data reporting procedure to the packaging register is too complicated. Consequently, the reporting is not done, making it difficult to elaborate and adjust the practical operations and economic incentives.

The quantity of packaging waste (included under municipal waste in Table 4.1) is between 170,000 and 200,000 t/y. The recovery of packaging waste is increasing year by year. Currently, approximately 15% of it is collected and recycled, mainly in the form of alcoholic and soft drink beverage packaging wastes. The main driving force has been the packaging excise duty, which can be avoided if the manufacturer or importer of an alcoholic beverage or soft drink organizes at least 60% of the recovery of its packaging wastes. A vast majority of the industry - more than one hundred companies of a total number of 150 - has fulfilled this requirement. Many new companies have been established to carry out recycling of packaging wastes.

Estonia will not be able to meet the targets set by the Packaging Waste Act. The proportion of beverage containers among all packaging materials is so small that additional measures will have to be taken to engage the rest of the packaging industry and distributors in recycling. The lack of incineration capacity and recycling possibilities may mean that an increasing proportion of packaging waste recovery has to be based on partial export of packaging wastes.

Waste recovery and disposal

Waste disposal in Estonia is mainly based on landfilling. The number of landfills in Estonia is considerable. Uncontrolled dumps are still frequent, partly because there are no control mechanisms or legislation for landfills. Some changes and improvements have occurred during the last few years, but the number of landfills is at present very high and conditions often very poor (see Table 4.2).

The draft of the national waste management plans suggests that in the future only 5-10 modern municipal landfills will be sufficient. Very recently, the first municipal landfill complying with the EU

landfill directive (i.e. mostly regarding monitoring, underground protection and sanitary conditions) went into operation in Väätsa and a few new up-to-date landfills are being planned.

The present situation makes compliance with the EU landfill directive costly and laborious. The greatest threat to the effective transition from old landfills that were illegal and also often free-of-charge to landfills that meet European regulations is the reluctance to use the new landfills while old landfills are still in use. Reasons for this are mainly economic, since the cost of waste management at a new landfill can be several times higher than that of the old one.

The fees of waste management have to cover all costs related to the treatment or disposal facility, including closure and aftercare costs. This is probably not implemented throughout Estonia, especially not at old landfills. When a new landfill is established, the investment costs must be covered in full. Since old landfills do not have the burden of investments, modern technologies or effective control, their running costs are much smaller than those of new landfills. Consequently, a new landfill cannot compete with an old one in economic terms.

4.4 Conclusions and recommendations

Since the mid-1990s Estonia has been negotiating issues and prerequisites for joining the European Union. Together with other initiatives like the UNECE first Environmental Performance Review of Estonia, this process has been and still is the driving force behind developing Estonian waste management policy and preparing for the full implementation of the European Union legislation. Considering its starting point and its resource limitations, Estonia has performed quite well in creating new environmental legislation, establishing a waste management infrastructure and striving towards a huge socio-economic leap in waste management towards the Western European countries.

However, there are still many problems deserving special attention in the near future. Among them are the outdated and environmentally indifferent or hostile large industries based on the exploitation of oil-shale and former phosphate and uranium mining, and, for such a small country, an unusually large number of military sites left in a critical condition by foreign troops. Economic growth, although showing some of the best indicators among the countries in transition, has not been as rapid as had been hoped.

Waste statistics and classification

Data on waste generation should be clarified. At present, it is not always clear which wastes are included in which statistical category or whether they are covered at all (e.g. timber waste, cement production waste, metal waste, construction and demolition wastes and waste-water sludge). The waste definition and classification system should be entirely brought into line with the European Union system, in particular regarding the identification and classification of hazardous waste (Directive 91/689/EEC), and the format and procedure for reporting on it (75/442/EEC). Comparability between the old and present waste classification systems should be achieved. *See recommendation 4.1.*

Dissemination of information on wastes and waste management

Waste prevention - although the first priority in EU waste strategies and policy - is difficult to achieve and is therefore even more challenging in a country looking forward to a considerable economic growth. On the other hand, the situation may provide a good opportunity to influence new industries and production processes in their early development phases. With the build-up of waste management infrastructure, it is also necessary to provide explanations and information, particularly to citizens and SMEs, on the practical organization of waste management. *See recommendation 4.1.*

Recommendation 4.1
The Ministry of Environment and the Environment Information Centre should:

- *Compile and systematize information on waste generation in such a way that it is more coherent and complete in order to improve its comparability with information from EU member states. Waste generation and waste management follow-up should be carried out so that data could be used for statistical purposes as well.*
- *Establish, together with regional and local authorities and all stakeholders of the waste management services, a programme of disseminating information on waste and waste management. Distribution of information should concentrate on waste prevention in*

particular, and practical waste management, and be targeted to citizens and small and medium-sized enterprises. Moreover, campaigns for waste collection and information-dissemination should be organized frequently.

Waste management planning

Waste management planning on all levels should be completed soon, including the updating of county and local government waste management plans. Realistic timetables and completion of this work should be clearly expressed and enforced. In updating waste management plans, it is necessary to look further ahead and focus more on prevention and recovery of waste and waste management integrated with industrial production processes. The periodic updating of the waste management plans should foresee, at the minimum, a more integral and developed product policy in relation to advanced waste management, instead of simple landfilling as the solution to waste management.

Recommendation 4.2:
The Ministry of Environment, through its County Environmental Departments should promote the drawing up or implementation of municipal waste management plans, and instruct county and municipal authorities to meet the set deadlines. The plans should be periodically updated.

Producer responsibility

Adopted EU directives on packaging and packaging wastes and end-of-life vehicles and the emerging directive on waste from electronic and electric equipment call for producer responsibility in organizing waste management. This producer responsibility is wider than that of the present Waste Act that is limited to end-of-life products endangering health or the environment. Consequently, the Waste Act should be amended to facilitate the adoption of producer responsibility for new waste categories.

Recommendation 4.3:
The Ministry of Environment should amend the Waste Acts and their implementing regulations to more clearly and extensively address the responsibility of producers.

Packaging

The Packaging Act set the goal of recycling 50% of total packaging waste by 2001, reprocessing 25% and reusing 15%. The Packaging Excise Act aimed at introducing economic incentives to help reach the recycling objectives, but was enforced only for beverage (alcoholic and soft drink) packaging. The presently too limited producer responsibility for packaging and packaging waste should be extended in practice to other sectors of the packaging industry as well as the beverage industry. For this purpose, the packaging industry would, for example, need to co-operate and form producer corporations, which would organize national collection, reuse, recovery and recycling of packaging and packaging waste. The responsibilities should be defined so as to include consumer and industrial packaging and packaging wastes, i.e. all such materials and wastes regardless of the type of holder of the packaging waste. Packaging deposits should be defined by regulations and the deposit system be extended to the whole country. The set of legislative acts (a total of 11) could be simplified and all provisions included in the legislation should be implemented effectively.

Recommendation 4.4:
The Ministry of Environment and the Ministry of Economic Affairs should amend the Packaging Act to correspond with the actual situation. At the same time, measures need to be undertaken in order to extend the management of packaging wastes to all sectors of the packaging industry and consumers and establish a uniform national system throughout the whole territory.

Development of R & D

Development of waste management is a cross-sectoral task. It appears that much of it has been carried out almost entirely by foreign consultants. R & D in this sector has been limited while there have been urgent practical problems to solve. However, the development of Estonian R & D activities would be highly advantageous as there are still considerable efforts to be made. It would be desirable to evaluate critically the achievements so far and to try to obtain a clear picture of the uses of different policy instruments in further development of the waste sector. Obviously, all available policy incentives (administrative, economic and informative instruments) need to be used simultaneously, but more emphasis needs to be placed on the use of economic instruments. Full coverage of landfill operations and aftercare costs for all landfills and considerable increases in waste disposal pollution charges (waste taxes), are measures worth serious consideration. Also,

appropriate R & D of integrated waste management and the use and application of new technologies in waste recovery and treatment should be initiated and financed. See Recommendation 6.1 and its implementation regarding in particular the waste management sector.

Recovery and treatment of certain waste streams

Waste prevention, reuse, recycling and recovery should be emphasized instead of the traditional landfilling. There are many possibilities of organizing and developing waste management systems, as has been demonstrated in the draft documents of the national waste plan. The proposals to organize waste recovery separately for various waste categories are correct and provide the maximum possibilities for the recovery of separately collected wastes. (a) For several waste categories, such as discarded tyres, waste paper, end-of-life vehicles and electric and electronic waste, batteries and accumulators etc., the implementation of full producer responsibility would enhance recovery and safe disposal. (b) Producer responsibility for packaging wastes should be expanded. (c) It is important to keep a constant watch on industry, especially the oil-shale industry, as it is the main waste producer whose waste management problems seem to be very difficult to solve. The power generation and cement industries are also important waste producers. (d) The frequent problem of construction and demolition wastes ending up in illegal places should be tackled by legislation. (e) The proposal of "integrating" the management of certain kinds of organic waste should be considered very carefully, paying attention to the directive preparations in the European Union, the dilution ban and the public and animal health care considerations. (f) The use and discharge of hazardous chemicals into the environment and sewers should be reduced by bans, and control mechanisms. (g) In the future, more attention will need to be devoted to integrated product policy and waste management.

<u>Recommendation 4.5:</u>
The Ministry of Environment together with the Ministry of Economic Affairs should negotiate agreements with industry, sector by sector, setting up the targets on waste recovery that each branch of industrial activity should reach. Waste management provisions should be included in all construction and demolition permits (see recommendation 7.2).

Landfills and municipal waste management

It is not possible to get rid totally of landfills in the foreseeable future. The most common way to manage wastes for the time being is to put them into landfills. This is the case in Estonia as in all other countries. Most of the existing landfills do not meet EU requirements and the construction of new landfills is very costly; for that reason Estonia has requested a transition period until 2013 to implement the EU Landfill Directive (1999/31/EC). Old illegal landfills are still in use and new landfills have little attraction because of their high waste treatment charges. Improvements in landfilling are needed urgently.

Development alternatives for municipal waste handling have been described in the preparatory documents of the national waste plan. It seems that a system of a few large landfills combined with waste collection points and reloading stations in remote locations would be the proper system. Simultaneously, biodegradable waste treatment should rely on separation at source, and central biological waste treatment plants in urban areas and backyard composting in rural areas. Remaining organic waste could be source separated and collected separately for energy production purposes, especially in the northeast where the power industry is located.

New incentives and guiding instruments should therefore be adjusted or reshaped in order to ensure that there will be a shift from the use of old landfills towards new ones, while the old ones are simultaneously closed. At the same time, supervision must be improved to avoid illegal dumping of wastes into the environment because of higher waste management fees.

At present, the Ministry of Environment has prepared a regulatory framework for the establishment, construction, operation, closure and aftercare of waste management facilities, especially landfills. It is also considering an increase in pollution charges in order to be able to recycle more funds to the construction of new landfills and the closure of old ones. Both actions are pointing in the right direction. They should be complemented with a modification of the permitting system to ensure that new landfills are used to their full potential.

Recommendation 4.6:
The Ministry of Environment should develop the permitting system and other related legislation in such a way that the service area of new landfills for municipal waste will be clearly defined and that the old landfills of the service area will be closed at the moment of bringing the new landfills into operation.

Soil contamination (past pollution)

As explained in Chapter 2, Estonia has tried to tackle the serious problem of contaminated soils in a rational way, starting with a site inventory and mapping and the rehabilitation of the most dangerous sites. However, the legislation needs to be improved to cover all kinds of waste and clearly attribute responsibilities.

Recommendation 4.7:
The Ministry of Environment should provide regulations to deal with all aspects of soil pollution not already covered in waste or other environmental legislation. Such regulations would target, for example, soil pollution, procedures for clean-up, financing, liability and the administrative arrangements required to implement the regulations. The Ministry might also consider the possibility of combining and rationalizing these regulations into a single soil protection act.

Chapter 5

BIODIVERSITY MANAGEMENT AND COMPENSATION SCHEMES

5.1 Status of biodiversity and pressures

Introduction

Compared with other territories of similar size situated north of the 57th parallel, Estonia's biological diversity is one of the richest. This is due to the varied climatic conditions, the existence of island and continental sectors, the abundance of sea and inland waters and the variety of base rocks with correspondingly diverse soil conditions, all of which formed the basis for the evolution and development of a wide diversity of ecosystems. In substantial areas of Estonia, traditional extensive land use methods persisted throughout history, permitting the survival of a comparatively high proportion of "semi-natural" associations of flora and fauna.

Estonia has a long tradition of nature conservation, and maintains many protected areas on its territory. Estonia was also among the 157 states that signed the 1992 Convention on Biological Diversity (CBD), ratifying it in 1994. The CBD provides a binding framework and mechanism for biological diversity protection and management.

Nature protection within and outside protected areas

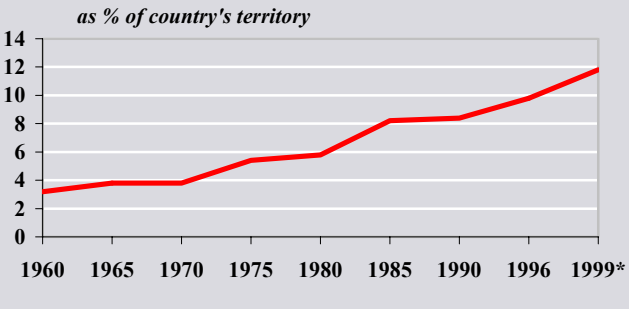
At the present time, there are 306 nature conservation areas. Each of the 16 independent protected areas has its own administration and the remainder come under the responsibility of the 15 County Environment Departments. In the past six years, 20 new protected areas were designated (comprising 34,380 ha), and, in 121 protected areas (433,532 ha), the renewal of the protection regime designated prior to Estonia's independence was achieved by the beginning of 2001. The 120 protected areas with a renewed protection regime represent 80% of the total area of protected territory. The first EPR report for Estonia (1995) recommended that the authorities "provide human and other resources necessary to ensure the application of a strict protection regime on 2% of the territory of Estonia by the end of the century." At present, more than 10% of the Estonian continental territory is nature protected (Figure 5.1). By 1 January 2001, 3.72% of the continental territory of Estonia could be classified as "strictly protected" (corresponding to IUCN category I (a + b)). Extension of this classification category to other protected areas would require a renewed protection regime.

An area protected jointly with Latvia (at the south-west corner of Estonia) is envisaged and a joint management plan is under preparation. Another potential cooperation site with Latvia has been identified at the central southern border of Estonia (border river area). There is no cooperation with Russia on cross-border-protected areas.

According to the nature conservation legislation, every nature-protected area should have a management plan. In the case of landscape reserves the preparation of management plans can also be initiated by ministerial decree. Approximately 20 protected areas are covered by a status survey (requirement for the preparation of a management plan) and status surveys for an additional 40 protected areas are in progress. . Six management plans have been prepared and approved, and about 40 are under construction. Although the management plans are drawn up in consultation with the local population, once a management plan has been finalized it may become an official document through declaration by the Minister of Environment (as a ministerial decree). The status of nature conservation management plans in the planning hierarchy is considered to be high. The County Environment Departments and the administrations of the 16 independent protected areas are responsible for management plan implementation, while supervision of the implementation is carried out by the Ministry of Environment.

A well-managed protected area system is the mainstay of biodiversity conservation. However,

Figure 5.1: Protected areas according to national law



Source: 2nd Baltic State of the Environment Report - based on environmental indicators, BALTIC Environmental FORUM, 2000.

Note:
* Including protected areas that do not have yet new protection regulations.

the conservation of biodiversity should inform economic activity outside protected areas as well. One of the recommendations made in the first EPR report (1995) was to "introduce concrete nature conservation measures outside protected areas in order to strengthen the protection of endangered species and biotopes." Some concrete measures have been taken outside protected areas, such as the agro-environmental programme and the setting up of a network of "key habitats" in forests, but more measures shall be elaborated.

Pressures on biodiversity and biodiversity management

Forestry and forest protection

In 1995, illegal logging in restored private forests had become a serious problem. The first EPR recommended that Estonia "strengthen provisions on forest protection and their enforcement in order to avoid conflicts between the economic, short-term interests of forest owners and the broader interests of sustainable management of forests." A Forest Act adopted in 1998 is being revised to improve the technical parameters of forest management. At present, forest owners need no permission to carry out harvesting activities in their forests. But they do have to "notify" the nature conservation authorities. The consequences for owners engaging in illegal cutting are in principle very severe. Not only must a penalty be paid, but also a compensatory sum for damaging nature, the latter exceeding the commercial value of the forest in question. However, enforcement of these measures is reportedly difficult due to complicated regulations. Illegal cutting in private forests has in general decreased, owing to a certain "satisfaction of short-term capital needs" in the past. However, the situation is not yet satisfactory. A "permit system" for the cutting of forests is to be introduced in the new Forest Act, presently under preparation.

The Forestry Development Plan (FDP), which is currently in preparation, incorporates measures relating to biodiversity conservation outside protected areas. For instance, certain forest management restrictions are imposed on forests in non-protected limestone regions. The FDP also includes the installation of a network of "key habitats" in forests. These key habitats are areas where rare or endangered species that are sensitive to changes in their living conditions live and multiply. Alternatively, they are areas with rare forest types in need of protection. In 1999, an inventory of these key habitats was prepared and approximately 3,000 were identified covering about 6,000 ha. Half of them are located in state-owned forestland and the other half in private forestland. The key habitats in state forests are protected by a decree of the Minister of Environment. In private forests, the state is trying to convince owners to sign contracts. These contracts will contain a description of the key habitat and an agreement on how it should be managed and protected. In some cases, monetary incentives encourage owners to follow the management advice (e.g. compensation for non-interference and associated loss of income). So far, only 40 contractual agreements with private forest owners have been signed, covering an area of about 120 ha. To raise awareness on the issue, a glossy brochure on key habitats was sent out as a Christmas greeting in 2000 by the Ministry of Environment to all forest owners in Estonia.

In 2001, with financial assistance from the Danish Government, another small brochure, "Management Guidelines for Protected Forests", was published. Although the guidelines were prepared for specifically protected forest areas, the authors suggest that they also be used for commercial forests. It remains to be seen whether the guidelines have been incorporated into the upcoming Estonian Forestry Development Plan.

In preliminary discussion of the upcoming Forestry Development Plan, environmental NGOs suggest that the proportion of strictly protected forest areas be raised from 4% (as contained in the Estonian Forest Policy of 1997) to 10% of the total forest

area. The Ministry of Environment, however, fears that it would not have sufficient capacity to ensure the enforcement of a strictly protected regime over such a large area.

In the course of preparation of the Forest Development Plan the Estonian Forestry Development Programme commissioned a background paper entitled "Biodiversity Management Strategy for Commercial Forests in Estonia" (M. Külvik et al, 1998). It is therefore likely that the Forest Development Plan will contain a number of the Strategy's objectives and related plans for forest and forest product certification. An experimental pilot project concerns forest management planning and biodiversity conservation outside of protected areas. "Green management plans," prepared for two forest owners in 2000, proposed that 10% of estates should be managed for the purpose of biodiversity conservation (4% strictly protected with no human intervention at all and 6% managed with restrictions for biodiversity conservation).

Despite these various initiatives, a concerted extension programme and a responsible systematic implementation framework (including institutions and economic incentive schemes) is insufficient. There are no plans for the promotion of so-called "close-to-nature forest management systems", designed to reconcile the economic interests of the forest owners with the ecological interests of the public.

Fisheries and fish protection

The over-fishing in some coastal marine waters reported from several official sources poses the serious problem of economic and ecological sustainability. This problem is directly related to the socio-economic difficulties of the coastal region. Coastal areas are also negatively affected by building and construction developments.

Concerning inland waters, both abandoned and working hydropower dams pose problems, especially in salmonid rivers. These dams are not equipped with fish ladders and block the different salmon species (among them the grayling (*Thymallus thymallus*), a strictly protected species, from reaching suitable spawning areas during spawning migration. Damming, pollution, over-fishing and habitat destruction have reduced the wild salmon populations. To compensate for the loss, salmon is being reared on a large scale to stock the rivers artificially. The low numbers of wild salmon population may result in loss of genetic diversity or even extinction, and the interbreeding between reared and wild salmon may cause undesirable genetic changes. So far, there is no inventory of hydropower dams that block salmon migration, and only sporadic rehabilitation of natural spawning areas has been carried out. Owners of dams are not obliged by law to construct fish ladders and in most cases, for financial reasons, they do not build them voluntarily. In 1997, the International Baltic Sea Fishery Commission (IBSFC) issued a "Salmon Action Plan" that has as its main goal to restore wild salmon populations. Even though the IBSFC Salmon Action Plan has prompted a lot of action and awareness, there seems still to be a long way to go. The major constraint in tackling the problem is related to funding. There also seems to be a lack of scientific knowledge of specifically freshwater ecosystems, but again funding for research is limited.

The introduction of species from abroad for fish farming or repopulation is another threat to indigenous species and ecosystems. Recently, salmon spawn was imported from Finland and Latvia for rearing purposes, raising the possibility of a decline of the indigenous salmon varieties. In addition, crayfish farming will be encouraged within the framework of the development and diversification of economic activities in rural areas (Measure No. 3 in the Agriculture and Rural Development Programme, SAPARD 2000–2006). Since the indigenous crayfish is vulnerable to plague, there are plans to introduce non-indigenous, more disease-resistant species. This again threatens biological diversity.

Agriculture and nature protection

The contribution of the agricultural sector to the GDP was 6.3% in 1998 and 5.7% in 1999. Employment in agriculture has decreased in recent years. State support to agriculture, including rural development, represented 2.4% of the 2000 state budget. The agricultural sector is in a difficult situation, especially with regard to insufficient financing capacities, and the proportion of abandoned, uncultivated land is increasing.

An alternative form of land use, especially for under-productive or abandoned agricultural land is afforestation. Afforestation falls under the responsibility of the Ministry of Agriculture, but the draft Forestry Development Plan also contains a chapter on afforestation. It is estimated that about 100,000 ha of agricultural land are available for

afforestation. Forecasts suggest that this figure might become larger due to the recent development of livestock diseases in Europe and because agriculture would in the long-term need no more than 1 million ha (currently 1.4 million ha). The forest cover of Estonia (47.4% of the land area) is, however, far above the European average.

Afforestation is not the only option for land-use change from agriculture. To avoid the adverse effects of afforestation on nature and biodiversity (i.e. to avoid afforesting valuable grassland habitats), each afforestation plan undergoes an Environmental Impact Assessment, and criteria and indicators were developed in this context. Subsidies for afforestation are granted only in the form of seedling distribution to private landowners. Reportedly, 1.2 million spruce seedlings (*Picea abies*) propagated from seeds collected in Belarus were imported from Sweden for the purpose. Key intervention subsidies for biodiversity, such as support for planting rare and endangered forest tree and shrub species on afforestation sites and support for microsite-matched species selection is not foreseen.

Considerable progress has been made in incorporating biodiversity management issues into agriculture. The most important achievement was the creation of the Environment Bureau in the Ministry of Agriculture in the year 2000. The Bureau has four professional posts, only two of which were filled at the time of the Environmental Performance Review, and is responsible for the coordination of the development of agro-environmental programmes, the promotion of organic farming, and for general environmental issues related to agriculture.

In 2001, two pilot projects were set up — initially in two different areas. They were designed to test the practical implementation of proposals for the National Agro-Environmental Programme to reduce the negative impacts of agriculture on the environment and support environmentally friendly agricultural practices. The pilot projects are financed through national state budget contributions, but it is planned to secure co-financing from the Estonian SAPARD programme (EU Special Accession Programme for Agriculture and Rural Development). Direct support was granted to ecological farming for the first time in the year 2000. The seventh measure of the Agriculture and Rural Development Plan (SAPARD 2000 - 2006) supports agro-environmental action, but only from the year 2003 onwards and with a relatively limited financial contribution. Moreover, although a 2001 decree was issued in its support, the agro-environment support scheme is not specifically mentioned in the legislation (Rural Development and Agricultural Market Regulation Act, 2000). It is classified under “other support”. This classification is a clear indication of the rather low level of priority assigned to the agro-environmental scheme.

The Ministry of Environment provides subsidies for the management of semi-natural areas, primarily for the mowing of meadows and wooded meadows. These meadows often have an outstanding biodiversity value (on one square-metre-sized plot, 76 vascular plant species were recorded) and are in danger of becoming wooded over in time through natural afforestation if not mowed or pastured. The subsidy scheme is a laudable effort to maintain these ecologically and culturally valuable semi-natural areas, and testifies to the commitment of the state to nature and biodiversity conservation.

Transport infrastructure

Transport infrastructure has a negative impact on biodiversity. Construction of new infrastructure destroys important habitats and interferes with ecosystems. The natural migration routes of fauna especially are often severed and animals (among them strictly protected, endangered species) increasingly become victims of traffic. The political and economic changes of the early nineties engendered a need to develop new concepts of transport infrastructure to accommodate the volume of increased national traffic (vehicle numbers registered in Estonia rose from about 80,000 in 1980 to almost 400,000 in 2000) and the increased volume of international transport (as Estonia became subject to international transit traffic). As a result, the density of the road network grew from almost 33 km per 100 km^2 in 1980, to 38 km per 100 km^2 in 2000. Overlaying the infrastructure network with the ecological corridor network shows a lot of overlap that graphically points up the potential conflict points.

The National Spatial Plan (EESTI 2010), prepared by the Department of Strategy and Planning of the Ministry of Environment, indicates the principal transport development projects: the construction of a major north-south international railway track; the construction of the Via Hanseatica, an international highway connecting Russia with Western Europe (by widening and upgrading the existing

Narva-Tartu-Valga road; widening and upgrading of the Via Baltica, which is already under construction; and widening and upgrading the Via Vironia for Tallinn-Narva).

Other pressures

Protected flora and fauna species are, in principle, protected equally within and outside of protected areas and it has been stated that in cases of important concentrations of protected plant species, for example, even the building of houses on private land could be prevented. This attests to the importance accorded to nature conservation and the defence of protected species.

New peat extraction sites are thoroughly investigated before authorization is given to open them. Abandoned peat extraction sites are recultivated and a decree is being drafted that will ensure that the fees paid by peat extractors into the Environmental Investment Fund are used for the recultivation of former extraction sites.

5.2 Policies and strategies

National level

Since the first Environmental Performance Review in 1995, there has been considerable progress in national nature conservation and related policies, strategies, programmes and statutes.

The *National Environmental Strategy* (approved by Parliament in 1997) aims to "ensure the preservation of viable populations of local plant and animal species, natural and semi-natural communities and landscapes typical to Estonia". It lists concrete tasks such as the establishment of a network of nature reserves corresponding to EU recommendations, where zones of strict protection would encompass up to 5% of the land area of Estonia by the year 2010.

The 1998 National Environmental Action Plan includes a section on biological and landscape diversity, and sets five specific goals, to be realized through 117 short-term (1998-2000) and long-term (2001-2006) measures. One of the most important goals mentioned is the integration of landscape and biodiversity protection with other sectors of economic activity. With regard to biodiversity issues, the NEAP goals, actions and time frames are particularly ambitious.

One of the recommendations of the first Environmental Performance Review in 1995 was "to speed up the finalization of the National Action Plan on Biodiversity". The task was completed in 1999 with the financial assistance of the United Nations Environment Programme (UNEP). This Estonian Biodiversity Strategy and Action Plan has not been approved by Government or by Parliament. It proposes concrete action to be taken by various sectors that are also required to allocate substantial funds. However, the budget is too high, and financing only exists for about 40 % of the proposed actions.

As Estonia approaches EU accession, it is also obliged to introduce the EU nature protection policy. The creation of the NATURA 2000 network contributes substantially to future biodiversity management. Although creation of the network is not explicitly set out in the Strategy and related Action Plan, it may be regarded as included in the "*in situ* conservation" sections. The Nature Conservation Department of the Ministry of Environment decided to draft a revised version of the document to reflect a number of changes, particularly in agriculture and genetic resources, and to cover all aspects of the Cartagena ("Biosafety") Protocol, signed by Estonia in September 2000. The Ministry of Environment planned to submit the revised Estonian Biodiversity Strategy and Action Plan to the Government for approval in 2001.

A National Plan on Plant Genetic Resources, to be approved in May 2001, will be implemented by the Ministry of Agriculture.

The *Estonian Forest Policy* endorsed by Parliament in 1997 is regarded in international professional circles as an exemplary participatory exercise. Among other goals, the policy aims at increasing the 1997 proportion of strictly protected forest areas from 3% to 4% (of total forest area), while maintaining the 1997 level of lower protection category forests at 15% of total forest area. In protected forests, uneven-aged management systems should constitute the principal management regime, favouring indigenous forest tree species and attempting to increase the share of mixed and deciduous stands, including broad-leaved and hardwood species. In commercial forests, even-aged management may be maintained as the principal management system, and the establishment of mixed stands will be promoted.

The process of the formulation of the Estonian Forestry Development Plan (2001–2010) began in 1999, when the two main objectives of the previous Forest Development Programme had been achieved, namely the formulation of a forest policy (1997) and a new Forest Act (1998). The formulation of the new Forest Act, which came into force in January 1999, also included the strengthening of the section on biodiversity conservation. Major objectives of the draft National Forest Development Plan relating to biodiversity are the following:

- To survey and analyse the status of forest biodiversity;
- To define the maximum volume of allowable cut, which does not endanger biodiversity;
- To define the optimal percentage of the national forest cover and the optimal spatial distribution of forests;
- To find the best forest management practices for biodiversity conservation.

The National Strategy for Sustainable Agricultural Development (2000) specifies the main goals and propositions of the Estonian agriculture and rural development policy for the period 2000–2003. In 1997, an Estonian working group began formulating proposals for an Agro-Environmental Programme (AEP). Comprehensive proposals for the administrative implementation of agro-environmental schemes in Estonia were then completed in 1999 through the EU Phare Programme. Two measures of the proposed programme (on organic farming and the breeding of native cattle) have been functioning nationally since the year 2000. In 2001, a support scheme for the management of semi-natural habitats was launched, and was to be overseen by the Ministry of Environment. As mentioned above, in 2001 two pilot projects were inaugurated in two different areas, designed to test the practical implementation of proposals for the National Agro-Environment Programme

In the period 1999–2000 a Rural Development Plan (RDP) was also drafted in accordance with the relevant EU regulations. The RDP served as a basis for the formulation of the Estonian SAPARD 2000–2006 programme. SAPARD envisages a total public subsidy of EUR 113.6 million, including the EU share of approximately 12 million euros per year over the period 2001-2006 for implementation. Among the Estonian SAPARD measures, No. 7: Agro-environment, is intended to encourage environmentally-friendly farming practices, while avoiding damage to semi-natural and natural habitats and landscape elements on the farms. This is an experimental aspect of the implementation of the Estonian Agro-Environmental Programme (AEP). The ongoing experimentation phase is also given as the reason for the planned, but overdue, start (2003) of SAPARD financing of agro-environmental measures. In 2003 and 2004, 2%, and in 2005 and 2006, 3% of annual SAPARD funds will be allocated to support agro-environmental measures. The SAPARD programme also uses Environment Impact Assessment (EIA). The County Environment Departments decide whether an EIA should be carried out for SAPARD projects that are then screened on the basis of threshold criteria approved by the Ministry of Environment. This ensures that SAPARD projects cause no serious threats to biodiversity, but the system has still to prove its effectiveness in the course of SAPARD implementation.

A comprehensive Code of Good Agricultural Practice has been prepared and will be submitted for approval to producer unions, ministries and Government. The Code contains, inter alia, chapters on landscape and biodiversity protection. It is an advisory document (adoption not compulsory) that explains the legislative restrictions on farming and promotes good practices (sustainable and environmentally sensitive).

International engagements

The EU NATURA 2000 network consists of sites designated within the framework of implementation of EU Council Directive 92/43/EEC on the conservation of natural habitats and wild flora and fauna (Habitats Directive) and Council Directive 79/409/EEC on the conservation of wild birds (Bird Directive). Estonia agreed during consultations with the European Union that it would submit by the accession time: (1) a national list of sites eligible for identification as Sites of Community Importance (Habitat Directive); (2) a national list of Special Areas of Conservation (Bird Directive); and (3) a NATURA 2000 database containing all relevant information on the sites.

In July 2000, the Government of Estonia approved the National Programme for the Implementation of the NATURA 2000 Network, along with a two-year work plan and corresponding budget allocation. Among other activities, one pilot project was launched in 2000 with assistance from the Danish

Government (Regional Implementation of the Habitat Directive /92/43/EEC/ and Birds Directive /79/409/EEC/ in Lääne and Rapla Counties). The objective of the project is to establish the basis for implementation and management of the NATURA 2000 network in the two counties, as well as to gain experience for implementation throughout the country. Three professionals are coordinating the work on NATURA 2000 in the ministry and one or two in each County Environment Department. However, this staffing at the county level is insufficient to be able realistically to meet the deadline of January 2003. Procedures have been adopted for the export and import of items specified in the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), that Estonia ratified in 1992 (see Annex IV). Whereas the number of permits for transactions involving species listed in the annexes to the Convention has been relatively stable over the years (50-60 permits per year), almost 100 permits were issued in 1999. In 1993, the objects of transaction were mainly living animals traded among zoos; while in recent years hunting trophies (an aspect of hunting tourism) became predominant (skulls and skins of bears, wolves and lynx).

At the time of ratification of the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (RAMSAR Convention ratified in 1993), there was only one RAMSAR site that had been designated prior to independence. According to the Estonian Wetland Inventory (1997), approximately 30% of Estonian territory is covered by wetlands. In 1997, the Government approved the National Programme for the Implementation of the Convention on Wetlands of International Importance, especially habitats of Waterfowl. The Programme has one considerable drawback: it commits no financial resources for implementation. Nine new areas were nominated and the borders of the existing area were amended. The ten areas are in a reasonable natural state, which means that no reconstruction work is required. The obligation of "wise use" of their resources is interpreted in relation to waterfowl by a hunting ban. Each RAMSAR area should have a management plan and under the RAMSAR National Implementation Programme these should be finalized by 2002. Management plans exist for five of the ten areas and it is expected that the plans for the other five will be ready by the end of 2001. The Programme includes the designation by 2010 of ten more sites listed in the Plan. Four of the future areas are already under a nature protection regime and therefore part of an existing protected area. There is a National RAMSAR Committee, advising the Minister of Environment on RAMSAR-related issues, such as new harbour construction, peat extraction site designation, etc. The RAMSAR areas will be part of the NATURA 2000 network, in terms of both habitat and species protection.

Estonia followed up on the Declaration of the Conference for Conserving Europe's Natural Heritage (Maastricht, 9-12 November 1993) by inviting member countries to build a European Ecological Network (EECONET) and by setting up its own network. The Estonian National Ecological Network (ENECONET) is based on the existing grid structure of forest and forested wetland. There are forest core areas in the north, south and northeast. Large swampland areas are found in the northwest and southwest of the country, and two distinct, large agricultural areas in the central north and southeast. Forested corridors and stepping-stones connect the forests and core swampland areas.

5.3 Implementation tools

Legal framework

The Act on Sustainable Development (1995) states in its article 9 (1): "Preservation of biological diversity shall be guaranteed by development and implementation of a national programme and an action plan approved by the Government of the Republic of Estonia, the development of which shall be financed from the national budget." The Estonian Biodiversity Strategy and Action Plan was prepared in 1999, but the document was approved neither by Government nor by Parliament. A more concise and realistic version of the Strategy and Action Plan is being prepared with the objective of gaining at least Government approval.

In February 2000, Estonia began revision of the 1994 Law on Protected Natural Objects in order to harmonize it with the Act on the Protection of Marine and Freshwater Coasts, Shores and Banks (1995) and with the Law on the Protection and Use of Wild Fauna (1998) through the creation of one single act. The provisional name of the new draft law, scheduled for the end of 2001, is "Act on Nature Protection". The Forest Act of 1998 is being revised, with an important change planned in the area of prevention of the cutting of unsustainable forests, in line with the recommendation made in the first EPR report of 1995. A permit system to regulate logging is to be introduced in the new act,

thus strengthening the protection of forest biodiversity.

Owing to several amendments in the past and the requirement of harmonization with the EU Aquis Communautaire, the Act on Fishing (1996) needs to be entirely reformulated. A new act is to be expected by 2003, while a new act on hunting is likely to replace the Hunting Management Act of 1994.

With regard to the Act on Landscapes, the first EPR in 1995 called for the drawing up and launching of a "national landscapes programme" with the cooperation of counties, municipalities and NGOs. Although there is no comprehensive national landscape programme, different frameworks are in preparation, such as the "Valuable Landscapes" and the "Green Network" concepts. The various concepts should be consolidated into one and given a legislative foundation. Two drafts for an Act on Landscapes have been prepared in the past, but the second draft was closer to a policy document, containing too many technical details. To provide the missing legal framework for the protection of landscapes, two alternatives are being discussed. One is to formulate a separate law; the other is to include the issue in the Environmental Code, presently under preparation.

Institutional framework

In January 2000, the previously independent county environment administrations joined the institutional framework of the Ministry of Environment as County Environment Departments, of which there are fifteen (see the present structure of the MoE in Chapter 1, Figure 1.1). The 15 County Environment Departments are headed by a director-general having the same status as the head of the Nature Conservation Department at the Ministry headquarters. There are also 16 protected areas of national importance with their own respective administrations. These administrations are also headed by director-generals, at the same level as the head of the Nature Conservation Department at the Ministry. Whereas the heads of County Environment Departments are directly subordinate to the Secretary-General, the 16 heads of the protected areas are subordinate to the Deputy Secretary-General for Nature Conservation and Forestry, who receives instructions from the Secretary-General. The head of the Nature Conservation Department, being at the same level as the director-generals of the 15 County Environment Departments and of the 16 separate protected area administrations, is not in a position to give even professional, technical instructions directly (or through the Director-General of the County Environment Department) to the nature conservation staff of the County Environment Departments (usually two to three nature conservation staff per County Environmental Department). Nor can she/he give such instructions directly to the director-generals of the national protected areas. All instructions from the head of the Nature Conservation Department and Forestry have to bear the signature of the Secretary-General, in the case of County Environment Departments, and of the Deputy Secretary-General for Nature Conservation and Forestry, in the case of the national protected areas. The head of the Nature Conservation Department of the Ministry consults regularly with the heads of the County Environment Departments or her/his nature conservation staff and with the heads of the separate protected area administrations.

In early 2000, the Nature Conservation Department of the Ministry of Environment had five professional employees, but, at the time of the second EPR review, they numbered 12, of whom the majority were young professionals.

Several remarks were made regarding the effectiveness of the independent Environmental Inspectorate. The problems of protected area maintenance and law enforcement also seem to be related to the insufficient capacity of the Environment Inspectorate that is reputedly understaffed and therefore unable to prevent and control negative impacts on fish resources.

The Estonian Biodiversity Strategy and Action Plan (1999) calls for the creation of a "National Biodiversity Unit". So far, this has not been done and is not definitely planned for the future. At present only one senior officer from the Nature Conservation Department of the Ministry of Environment is responsible for the coordination of the Convention on Biological Diversity. Collaboration with other sector ministries is not very efficient, except for the cooperation with the Ministry of Agriculture where the establishment of an environmental office in 2000 brought about a positive change. There was an inter-ministerial board that dealt with the coordination of CBD implementation, but this board no longer exists.

Budget allocation

To coordinate CBD implementation in the year 2000, the Ministry had a budget of about US$ 1,500 available, which was increased to about US$ 10,000 in 2001. With this budget, some small studies, reports to the CBD Secretariat and the publication of some small brochures may be envisaged. The sum of US$ 100,000 is expected in 2001 from a UNEP/GEF project for the creation of the implementation framework of the Cartagena Protocol on Bio-safety. Another UNEP/GEF project proposal was submitted for possible funding for the "Assessment of capacity-building needs for biodiversity conservation".

Monitoring

The National Biodiversity Monitoring Programme (NBMP) is part of the National Programme of Environmental Monitoring, launched in 1994. The programme is legally based on the Law of Environmental Monitoring (1999). The NBMP, subdivided into 54 sub-programmes, is coordinated by Tartu University through Environmental Protection Institute of Estonian Agricultural University and supervised by the Ministry of Environment. The implementation of individual sub-programmes is usually sub-contracted to suitable institutions, companies and experts. State budget resources in the order of US$ 90000 annually are available for this purpose. The budget of complementary monitoring programmes executed by other agencies (e.g. meteorology, geology) is not included. The data stored in the databases of the Environmental Information Centre are accessible, but appear mostly in the Estonian language only. Some data on strictly protected species (Table 5.1) are protected by electronic firewalls, to deny access to unauthorized persons.

5.4 Compensation schemes

The term "compensation" in biodiversity management applies in two different areas. One is the compensation of economic loss to landowners caused by restrictions in the management of natural resources imposed by nature conservation authorities. The other form of compensation can come into effect if biodiversity values are harmed legally (e.g. through the legally approved construction of a road, where the loss of biodiversity takes second place to the higher public interest of the road construction) or harm is caused illegally. Here mechanisms may be used to compensate the loss of biodiversity such as fining the party responsible and using the fines for investment in biodiversity conservation measures.

In the course of the restitution process, the former private owners of land that is now protected are able to reclaim their old property. However, they are obliged to accept management restrictions imposed in the interest of nature conservation. Owners of such land have no legal basis on which to apply for compensation for economic losses suffered through the management restrictions. However, they do receive a reduction in land tax depending on the protection regime. They have also the possibility according to the Law on Protected Natural Objects (1994) to request an exchange of their land for land of equal acreage outside protected areas. At the moment this rule applies only to private land in strictly protected areas ("strict reserves" and "special management zones"). A valuation of both pieces of land is carried out only in some cases, and usually at the request of the landowner to be compensated. The National Land Board and its State Land Fund are in charge of administering the exchange procedure, which tends to be both time-consuming and expensive.

The draft Law on Nature Conservation, intended to replace the Law on the Protected Natural Objects, makes no distinction between tracts of private land in different protection categories, but treats all private land in protected areas equally to avoid negative discrimination against private landowners in less-protected areas. According to the Law on Protected Natural Objects, the state also has the right to pre-empt and even to expropriate private landowners in protected areas when it is in the public interest to do so. Recently it has been suggested that the State should preferably buy the land from the private landowners in protected areas, because this would be faster and might be cheaper than the time-consuming and rather expensive exchange procedure.

The process of increasing state ownership in protected areas has the drawback of depopulating rural protected areas. The need for nature conservation to actively manage mainly semi-natural land in conservation areas will increase, but the present institutional framework for nature conservation, with insufficient human

Table 5.1: Natural species and distribution under protection categories

		I	II	III	Monitored species
Bacteria incl. cyanobacteria	1 000				
Protists	500				
Fungi incl. lichens	4 500				
Plants					
Algae	2,000				X
Bryophytes	525		23	2	X
Pteridophytes + Spermatophytes	1,500	22	122	41	X
Animals					
Invertabrates					
Sponges	3				
Coelenterates	11				
Ctenophores	1				
Platyhelminths	300				
Nemathelminths	450				
Nemertines	4				
Annelids	143		1		X
Bryozoans	7				
Molluscs	155	1			X
Anthropods	~12 000			26	X
Vertebrates					
Fishes	74		2	2	X
Amphibians	11		4	7	X
Reptiles	5		1	4	X
Birds	222	7	36	88	X
Mammals	64	2	15	12	X

Source: Estonian Biodiversity Strategy and Action Plan, Estonian Ministry of Environment and UNEP.

resources, equipment and budget, is not equipped for this and experience has shown that the state is not always an economically efficient manager. Some countries resolve the problem by having the state buy up private land in protected areas, but delegate the management often to the former owner under very favourable conditions, through long-term lease contracts. The advantages are that: (1) the state as the owner may determine the management conditions through the lease contract; (2) the state incurs no cost for the management of the land (a small income from the lease contracts can even be obtained); (3) the area keeps its population; and (4) from the sale of the land the private landowner obtains capital for investment to supplement his or her income.

In general, it is not advisable to compensate or pay subsidies for restrictions as this leads to landowner dependence. Instead of prohibiting and paying for "not doing", it is preferable to encourage landowners through incentive schemes to adopt alternative land use practices. Positive action might be encouraged by offering to reduce taxes on certified products produced. A private forest owner, for example, engaging voluntarily in close-to-nature forest management would pay less VAT on the certified products of the forest, providing a comparative advantage when marketing them. This is in the interest both of biodiversity conservation and of the public.

Payment to landowners to maintain semi-natural areas (e.g. paying for the mowing of meadows) is a short-term solution. In other countries, landowners not only have constitutionally based, guaranteed property rights, but also constitutionally based property obligations to manage the land according to officially registered land use (e.g. agriculture or grazing). In addition, it would be more advisable to support the extensive grazing of semi-natural meadows in combination with the production of organic meat for which the demand is increasing significantly due to the prevalence of livestock diseases in Europe.

With regard to "legal" and illegal biodiversity damage, a legally well-founded damage assessment and compensation scheme should be established and compensation payments used exclusively for investment in biodiversity compensation. For example, if an ecological corridor is interrupted or blocked through the building of infrastructure, compensation funds could be used to open up another corridor elsewhere.

5.5 Conclusions and recommendations

In general, it is an outstanding achievement that Estonia has been able to preserve its existing system of protected areas through the difficult period of political, economic and social transition.

Because the bulk of Estonian efforts, capacities and resources are presently concentrated on the EU accession process, the implementation of the Convention on Biological Diversity is not the highest priority. However, the state budget for 2001 for implementation of CBD has increased more that 10 times compared to 2000, and it is likely to continue to increase. In addition, certain moves towards accession (e.g. the harmonization of the national legal framework with the EU Aquis Communautaire and the implementation of the harmonized legal framework) are concrete steps towards CBD implementation.

Overall, the recommendations on biodiversity conservation and nature protection of the first Environmental Performance Review have been carried out. Remarkable progress has been made in the field of policy formation and the formulation of legislation, programmes and plans. Initiatives have been launched in the agriculture, forest and rural development sectors to tackle the issue of biodiversity management outside protected areas. The institutional capacity of the Nature Conservation Department of the Ministry has been considerably strengthened.

The challenge for Estonia now is to concretize the various strategies and policies aiming at biodiversity conservation. Success in the majority of areas identified as needing improvement in biodiversity management is dependent on the implementation of the policy and legal framework, the achievement of which will necessitate finding adequate financing.

Policy, strategy and legal framework for biodiversity management

The 1999 Estonia Biodiversity Strategy and Action Plan has now to become a genuine instrument for CBD implementation. All sectors concerned need to commit funds to its implementation, and an inter-sectoral coordinating mechanism is also required.

Recommendation 5.1:
The Office of the Prime Minister should set up an intersectoral Cooperation Fund for the Convention on Biological Diversity (CBD), supported by financial contributions from all relevant sectors. It should also establish a high-level intersectoral CBD Coordination Unit consisting of delegated staff from the various economic sectors to implement the 1999 National Biodiversity Strategy and Action Plan.

It is further recommended that the Government consider revising its legal framework in certain areas to tackle threats to biodiversity. Abandoned hydropower dams in rivers should be dismantled in the medium term and existing river dams, as well as new ones, should be equipped with fish ladders to enable the free migration of economically and ecologically valuable fish resources. Attention should be given to the question of whether landowners should be legally required to manage their land according to its registered land use category (a constitutionally based obligation in the interest of the public) to reduce the threat to valuable semi-natural areas in need of management.

The ENECONET could be the ideal tool to pursue nature conservation objectives through sectoral and multi-sectoral spatial strategic planning exercises. However, there is as yet no legal basis for the ENECONET. A positive development is that the preparation of detailed county development plans is going ahead within the framework of the EESTI 2010 plan (see Chapter 1). These county development plans also determine the "green layers" (i.e. green corridors and valuable landscapes reservations), for which the ENECONET should be used. Support to agro-environmental measures should be legally upgraded to become a separate agricultural support category in terms of the Rural Development and Agricultural Market Regulation Act, 2000.

Recommendation 5.2:
In the context of revising the act on nature protection and in order to eliminate certain threats to biodiversity, the Ministry of Environment should make proposals to:

- *Make it compulsory to equip operating and new river dams with fish ladders and, in the medium term, to dismantle abandoned hydropower dams;*
- *Encourage landowners to manage their land according to its registered land use category, in particular in valuable, semi-natural areas;*
- *Upgrade agro-environmental measures so that they become a separate agricultural support category in the Rural Development and Agricultural Market Regulation Act, 2000.*

Appropriate enforcement of these measures should be ensured and sufficient funds allocated accordingly.

Institutional framework for biodiversity management

In addition to the creation of an Inter-sectoral CBD Coordination Unit as recommended above (see Recommendation 3.1), the following improvements in the institutional framework should be considered:

- In relation to the additional tasks that will emerge from the implementation of EU accession, legal instruments on biodiversity conservation and nature protection, the institutional framework of nature conservation needs to be strengthened (2-3 positions at the Ministry of Environment for the agro-environmental programme and ecological networks; at least 1 position at each County Environment Department for NATURA 2000 implementation; and possibly IT consultancies for servicing computer systems and training staff at the County Environment Departments and at the 16 separate protected area administrations). Since the effective functioning of the Environmental Inspectorates seems to be hampered by staff and budget shortages, consideration could be given to the creation of a "Civil Ranger Service", consisting of volunteers willing to make an active contribution to the protection of the environment.
- The Ministry of Environment should consider establishing a clear and direct "line of command" in technical matters between the Nature Conservation Department at the Ministry of Environment, the nature conservation staff at the County Environment Departments, and the 16 separate protected area administrations.

Recommendation 5.3:
The Ministry of Environment should strengthen and rationalize its institutional framework for nature conservation, particularly with respect to ecological networks, agri-environmental issues and NATURA 2000 implementation. Sufficient trained staff at both the national level (MoE and protected area administrations) and the regional levels (County Environmental Departments) should be ensured. The creation of a volunteer "Civil Ranger Service" could also be considered to monitor compliance with legislation and regulations.

Financial support to biodiversity management and inter-sectoral involvement

The Government should generally improve the salary scales for civil servants (making them competitive with the private sector) to avoid a rapid turnover of professional staff, and its damaging effects on biodiversity management. The foregoing recommendations on reinforcing the institutional framework for biodiversity management have of course direct implications for the state budget and mention was made above of the importance of establishing an intersectoral CBD Cooperation Fund.

The following further recommendations are made in relation to financial support to biodiversity management:

- At present, most of the policies and plans have been worked out, and the legal framework and programmes for the management of biodiversity have been installed. The Government should now consider increasing financial support to the biodiversity management task itself, particularly in view of the increased workload resulting from the EU accession process. The financial support could be increased through a higher state budget allocation, better utilization of EU pre-accession programmes and through increasing the share of biodiversity funding from the Environment Investment Fund. Sufficient funds should be provided to speed up the preparation of management plans for protected areas, to revise the Agriculture and Rural Development Plan (SAPARD 2000–

2006) so as to begin the funding of agro-environmental measures earlier and with higher contributions than those presently planned. Budget allocations should be increased so that the staff of County Environment Departments can carry out the necessary fieldwork. Incentive, subsidy and compensation schemes should also be strengthened by systematically coordinating them with other sector ministries. Financing should be increased for important research and education issues, such as research on freshwater ecosystems and alternative farming methods and to develop educational resources on ecological farming including the revision of curricula, and the establishment of a medium-term support programme to overcome the fish migration problem caused by river dams. Alternative farming practices must be investigated and supported. The financial means available are considered insufficient for the research on and experimentation with alternative farming systems. Another shortcoming seems to be the lack of educational capacity at all levels with regard to alternative and ecological farming systems. A need to "train the trainers" was identified.

- The nature conservation staff of the Ministry of Environment, with its entire institutional framework, should undertake increased efforts to become a more important part of the Agriculture and Rural Development Programme (SAPARD 2000-2006) and agro-environmental programme. The opportunities to use future EU structural funds for rural development for nature conservation purposes now need to be determined.

Recommendation 5.4:
The Ministry of Environments should increase financial support to implement the biodiversity management tasks, including:

- *Preparation of management plans for protected areas;*
- *Introduction of agro-environmental measures; and*
- *Implementation of compensation schemes, and provision of support for important research and education issues (freshwater ecosystems and alternative farming systems and practices).*

Recommendation 5.5:
The nature conservation staff of the Ministry of Environment, both at national and regional levels, should work closely together with the Ministry of Agriculture for the implementing of the Agriculture and Rural Development Programme (SAPARD 2000 - 2006) and the Agri-Environment Programme.

Compensation Schemes

The protracted and cumbersome land exchange system should now be reviewed and modified to better serve pressing biodiversity conservation needs. The buying up of private land in protected areas, combined with long-term contractual management agreements with former owners, is certainly an option that should be seriously considered. Further, incentive schemes should be introduced, to encourage the development of sustainable alternative land management systems that could productively contribute to the national economy and at the same time fulfil biodiversity conservation objectives. In addition, a biodiversity damage assessment and compensation scheme should be developed.

Recommendation 5.6:
The Ministry of Environment should work out in partnership with other concerned ministries a biodiversity damage assessment and compensation scheme. Incentive systems should be developed to support the development of sustainable alternative land management patterns.

Chapter 6

FURTHER DEVELOPMENT OF ENVIRONMENTAL ECONOMIC INSTRUMENTS

6.1 Economic instruments

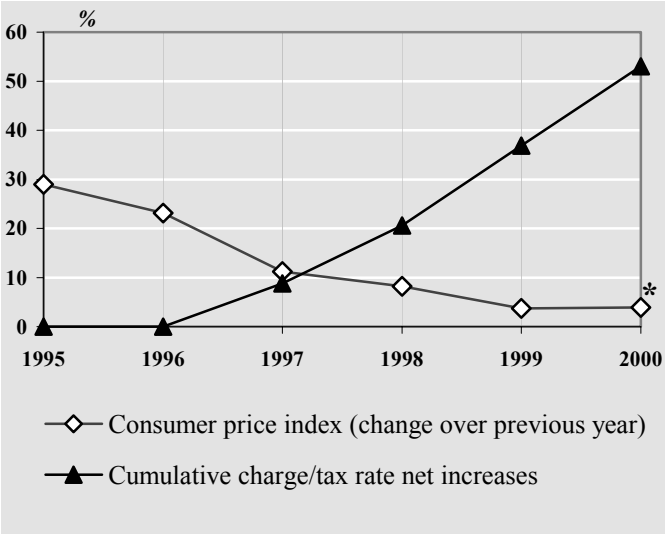
Developments in the period 1994-2000

The use of economic instruments for environmental policy-making has developed extensively in recent years, and, since 1995, the total revenue from pollution charges and environmental taxes has increased by 506% in current prices (see Table 6.1). The development of these instruments is characterized by:

- A significant increase in rates and charges. For instance, oil-shale mining charges were increased by 100% from 1997, resulting in a substantial increase of the mining charges revenue. In 1999, the water abstraction charges from surface water and upper layers of groundwater were increased by 100%. Until 1997, the waste deposit charges for oil-shale mining, energy production, and processing were only 10% of the rates for other wastes. From 1997 the oil-shale mining charge rate was gradually raised until, in early 2001, it reached almost 60% of the rates for other wastes. After 2001 the rates for mining and processing wastes will be increased by 20% per year, and for combustion waste by 5% per year;

- A significant change in "calculation volumes". During the period 1995-2000 there was a reduction in water consumption and therefore water abstraction of approximately 36%, most likely due to the installation of water meters. Mining volume for oil-shale excavation and therefore the volume of oil-shale waste was reduced by about 20%, thereby reducing the tax revenue as well. Air pollutants have decreased by 25%, and the total quantity of waste by 20%, all most likely due to changes in production patterns;

Figure 6.1: Global trends in environmental charge and tax rate, 1995-2000



Sources: Statistical Office of Estonia and Ministry of Environment, 2001.

Note:
* Expected data

Table 6.1: Overview of revenue developments, 1994-2000

US$ million

	1994	1995	1996	1997	1998	1999	2000	Increase 1994-2000 %
Total revenue	**2.534**	**4.659**	**5.727**	**9.432**	**10.881**	**11.938**	**15.347**	***506***
Pollution charges - Total	**1.170**	**2.006**	**2.335**	**3.341**	**4.318**	**4.813**	**7.670**	***555***
Water	0.403	0.807	0.926	1.108	1.063	1.409	1.227	*204*
Air	0.364	0.381	0.517	0.653	0.801	0.830	0.938	*158*
CO_2	0.000	0.000	0.000	0.000	0.000	0.000	2.307	...
Waste	0.403	0.818	0.892	1.580	2.455	2.574	3.199	*693*
Environmental taxes - Total	**1.364**	**2.653**	**3.392**	**6.091**	**6.563**	**7.125**	**7.676**	***463***
Mining	0.705	0.824	1.040	3.540	3.739	3.426	3.239	*360*
Water abstraction	0.659	1.489	1.932	2.153	2.267	3.199	3.886	*490*
Hunting	0.000	0.114	0.131	0.136	0.165	0.193	0.216	*90*
Fishing	0.000	0.170	0.233	0.199	0.290	0.210	0.273	*60*
Nature protection	0.000	0.057	0.057	0.063	0.102	0.097	0.063	*10*
Allocation				***as % of total***				
State budget	*41.9*	*38.9*	*0.0*	*0.0*	*0.0*	*65.8*	*72.9*	
Environmental fund	*46.2*	*46.2*	*66.0*	*59.2*	*61.5*	*0.0*	*0.0*	
Fishery capital	*0.0*	*3.7*	*4.1*	*2.1*	*2.7*	*0.0*	*0.0*	
Local budget	*11.9*	*11.2*	*31.0*	*38.7*	*35.4*	*34.2*	*27.1*	

Sources: Statistical Office of Estonia; Ministry of Environment, 2000.

- The introduction of new economic instruments such as CO_2 charges (in the year 2000), and a package excise charge (in 1997);
- The discontinuation of some charges such as the stumping fee regarding tree cutting.

There have been no significant changes in the methodologies for calculating fees and charges over the past five years. With regard to inflation adjustment, until 1997 all charges were adjusted yearly in accordance with the official price index. After 1997 this index regulation was discontinued and replaced by a general increase of about 20% yearly, which resulted in an important net overall revenue increase of 53% over the period 1997-2000 (see Figure 6.1). A more detailed analysis of the trends of the various economic instruments (Table 6.1) shows a particularly sharp increase in waste charges and water and mineral resources abstraction taxes.

The oil-shale industry has been an especially sensitive sector, as important economic and social implications are linked to the mining of the domestic resources of oil-shale. In order to avoid placing too tight constraints on this activity, the Government let it work under favourable conditions such as reduced water abstraction charges. In the year 2000, oil-shale production caused the discharging of 850,000 m^3 of ground water per day. The normal resource-use tax on underground water in that year was 0.35 EK/m^3. The resource tax for the usage of underground water of drinking quality for industrial purposes was 0.70 and most of the water being discharged from mining areas was originally of drinking water quality. However, for the oil-shale industry the above taxes have for many years been reduced – in the year 2000 to 0.04 EK/m^3 and in 2001 to 0.05 EK/m^3. This resulted from direct negotiations at high level between the Ministry of Environment and the Ministry of Economic Affairs.

Current economic instruments

The current economic instruments for implementing the environment policy and their respective rates are shown in Table 6.2. The revenues given cover all revenues, including non-compliance fees, within the category for the year 2000. The present instruments are similar to those used in other European countries since the Ministry of Environment has adapted these economic instruments to Estonia.

Table 6.2: Overview of selected current instruments, 2000

Instrument	Tax base	Tax rate*	Comments
Motor fuel taxes/charges	*Total revenue: US$ million **1 455***		
Excise tax	Unleaded gasoline, similar products	**3.5** EK/l	Leaded gasoline not allowed from 1/1/2000
	Diesel fuel	**3.04** EK/kg	
Air Emission charges	*Total revenue: US$ million **3 248** (including **2.308** for CO_2)*		
Emission	SO_2	**55.2** EK/t	Depending on location of point sources the rates are increased 1.2 - 2.5 times
	NO_x	**126.4** EK/t	
	Particulates	**55.2** EK/t	
	CO	**7.9** EK/t	
	Heavy metals	**1 995.5** EK/t	
	CO_2	**5.0** EK/t	
Waste related charges	*Total revenue: US$ million **3.27** (excluding local household charges)*		
Package excise tax	Glass and ceramics	**0.5** EK/p **(2** EK/l**)**	Exemption if min. 60% being reused
	Plastic	**1** EK/p **(2** EK/l**)**	
	Metal	**0.25** EK/p **(1** EK/l**)**	
Municipal waste user charges	Average for households	**150** EK/t	Paid to facility operating company
Waste disposal charge	Non-hazardous	**1.9** EK/t	Rates are increased up to 2 times depending on location and environment standard of site
	Mine waste	**0.9** EK/t	
	Hazardous (cat. IV)	**5.8** EK/t	
Water related charges	*Total revenue: US$ million **5.9** (excluding local water and sewage user charges)*		
Municipal water consumption charges	Average households	**4 - 8.30** EK/m^3	
	Average companies	**4 -16** EK/m^3	
Sewage treatment user charges	Average households	**3.82 - 16.64** EK/m^3	
	Average companies	**3.50 - 28.30** EK/m^3	
Effluent charge	BOD	**2 258** EK/t	
	Suspended solids	**1 142** EK/t	
	Phosphorus	**3 401** EK/t	
	Nitrogen	**2 045** EK/t	
Water abstraction charges	Surface (drinking)	**0.12-0.25** EK/m^3	
	Groundwater (drinking)	**0.25-0.40** EK/m^3	
Natural resource and mining	*Total revenue: US$ million **3.97***		
Mining charges/taxes	Oil shale	**4** EK/t	
	Construction sand	**4.7** EK/t	

Source: Ministry of Environment, 2000.

Note:
* Due to the low rates in EK, the rates are not converted into US$. Conversation rate is EK 17.60 = 1 US$.

Incentives

A number of incentives are currently in place for encouraging environmental investments. They are:

- Tax allowances: Accelerated depreciation for environmentally related buildings and constructions;
- VAT allowances: The following goods are totally exempted of VAT (0%): (a) Environmental equipment and technology imported by the Ministry of Environment within the framework of foreign aid programmes, and (b) goods (including environmentally related goods) imported for

use in projects financed by the Estonian Government or given as state foreign aid, and (c) services, concerning hazardous waste handling (5% VAT);

- Investment grants: These are channelled via the Environmental Investment Centre (EIC), previously the National Environmental Fund, to investments that are selected in the NEAP priorities;
- Substitution of pollution charges*:* The 1999 Act on Pollution Charges (Chapter 5) allows enterprises, including municipal enterprises, to substitute the financing of activities for pollution charges if the polluter:
  - (i) Implements environmental protection measures that ensure the reduction of pollutants or waste during the course of three years by not less than 25% in comparison with the last accounting year of the period prior to the implementation of such measures;
  - (ii) Participates in financing national or regional environmental programmes or projects that have been approved by the Ministry of Environment. The Act also allows a private co-financing enterprise to offset its charges against the co-financing.

Substitution schemes

The substitution scheme was instituted in 1991 as an incentive support to environmental investments. The substitution or reduction in pollution charges cannot exceed the actual investment or financing made by the polluter. If the investment amount exceeds the amount paid in pollution charges in the year prior to the three-year period, the charges paid can be offset over the three-year period. The arrangement shall be based on an agreement with the Ministry of Environment, specifying the intended investments, the implementing schedule and sanctions in case the project is not completed. In case the project defaults, the substitution received shall be repaid to the state budget. However, due to the generally poor financial situation it is difficult for enterprises to raise capital for the investments – and thereby be able to deduct pollution charges. Consequently the substitution amounts are still relatively low (see Table 6.3 and Box 6.1). After the announcement by the Ministry of Environment of the increases in charges from the beginning of 2001 onwards, the number of applications from industries for the substitution scheme has increased.

Table 6.3: Amounts of charges substituted by investments for environmental protection, 1994-2000

	Agreements with enterprises	Substitution amount	
		EK	EURO
	Number	*(million)*	
1994-1996	1*	27.70	1.78
1996	5	2.60	0.17
1997	7	4.80	0.31
1998	4	4.70	0.30
1999	6	3.30	0.21
2000	9	10.50	0.67

Source: Ministry of Environment, 2000.

Note:
* Kunda Nordic Cement

Fines

Table 6.4 summarizes the number of fines and violations —to be paid by physical persons— issued by the inspectorates and collected amounts for the years 1999 and 2000. The present maximum fines per violation are US$ 600 (EK 10,200) for wastewater fines and US$ 450 (EK 7,650) for waste- and air-related fines. All revenues from fines and notifications go directly to the state budget for general budgetary purposes. The level of fines appears to be too low to be of real concern to violating companies.

The CO_2 charge and the energy sector

In addition to the traditional air emission charges on SO_2 and NOx, a direct CO_2 charge was introduced in the year 2000, at a rate of US$ 0.28/ton. The expansion and refining of the CO_2 charge will be a priority for the Ministry of Environment in coming years. In Estonia, energy is a prime factor in the national economy and has complex and mixed economic, social and environmental effects (see also Chapter 7). The development of the CO_2 charge structure needs the full co-operation of all involved sector ministries, even though the Ministry of Environment may be the leading actor.

Table 6.4: Environmental fines and violations, 1999 and 2000

	1999		2000	
	Fines and violations	Penalties	Fines and violations	Penalties
	Number	*EK*	*Number*	*EK*
Total	**7,743**	**1,669,476**	**12,365**	**2,412,292**
(in Euro)		***107,018***		***154,634***
Water protection	882	70,923	858	208,438
Air pollution from motor transport	7	1,394	-	-
Other air protection	102	4,521	132	50,142
Noise	6	-	8	-
Radioactive pollution	-	-	32	-
Waste handling	1,761	89,602	2,143	269,869
Handling of hazardous waste	30	6,765	116	33,082
Distribution of land	3	410	13	1,120
Soil protection	22	650	31	4,651
Earth crust protection	15	2,665	86	24,134
Forest – fire protection	11	3,250	31	1,585
Forest violations	1,779	461,813	3,150	831,436
Flora	161	12,311	88	7,407
Hunting	154	5,097	296	4,757
Fishing	2,238	849,225	4,313	838,212
Fauna	20	2,856	68	8,698
Protected nature objects	49	3,759	95	22,170
Small vessels	207	73,548	-	-
Packaging act	-	-	12	-
Construction and planning	296	14,814	669	45,780

Source: Estonian Environmental Inspectorate, 2000.

6.2 Environmental expenditures and financing

Environmental investments financed from national sources

Until the end of 1999 all environmental investments were managed and implemented via the National Environment Fund under the Ministry of Environment. All pollution fees and centralized environmental charges were transferred directly to the environment fund (see Table 6.1). The Environmental Investment Centre under the Ministry of Finance, in co-operation with the Ministry of Environment, now manages these funds and other state funding for environmental investments listed in the Public Investment Programme (PIP).

In June 1999, Parliament passed the Act on the Use of Revenue Accruing from Exploitation of the Environment. According to the Act, all of these funds shall be transferred to the state budget. Money is to be spent for environmental protection, "regenerating natural resources, preserving the state of the environment and repairing environmental damage" (see Box 6.2). The share of pollution charges and environmental taxes allocated to local budgets is not always earmarked for environmental purposes and is often absorbed in the local budgets for general purposes.

Table 6.5 shows the environmental expenditures in the period 1996 to 2001, i.e.in the period 1996-1999 by the National Environment Fund and from 2000 onwards by the Environmental Investment Centre. The bulk of the expenditures has been spent firstly on water protection and, starting from 1998, on waste management. In 2000, forestry, fishing and nature protection also received an appreciable amount of financing.

Table 6.6 summarizes the sources of funding for the National Environment Fund and the Environmental Investment Centre. The Table shows a significant decline in project funding in 1999. Part of this was caused by changes of accounting principles, the handling of outstanding

Box 6.1: Breakdown of environmental revenues

Type/source of income	Share going to the general state budget	Share earmarked for environment purposes	Share for regional / local / other budgets
Pollution charges		100%	
Packaging excise duties	50%	50%	
Fees for mining rights in water bodies and economic zones		100%	
Fees for mining rights at deposits of national importance		30%	70%
Fees for mining rights at deposits of local importance			100%
Fee for special use of water from transboundary water bodies		100%	
Fees for special use of water from other bodies and groundwater		50%	50%
Hunting rent		80%	20%
Income for the right of hunting for game		100%	
Fee for the right of fishing		100%	
Fees for felling in state forests	22%	4%	74%
Income from timber in state forests	22%	4%	74%
Compensation for environmental damage *		100%	

Source: Act on Pollution Charges, 1999. Ministry of Environment 2001

Note:
* Compensation for actual environmental damage is (normally) decided by the court, on case by case basis. The damages awarded are generally only 10% of the true amounts as estimated by the inspectorates.
In year 2000 the compensations amounted to EK 1.5 m

fund balances and the ongoing discussions to restructure the fund into an investment centre under the Ministry of Finance. Previously, all funds were directly administered by the Fund, including the management of yearly balances. Today all financing goes from the state budget to the Environmental Investment Centre (EIC) and is directly allocated to individual approved projects. The expected funds and sources for projects in 2000 and 2001 are indicative.

The Environmental Investment Centre

The Environmental Investment Centre (EIC) was established as a foundation in mid-2000 and is under the Ministry of Finance. The foundation is a legal and autonomous institution led by the Management Board. According to its statutes the Centre has a wide range of objectives related to projects of environmental protection, the liquidation of environmental damage caused in particular by past pollution and use of natural resources, the recovery of waste, the restoration of the environment, environmental monitoring and environmental research.

Projects are selected according to (at present ten) priority areas, in principle reflecting the projects and priorities in the 1998 NEAP (see Chapter 1). Project applications are submitted by the applicants (mostly municipalities) to the specific sectors within the Ministry of Environment, in accordance with the ten priority areas. Expert groups, consisting of experts from the Ministry of Environment, other Ministries, and NGO's, assess the applications and draft the financing programmes. Programmes approved by the Council of EIC are submitted to the Environmental Investment Centre for financing within the sub-budgets allocated to each priority area. The fund statutes also allow for investment loans but, so far, all support has been in the form of grants.

Due to the dynamic developments in the transition phase and the increased focus on EU accession, a number of priorities have been shifted de facto (for instance from air to water), and the original NEAP priorities have been changed. Though detailed, the 1998 NEAP does not include targets, useful criteria that are required for project follow-up. The monitoring of the progress and success of projects appear to be measured by the quantity of money spent (e.g. if 50% is disbursed, 50% of the project has been achieved). In the newly approved NEAP this situation seem to have changed and, wherever quantifiable, expected results are specified.

Table 6.5: Environmental expenditures from National Environmental Fund and Environmental Investment Centre, 1996-2000

		National Environmental Fund				Environmental Investment Center
	1994*	1996	1997	1998	1999	2000
Total expenditures	**1,540**	**4,879**	**8,651**	**9,184**	**6,220**	**12,054**
Priority areas						
1. Earth crust	-	446	146	690	643	615
2. Environment awareness	-	138	310	353	293	866
3. Water protection	713	1,567	3,255	3,211	1,234	3,979
4. Air protection	72	129	155	162	170	367
5. Technology	14	-	93	74	27	239
6. Waste management	152	669	622	1,671	849	2,505
7. Nature protection	105	258	561	549	227	1,117
8. Sustainable development	-	-	-	-	87	-
9. Forestry	-	-	-	-	407	1,193
10. Hunting	16	93	124	119	71	176
11. Fishing	-	-	-	-	-	736
Other areas						
Small county program	-	-	-	-	-	213
LIFE programme	-	-	-	-	-	-
Buildings	-	452	1,274	1,009	511	-
Privatisation	-	568	-	-	-	-
Supervision	134	305	1,346	628	408	49
Administrative expenses	19	54	329	217	160	-
Reserve	145	85	118	-	-	-
Other areas	170	-	-	294	1,087	-
Balance next year	-	114	318	208	46	-

Source: Ministry of Environment and Environmental Investment Center, 2001.

Note:
* Figures from 1994 are from *EPR Estonia 1996* (table 7.3)

Funding from European Union programmes

EU Phare National and Cross Border Cooperation programmes (Baltic Sea) are managed by the Investment Department of the Ministry of Environment that is the project implementation unit. The overall responsibility for the new EU programme ISPA (Instrument for Structural Policies for Pre-Accession) lies with the Central Financing and Contracting Unit (CFCU) within the Ministry of Finance. The ISPA programme is still in the programming and approval phase vis-à-vis the EU Commission. Following the normal EU procedure, the line Ministry (MoE) will be the physical "project implementing agency" for ISPA environment projects, with the Investment Department of the MoE as the executing organization, reporting to the CFCU. ISPA financing began in the year 2000, and focuses on water, waste issues and sewage collection. Table 6.7 summarizes past EU financing under Phare and the expected ISPA support.

All international assistance is coordinated by the Ministry of Finance. It is understood that at present Estonia has no funding agreements with international financing institutions but considerable support, primarily technical assistance, is being received from bilateral donors.

Table 6.6: Revenue Sources from National Environmental Fund and Environmental Investment Centre, 1994-2000

US$ million, current values

	1994*	1996	1997	1998	1999**	2000
Pollution charges/tax	1,171	2,426	3,341	4,108	4,807	7,670
Hunting charges	90	131	136	165	193	216
Fishing charges	-	-	-	-	102	273
Mineral resource charges	-	312	987	1,057	977	773
Water abstraction charges	-	966	1,080	1,250	1,000	2,257
Revenue from privatisation	-	625	1,682	1,432	1,449	-
Packaging excise tax	-	-	204	114	57	60
Other	28	273	62	1,062	500	37
Forestry	-	-	-	-	557	14
Total revenue	1,289	4,733	7,492	9,188	9,642	11,300

Source: Ministry of Environment and Environmental Investment Center, 2001.

Note:
* Figures from 1994 are from *EPR Estonia 1996* (Table 7.3)
** 1999 Environmental Fund and State Budget together

Table 6.7: Environmental investments financed by European Union, 1994-2001

US$ million, current values

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total	**1,345**	**3,797**	**2,298**	**5,028**	**2,226**	**14,072**	**15,187**	**2,544**	**5,437**
Phare									
CBC	1,345	2,500	2,298	-	2,226	-	-	-	-
Infrastructure	-	1,297	-	-	-	-	-	-	-
Water	-	-	-	3,850	-	-	-	-	-
Air	-	-	-	1,178	-	-	-	-	-
ISPA									
Waste water	-	-	-	-	-	6,915	-	1,729	-
Water	-	-	-	-	-	-	4,451	-	-
Waste	-	-	-	-	-	3,263	10,736	815	4,464
Other	-	-	-	-	-	3,894	-	-	973

Source: Ministry of Environment and Environmental Investment Center, 2001.

6.3 Economic instruments and their efficiency

Political and economic context

Design and development of economic instruments are only partly an administrative process. When designing an economic instrument, priority should first be given to setting or improving and clarifying the political orientation for implementing the Government's economic strategies.

In addition to the political guidelines, there are other elements to be taken into account for the successful design and operation of economic instruments, in particular design philosophy, information basis, revenue collection structure, and monitoring. The future development of economic instruments to improve the environment should not be seen as simply an administrative process within the Ministry of the Environment. It is also a matter of strategies, policies and guidelines decided and formulated at the political level. For such a complex issue, no external economist can advise on how to implement the country's economic policies and suggest a set of fees and charges. This should be the result of a concerted analysis and series of actions by teams of specialists within the country

(see Box 6.2) on general considerations for the designing of new environmental economic instruments). The presence of professionals in this field within the Ministry of Environment would certainly be an asset for formulating future economic instruments.

The aim of the economic instruments as direct tools for implementing the economic policies to change environmental behaviour in Estonia is somewhat unclear. Due to the very limited capacity for economic analysis, in particular in the Ministry of Environment, the monitoring of the effects and impact of the instruments is limited. The setting of charges and taxes appears to have been based more on "presumed affordability" by enterprises and public consumers than on a minimum/maximum cost-percentage of income. In cases of increases, the discussion has merely been on the incremental increase of the charge, not on the overall cost effect for the polluter or consumer. A direct effect of the limited economic capacity is also that considerable time is required to deal with and solve problems from industry. This could be avoided if the Ministry of Environment had more capacity for research and modelling before implementing increased charges or changes in existing economic instruments.

Further developments in pollution charges and environmental taxes expected in Estonia include the:

- Continued refining of the CO_2 tax;
- Development of a few new economic instruments, e.g. for car tires, batteries and packaging;
- Increase of the current rates to raise revenue.

In general, European countries are shifting environmental taxation towards energy and transport and using economic instruments as a means for industry restructuring, increased competitiveness, new investment capital and incentives for new technologies. There is a broadening of the environmental tax base to ensure a widening of the polluter-pays principle and internalization of pollution costs. There is also a relative move from labour and social taxation toward taxation of non-renewable resources. These shifts are affecting consumer behaviour and raising awareness of new environmental standards.

Effects on target groups

There are a few issues that are well known by the Estonian authorities but that nevertheless still require further efforts: (a) the situation of the oil-shale industry, with its social implications, and (b) the future structuring of the complex CO_2 tax. The oil-shale mining and power production industry appears to benefit from a preferential treatment due to a number of socio-economic factors. It appears that environmental concerns need to be more coordinated with other ministries to decide the direction of future economic instruments in these industries. On the other hand, creating new taxes or merely continuing to raise fees is not advisable. Most likely this would lead to an increased confrontation with industry while the fees remain relatively small, in any case too small to be active instruments in implementing the economic policies.

Environmental taxes and charges should also have an industrial restructuring purpose, but this effect appears very limited in Estonia so far. Industrial enterprises are part of society and co-responsible for national environmental improvements. But in Estonia, the tendency of industry is to consider that everything outside of its own premises is the Government's problem. Although this is a key factor when considering future environmental instruments, interaction with industry is rather limited. In addition, the difficult socio-economic circumstances faced by the oil shale industry have often resulted in tax reductions. A major problem is that the available data and information on the true profitability of enterprises are scarce (there is no business tax in Estonia), giving no useful information or documentation on the enterprises' ability to absorb environmental cost, a key element to orient the shaping of an efficient economic instrument. In other countries the excise and tax authorities have detailed accounting figures (including data on industrial structures and production patterns) enabling them to monitor and forecast the effects of economic instruments. These standardized information requirements on industry for monitoring, statistical and modelling purposes are lacking at present in Estonia. The database on permits that is being developed in the Ministry of Environment will be a useful contribution in this regard.

Box 6.2: General considerations for the designing of new environmental economic instruments

The design phase of an economic instrument has a number of considerations, mainly of a technical nature. The most important elements to be taken into account are:

- The chosen economic instrument and its design must be consistent with the objectives and principles of the economic policies and strategies: Precisely what is the economic instrument intended to achieve? If recycling of a given waste-product is the aim, the charge must be sufficiently high to ensure a corresponding public response. Thus the tax base should be directly related to the targeted aim. Inclusion of additional hidden objectives (often political) should particularly be avoided.
- The design and rates must correspond to the intended distributional effect as regards households and industry or different income groups, with no harmful effects on special groups, or regional/local considerations. Also, it must be considered that positive effects for some groups may be negative for others.
- The taxing structure, whether linear, progressive or regressive.
- The point of application of the economic instrument, at either the production or consumption stage (or both) in the production cycle: simple end-of-pipe or integrated solutions (BAT, IPPC), the latter being important to encourage new technology.
- The design should be as simple as possible, both technically and administratively, for understanding, implementation, administration, collection and handling of sanctions. This also includes the administrative, compliance and monitoring measures at the polluter and consumer level. Is the proper monitoring technology available? Can emissions be properly and correctly quantified? In this connection it should be considered that technological advances might influence current definitions (e.g. regarding emissions).

- Economic instruments for environmental improvement should be incisive, not only in word but also by having sufficiently high rates to push through an intended change. Incentives in the form of subsidies should be time-limited and specifically designed to encourage alternative input and technology. If insufficient, the support should be removed, thus forcing assimilation of the true cost of pollution or limiting the use of the resource, in turn forcing a reduction of the pollution in question. Efforts should be made to balance the incentive value for polluters against the incremental cost to them of abating the pollution.

Many economic instruments have both a regulatory and a fiscal objective, which require balancing when defining rates.

While there is no business tax in Estonia, the social and labour costs and taxes are relatively high, impacting on the industry's ability and incentive to restructure for the needs of the future. It is hard for companies to set aside sufficient profit to restructure their business so as to become more competitive, including by the application of new technologies and conversion to alternative (renewable) raw materials. Therefore, a shifting of the taxing of enterprises from taxing of labour towards taxing of resource-use and increased taxing of non-renewable resources would enable companies to better undertake technological changes. The emphasis of the Ministry of Environment's activities related to economic instruments is still primarily placed on environmental management and only to a very limited extent on restructuring production and industrial structures to meet future problems, within both the national and the future EU contexts.

Substitution of pollution charges

The process of making agreements under the "Substitution of pollution charges" scheme appears somewhat complicated in practice, and the efficiency of the agreements questionable. Feedback from local inspectorate offices indicates that the actual reductions in pollution discharges may in fact often be a consequence of previously planned restructuring of the enterprise's production system and not of the agreed investments. Normal market conditions require dynamic changes in production patterns and volumes. Moreover, the paying back of past substitutions, in cases where the agreement is not properly or completely implemented in time, may be difficult to enforce. For instance, there is a risk that an enterprise may go bankrupt, thus being unable to complete the investments, and will never pay back the amount corresponding to the granted substitution.

The focus therefore, should be on improving the framework and conditions for a successful implementation of the instruments. In particular:

- The commitment of the Government should be clear: currently, indications are that while the administrative levels are struggling with increasing fees and taxes, the political signals and directions are unclear (e.g. the oil-shale mining problems).
- The environmental acceptability by industry should be improved and a better partnership with industry and business organizations developed.
- The collection of data and information and control and compliance mechanisms should be improved: sufficient information should be obtained and shared among authorities.

- Co-ordination among actors should be improved, in particular between ministry sectors (i.e. the persons within the Ministry of Environment ensuring the connection with the other ministries regarding agriculture, transport, energy, etc.), and sector ministries (in particular the Ministries of Transport and of Energy).
- Simple design of economic instruments should be ensured and transparency increased, so that polluters and consumers understand and accept their responsibilities; for instance, the ability to monitor and control should be improved.
- Tax laws should clearly state the problems and the specific objectives to be addressed, and specify the authorities, responsibilities and resources to implement and operate the act.
- Tax laws should be standardized and have a reasonably uniform structure, basic design and reporting standards, uniform definitions of terms used, and coordination of sanction procedures.

6.4 Conclusions and recommendations

Over the past decade Estonia has been successful in developing the basic and necessary framework and structures regarding economic instruments and financing as seen from the environmental point of view. An environment fund has been created and economic instruments modernized and developed. The development and diversification of economic instruments have been significant, resulting in a comprehensive and consistent range of charges and taxes. Many attempts have also been made to develop advanced economic instruments (CO_2 tax) and economic incentives (substitution schemes). At present, the challenge for Estonia is less a matter of introducing new economic instruments, and more of ensuring that their implementation and use are as efficient as possible. Toward this end, both the design of the economic instruments and their management and related institutional arrangements play an important role.

Economic instruments are not just static tools to be designed administratively. Every environmental economic instrument has a political impact on and implications for the economic sectors. In addition to the political considerations, there are other elements involved in the successful design and operation of economic instruments, including design philosophy, the information basis, revenue collection structure and monitoring, that should also be taken into account. It appears that at present the Ministry of Environment focuses too much on the technical issues relating to these economic instruments. The aim of the instruments as direct tools for implementing the economic policies to change environmental behaviour is therefore somewhat unclear. Due to the very limited MoE capacity for economic analysis, monitoring of the effects and impact of the economic instruments is limited. In addition, environmental taxes and charges should have an industrial restructuring purpose, while so far in Estonia this effect appears very limited. Co-ordination among actors should be improved, in particular between ministry sectors and sector ministries, since environmental economic instruments such as CO_2 tax or taxes on heavily polluting fuel may have strong effects on other economic sectors.

In 1996, the first EPR recommended a strengthening of the economic analytical capacity within the Ministry of Environment (see Annex 1 on the status of implementation of the 1995 EPR recommendations). Although it is a very basic requirement, this recommendation has not been implemented. During the past five years the basic framework of instruments was completed. Now, for all the reasons mentioned above, the need for an increased economic capacity within the Ministry of Environment is crucial. It is also advisable that the Ministry of Environment establish twinning arrangements with other countries to transfer experience of use in establishing and structuring an economic section within the ministry.

Recommendation 6.1:
The Ministry of Environment should strengthen its capacities for the management of environmental economic instruments. It should in particular become able to:

- *Research and evaluate relevant experiences with environmental policies and economic instruments from other countries;*
- *Establish affordability models for forecasting, at the design stage, the possible effects of the instruments;*
- *Evaluate the existing fees and charges and, based on this evaluation, propose the introduction of new fees and charges with documentation explaining the need and purpose.*

The Ministry of Environment should also establish twinning arrangements with other countries to transfer experience on the above issues.

Different institutions administer different funding sources (Investment Department of the Ministry of Environment, Environmental Investment Centre of the Ministry of Finance, and sectoral departments in other ministries). Their interaction appears based on individual relationships rather than on a transparent, competitive selection process.

At present, all applications for environmental projects (on waste, water, air, biodiversity, clean technology, etc.) are submitted for evaluation directly to the individual technical sectors that are internal to the Ministry of Environment. These departments —together with experts from County Environmental Departments, other ministries, and NGO's— select what they consider the best projects and forward them for financing to the EIC. Neither the Investment Department of the Ministry of Environment nor the Environmental Investment Centre of the Ministry of Finance has the resources required for professional project handling, from the point of call-for-application throughout the project cycle until completed implementation and ex-post evaluation. In the near future, the EU requirements for ISPA project management will require a considerable strengthening of the overall project management capacities. The sharing of responsibilities along the environmental project management chain should be reconsidered.

Currently, all applicants for project support are required to submit full and detailed documentation and description of their project (including feasibility studies, technical specifications, environmental permits, etc.) at the time of their initial application. Consequently, to have a real chance of being selected, professional applications generally require the expensive assistance of external consultants. Project preparation is therefore a costly issue for the project proponent, often a municipality with limited financial resources, and the ratio of rejected projects is very large (80-90%) with most preparation costs then being lost.

A two-step approach should be developed in Estonia as is applied in most CEEC countries to save effort and money. The management board of the EIC should define the overall environmental fund criteria regarding eligible types of projects and priorities. The financial feasibility should initially be expressed by the project's IRR and, in a first step, the applicant should submit only the elements needed to take a basic decision on eligibility and the possibility of funding. This is sufficient to rank the project among the other applications competing for the same funds. A further step may then include elaborate technical and financial statements to confirm the first IRR.

Recommendation 6.2:
The Environmental Investment Centre should manage all activities related to investment funding (in accordance with its existing statutes). The Environmental Investment Centre should utilize technical expertise inside and outside the Ministry of Environment and be responsible for assessing projects for presentation in accordance with criteria and priorities decided by the management board and in line with the internationally accepted practices. The Environmental Investment Centre should modify the application process and the application forms for environmental projects by dividing them into two steps:

- *Step 1 (or project fiche): containing limited information sufficient to decide if the project is eligible within the year's priorities (both main and sub-criteria), if co-financing is secured, if the implementation preparation and organization are in place, as well as an assessment of the overall criteria for environmental effects and financial feasibility.*
- *Step 2 (or detailed documentation): provided that step 1 is successful, the applicant will be requested to submit detailed documentation.*

The success of any instrument, including economic instruments, depends on the inspectorate's ability to exercise efficient control over and monitoring of its implementation. Inspectorates should be consulted prior to the issuing of permits to ensure that the permit includes a monitoring programme and parameters that are in fact controllable. At present in Estonia the inspectorate receives no information on the content of permits (except upon specific written request), the permitted pollution volumes, or the charges collected as this information is managed by the County Environmental Departments. These departments are also aware of complaints or sanctions against enterprises, information that is not automatically passed on to the inspectorate. In general, both the environmental departments and the local inspectorate offices have very limited background information on companies.

The system of complaints and follow-up between the environmental departments and the inspectorates needs to be co-ordinated and, preferably, a standardized system implemented. The new joint info-base under development could prove to be an asset in solving this problem (see

also Chapters 1, 3 and 7 and Recommendations 1.2 and 1.4).

Chapter 7

SECTORAL INTEGRATION AND PARTNERSHIP WITH THE PRIVATE SECTOR

7.1 Sectoral pressure on the environment

An overall decline in Estonian economic performance and industrial output at the beginning of the 1990s resulted in a decrease of pressure on the environment. In the past five years, however, the economic situation of Estonia has stabilized, but environmental problems still prevail, many of them related to specific sectors such as agriculture, energy production and transport.

Environmental pressure from the transport sector

In 1999, the share of transport (including storage and communication) in the GDP was 13.2%, an important sector in the Estonian economy. The environmental pressure from the transport sector results mainly from emissions of CO, VOC, Lead, NO_x and SO_2 (see Table 7.1). The fragmentation of landscapes and ecosystems by main road and railway infrastructures is limited. Road density is among the lowest in Europe (38 km per 100 km^2 in 2000), and no new major highways are planned in the future. In 1998, the transport sector accounted for 91% of CO emissions, 87% of Volatile Organic Pollutants emissions and 68% of NO_x emissions into the air (see Table 2.1). Contributions of SO_2 emissions from the transport sector are relatively limited (8% in 1998), while the total emissions of lead from the transport sector decreased from 149 tons in 1990 to 11 tons in 1998 due to the gradual phasing out of leaded petrol. Since January 2000, only unleaded petrol is sold in Estonia.

The number of motor vehicles increased by 7% annually on average in the period 1992-1999 leading to an increase in total emissions. The number of private cars increased from 261,086 in 1991 to 458,700 in 1999, a trend accompanied by a decrease in the usage of public transport. Seventy-five per cent of the cars, however, are older than 10 years (see Box 7.1). The modal split of passenger kilometres in 1999 was estimated to be 67.5% for private cars and 32.5% for public transport vehicles. It is expected that by 2010 the ratio will be 80:20 in favour of car transport.

Environmental pressure from the energy sector

Energy production is by far the most polluting sector in Estonia. Over 90% of electricity is generated from oil shale, a fossil fuel mined in Estonia. Oil shale is a solid fuel with a high sulphur content and high ash residue. The Baltic Power Plant and the Estonian Power Plant (often referred to as the Narva Power Plants), both situated in the Ida-Virumaa County in the east on the Baltic coast,

Table 7.1: Emissions of the main pollutants from transport, 1992-1999

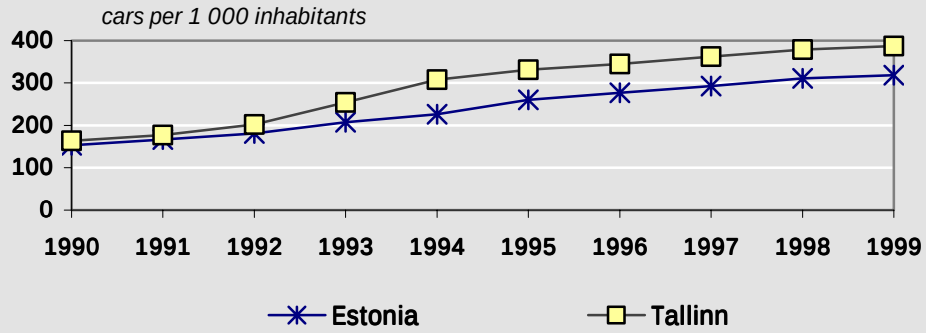
	1990	1995	1996	1997	1998	1999
CO *(thousand tons)*	374.2	215.1	238.3	256.1	254.3	..
VOC *(thousand tons)*	70.4	41	44.6	47.6	48	48.5
NO_x *(thousand tons)*	45.1	27.2	28.1	29.2	31.1	31.7
SO_x * *(thousand tons)*	13.1	8.3	8	8.0	9.2	9.4
Pb *(tons)*	149.1	39.6	30.3	21.9	10.6	..

Source: Ministry of Environment, 2000.

* as SO_2

Box 7.1: Transport Problems in Tallinn

The capital Tallinn has the worst quality of air compared to other cities in Estonia. Pollution from transport makes up for 90% of all air pollution in Tallinn. Car ownership reached 373 cars per 1000 inhabitants in Tallinn compared to the national averag



Source : Ministry of Environment, 2000.

are the single most dominant sources, contributing respectively 37% and 54% of the solid particles emitted by companies in Estonia in 1998, and 29% and 42% of SO_2 emissions (see Table 7.2). The Baltic Thermal Power Plant, with a capacity of 1,610 MW, ranks among the largest oil-shale heated thermal power plants in the world. The capacity of the Estonian Thermal Power Plant is 1,390 MW. The power plants, built in the 1960s and 1970s, were designed to produce electricity for Russia, Latvia and Estonia. Due to the economic decline and a collapse of the export market of electricity to Russia and Latvia, both power plants work far below their capacity. Oil shale produces large amounts of ash waste, and the waste generated by the two power plants in 1999 amounted to 4.501 thousand tons, which is deposited in two large ash ponds of 490 ha and 810 ha. One 570 ha ash pond of the Baltic Power Plant is already out of operation. The ash is transported to the ponds by means of water that becomes very alkaline, and water overflow has created many problems. Since 1999 the water has been treated in a new waste-water treatment plant.

Table 7.2: Emissions from the Baltic and Estonian thermal power plants, 1996-1999

thousand tons

	1996	1997	1998	1999
Solid particles	73.3	65.7	59.2	60.5
SO_2	78.3	74.6	67.4	67.0

Source: Ministry of Environment, 2000.

Environmental pressure from the agricultural sector

Agriculture is mainly practised for subsistence reasons. In the year 2000 there were only 680 commercial agricultural enterprises compared with over 50,000 private farms. The share of the agricultural sector (including hunting) in GDP has been declining from 16.6% in 1990 to 8.1% in 1995 and 5.8% in 1999. Food products, however, remain the second largest export commodity. In 1997, 16.3% of total exports were agricultural. Due to climatic and soil conditions agriculture has concentrated mainly on pig breeding and dairy production. Since 1990, overall environmental pressure from the agriculture sector has decreased, mainly due to decreased output. In 1999 the total cattle herd had declined to only 33%, the number of pigs to 26% and poultry to 30% of the 1988 figures. The consumption of mineral fertilizers shows the same trend. In 1999 the usage of nitrogen was approximately 20% of the amount used in 1988. The agricultural sector contributed 30% of all CH_4 emissions, and 30% of all N_2O emissions in Estonia in 1998. The use of fertilizers and the

mismanagement of manure lead to the eutrophication of surface waters and contribute to the enhanced greenhouse effect. Intensive agricultural practices, applied before the privatization of the 1990s, have also led to the loss of traditional landscape structures.

Environmental pressure from other sectors

The agriculture, transport and energy sectors are three of the main polluting sectors in Estonia. Although not always by means of pollution, other sectors such as tourism, forestry, fishery and industry also make an impact on the environment. Environmental pressure from the industrial sector is relatively limited. Approximately 140 enterprises – consisting of 56 industrial enterprises and 84 commercial farms and waste landfills – will be subject to the implementation of the Integrated Pollution Prevention and Control Directive (96/61) of the European Union. The main branches of industry are chemicals, food processing and construction materials.

7.2 Sectoral integration

Strategic initiatives for sectoral integration

The elaboration of the National Environmental Strategy (NES) is considered to be one of the first steps towards sustainable development. Because of its comprehensive approach, the NES is the main document bringing together the environmental problems caused by the various sectors. (See Box 1.1) and will be evaluated in 2002. The NES was elaborated in 1998 by a National Environmental Action Plan, which set short-term (three years), medium- and long-term priority goals. The goals of 658 priority projects were worked out with the organizations responsible, and include estimated costs (including the sources and status of funding) and human resource requirements. Among the organizations involved are relevant ministries, including the Ministry of Economic Affairs, Ministry of Transport and Communications and the Ministry of Agriculture.

The Convention on the Protection of the Marine Environment of the Baltic Sea Area, to which Estonia is party, focuses on the causes of environmental problems in the Baltic Sea area and is therefore an important instrument for the various sectors contributing to these problems. In 1992, the Baltic Sea Joint Comprehensive Environmental Action Plan under the Convention identified 13 hot spots in Estonia. These hot spots are sites or areas of high pollution emissions or discharges. Of the ten remaining hot spots at the beginning of 2001, two are the Narva Power Plants and a third is a pulp and paper factory. Only after completion of the investments as planned by 2009 is it expected that the Narva Power Plants can be deleted from the list of hot spots. Two agricultural hot spots were determined to be regional hot spots covering practically the whole territory of Estonia. Changes in agricultural production (including the reduction in the number of livestock), implementation of relevant legislation (e.g. the Plant Protection Act of 1999, and the Regulation on distribution, storage and use of plant protection products of 1999) and plans to combat agricultural pollution (e.g. the Agro-Environmental Programme) are being carried out, and Estonia intends to eliminate the two agricultural hot spots and replace them with two "nitrate vulnerable zones" (Pandivere and Adavere) and a large-scale piggery of approximately 60,000 pigs.

By 2001, the Convention had made more than a hundred recommendations containing specific production procedures as well as emission standards, with dates for compliance. The recommendations are accompanied by reporting requirements. For example, recommendation 17.5 aims at reducing discharges from the iron and steel industry. In the general requirements the use of closed loop systems for processing and cooling water with a circulation rate of at least 95% is suggested. In addition to the suggested production requirements, it gives emission standards for oil, cyanide (CN) and suspended solids. To become applicable and enforceable in Estonia, the recommendations of the Convention should be transposed into national legislation.

The National Commission for Sustainable Development, established in 1995, is the only permanent body in which all relevant ministries collaborate on cross-sectoral issues. The Commission is chaired by the Prime Minister, and the Ministers of Environment and Economic Affairs act as vice-chairs. Ad hoc interministerial working groups focus on specific issues like the implementation of the Framework Convention on Climate Change. The Commission meets at least once a year, and its output has not been significant (see Chapter 1).

Environmental impact assessment is one of the two main instruments for sectoral integration. By identifying the environmental impacts of a planned project, these impacts can be taken into

consideration in the decision-making process and mitigation measures can be required. Projects can range from public infrastructures such as roads and sewerage networks to industrial developments. Spatial planning can reduce or prevent negative impacts of developments by designating separate areas for activities such as industrial development and nature conservation and for residential purposes. Buffer zones between the various zones can significantly reduce effects like noise and air pollution (see Chapter 1).

Environmental concerns in sectoral policies

Transport sector

In addition to the NES and its subsequent NEAPs, environmental issues are integrated in the individual sectoral policies. The Transport Development Policy 1999-2006 lays down the directions of the national transport sector for the medium-term. The Ministry of Transport and Communications acknowledges the increased emissions and the decreased share of public transport in passenger transport as an underlying problem and lists an environmentally friendly transport service among the overall objectives. Four main kinds of instruments are identified to achieve the favourable development of sustainable transport: (i) fiscal policy, (ii) regulation, (iii) land-use planning and (iv) state investments. Currently no action plans or programmes exist to elaborate the Transport Development Policy, nor are there any local action plans. The Transport Development Policy mentions the development of a sustainable transport action plan that should contain a set of indicators for the constant assessment of the development of sustainable transport. Furthermore, a long-term development plan for public transport will be developed in 2002. The implementation of this plan will begin in 2003.

In order to stop the decline in use of public transport and to make it more competitive with private transport, local and national authorities subsidize public transport. Between 1995 and 2000 just over 50% of the costs of local passenger transport by bus, tram and trolleybus was subsidized. The financial support for domestic passenger transport by rail increased from 16% in 1995 to 81% in 1999. The total subsidy for public transport increased from EK 273.3 million in 1995 to EK 660.6 million in 1999 (EK 460 per capita). Despite the increase in subsidies, there are no indications of decreasing or stabilizing trends in the model split in passenger transport.

There is no specific unit responsible for environmental issues within the Ministry of Transport and Communications. The Department of Development and Foreign Relations organizes and coordinates problems concerning the sustainable development of transport in general. Whenever co-operation and information on environmental issues is required, arrangements are made on an ad hoc basis with the Ministry of Environment. So far, both Ministries have found this procedure satisfactory.

Energy sector

Between 1996 and 1997 the Energy Strategy for Estonia was developed, elaborating various scenarios for energy supply and consumption. The Long-term Development Plan for the Estonian Fuel and Energy Sector was based on this strategy and approved by Parliament in 1998. The Plan provides a forecast to 2005 and predicts development trends to 2018. The Estonian government has taken the strategic decision to continue using domestic oil shale as fuel for electricity production. A shift is foreseen, however, in the long-term share of oil shale in the energy balance (see Table 7.3). The share of less-polluting fuel sources with lower greenhouse effects and of renewable fuel sources will steadily increase.

Table 7.3: Energy balance, 1995-1999 and forecast 2005 and 2010

%

	1995	1996	1997	1998	1999	2005	2010
Oil shale	62	64.0	62.0	58.0	58.0	52-54	47-50
Peat, wood, renewables	8	8.5	12.0	12.0	12.0	11	13
Fuel oils	6	4.5	3.0	5.0	6.0	5	4-5
Motor fuels	13	11.0	12.0	13.0	12.0	14	14
Natural gas	11	12.0	11.0	12.0	12.0	16-18	18-22

Source: Ministry of Economic Affairs, 1998.

Concrete environmental measures will be developed, based on the NES, and coordinated by the Ministry of Economic Affairs. In 1998, investments in the two power plants began. The investments focus on improving fuel supply technologies, energy generation, transmission and use, and on reducing environmental impact, mainly by the rehabilitation of end-of-pipe technologies such as electrostatic precipitators. Between 1998 and 2000 environmental investments worth EK 395 million (€ 25 million) were made. The investment plan for 2001-2009 amounts to € 370 million.

The energy conservation potential of Estonia is estimated to be about 30% of the current consumption, taking into consideration the economic situation and possible investment capabilities. The 1999 Target Programme on Energy Conservation is an elaboration of the Long-term Development Plan that covers the period 2000-2005. The target programme has set five general objectives and two more concrete objectives requiring energy efficiency. The latter are to:

- Maintain the change in energy consumption conditioned by economic growth to no more than half the increase in GDP; and
- Ensure the decrease of emission of CO_2 by 8% as compared with the year 1990, pursuant to the Kyoto Protocol, by increasing the efficiency of energy production and transportation, by using environmentally friendly fuels, and by reducing energy consumption in all sectors and households.

The Ministry of Economic Affairs has no separate unit responsible for environmental issues. Co-operation between the division of energy of the Ministry of Economic Affairs and the Ministry of Environment takes place on an ad hoc basis.

Agriculture sector

Environmental concerns have also been included in the analysis underlying the Rural Development Plan prepared by the Ministry of Agriculture in 2000. The Rural Development Plan has been developed as part of the Special Pre-Accession Programme for Agriculture and Rural Development, SAPARD, of the European Union. The plan has set three priorities, subdivided into eight measures. Although most of the plan focuses on improving the competitiveness of the agro-food industry in meeting EU standards, one of the measures will specifically focus on agricultural production methods designed to protect the environment and preserve the landscape. A change in agricultural practices, backed by legal restrictions – for example on manure treatment or fertilizer usage – could solve and prevent some environmental problems caused by the agricultural sector. A public funded national Agro-Environmental Programme is therefore proposed, which could compensate farmers for the loses that might occur through a loss in productivity. Out of a total €12 million funding per year for the Rural Development Plan, 1.4% has been allocated for this measure. The Agro-Environmental Programme commences on a pilot-project basis during 2001-2002. Full implementation should start from 2003. If negative environmental impacts are expected for any of the proposed measures in the Rural Development Plan, the County Environment Department may require an Environmental Impact Assessment for the project.

Furthermore, a code of good agricultural practice was developed in 2001, which can be implemented by farmers on a voluntary basis (with the exception of farmers in two designated Nitrate Vulnerable Zones). As an advisory document it provides information on the legislative restrictions and good practice for farming in a sustainable and environmentally sensitive way.

Within the Ministry of Agriculture, an Environment Unit is responsible for all aspects of the Agro-Environmental Programme and the general environmental requirements in the agricultural sector. There are two professionals working for the bureau. The action plan for the Agro-Environmental Programme foresees the establishment of an agro-environmental working group in which representatives of both the Ministry of Agriculture and Ministry of Environment would participate.

Constraints to sectoral integration

The Law on Sustainable Development (1995) requires the development of sectoral strategies and programmes. The commitment to improved environmental performance, and ultimately sustainable development, is clear from the integration of environmental issues in the various sectoral strategies and action plans.

The implementation of the Acquis Communautaire of the European Union and the HELCOM

recommendations often provides "ready made" targets that are measurable. The National Environmental Strategy and the sectoral strategies and action plans (i.e. the Transport Development Policy 1999-2006, the Long-term Development Plan for the Estonian Fuel and Energy Sector, the 1999 Target Programme on Energy Conservation, the 2000 Rural Development Plan) give direction to most sectors and provide a basis for project development. The NES, however, is not translated into environmental quality targets that Estonia seeks to achieve as a basic level of environmental performance, and none of the policies or plans sets environmental targets that can be measured in quantitative terms. Similarly, hardly any measurable targets are set in the sectoral strategies. Currently, the sectoral strategies are being translated into individual projects without specifying the environmental benefit or contributions the project makes to solve or mitigate environmental problems. For example, the construction of a waste-water treatment plant cannot be seen as an environmental target in itself. The contribution expressed in terms of the improved water quality of the receiving water body is the ultimate goal of the waste-water treatment plant. Insufficient environmental targets result in a lack of clear responsibilities for the desired outcome – the quality that should be achieved. Instead of reaching a certain level of environmental quality, the implementation – or even the amount invested – often becomes the success criterion.

By setting measurable environmental targets, such as a desired modal split in passenger kilometres or energy efficiency level in an industrial sector, sectoral integration can improve and so can the overall effectiveness and accountability of environmental policy-making. The "Indicator Based Assessment" developed for Agenda 21 for the Baltic Sea Region provides an interesting overview of indicators used to measure "sustainability" and could easily form the basis for target-setting. The range of instruments used for the implementation of the various sectoral policies, be they information-based instruments, regulation or economic instruments, could be further analysed to establish their contribution to the achievement of the desired targets (see Chapter 6).

7.3 Partnership with the private sector

Framework for partnerships

In general, the state has regulated and controlled environmental pollution of industry through instruments such as media-specific permits accompanied by ambient standards. The level of the standards and the strictness of enforcement have determined the actual level of performance. In market-based economies, economic instruments such as resource taxes and pollution charges are also available as tools for environmental policy implementation. Recently, co-regulatory instruments, such as negotiated agreements that have proven to be a useful addition for policy implementation in many countries, have gained the interest of policy-makers in Estonia. Voluntary schemes, as applied in many European countries, can be more economically efficient than command-and-control regulations as they allow for a greater flexibility on the individual abatement targets. In addition, results are more likely to be achieved as all involved parties have agreed on them during the negotiating process.

Until recently, environmental law enforcement in Estonia has been poor due to lax inspections. After the recent restructuring of the Ministry of Environment the tasks of permit issuing and enforcing have been clearly divided between County Environmental Departments and the Environmental Inspectorate respectively (see Chapter 1), thus avoiding possible conflicts of interests. Fines for violations of permits are still low (see Chapter 6). They do not offer a real incentive to industry to stop or invest in order to prevent violations. Furthermore, information exchange between the issuing body and the controlling body on the content of the permits is limited. Although the capacity and the structures for effective inspections and control increased with the restructuring process, it will still take some time before enforcement reaches a sufficient level.

The number and use of economic instruments have increased over the past few years and so has the level of pollution charges (see Chapter 6). In view of the due dates for implementing the EU requirements, a 20% annual increase in the rate of pollution charges is envisaged for the next decade. The objectives of the economic instruments in terms of behavioural change have not been specified or analysed nor has the rationale for the (increased) level of charges. For example, a resource tax on CO_2 has been introduced to promote the use of less-polluting fuels. The Estonian government has taken the strategic decision to continue using the domestic, and polluting, oil shale as the main fuel for energy production for the medium and even longer term. The use of alternative fuels is therefore limited as

are abatement techniques to reduce CO_2 emissions. Only increased efficiency would be able to reduce the 13 million tons of CO_2 emission from the energy sector. Under such conditions the tax cannot work as an incentive to shift to cleaner fuels, thus reducing CO_2 emissions. The tax is therefore expected to be only a source of revenue.

A major development affecting the industrial sector for years to come is the implementation of the EU Integrated Pollution Prevention and Control Directive (96/61/EC). The IPPC Directive demands that by 2007 all large enterprises have an integrated environmental permit complying with EU requirements (or a compliance plan approved by the authorities). The permit will require the application of the "best available technique" as developed at European level. Current legislation, such as the Ambient Air Protection Act of 2000, already prescribes the application of BAT. For the implementation of IPPC three draft documents on BAT have been developed by the EU and are available on the IPPC website of the Ministry of Environment. Until EU regulations and national guidelines concerning BAT come into force, the County Environmental Departments should interpret what are "best", "available" and "technique". At present there are no national guidelines.

A substitution scheme for environmental investments is available through the Environmental Investment Centre. An industry can substitute the pollution charges it owes the authorities with investments that promote an environmental improvement of at least 25% (see Chapter 6). The amounts available for the substitution scheme are most likely insufficient to cater to the investments required to comply with the IPPC regulations.

A two-year joint Danish-Estonian project to transpose and implement the IPPC Directive was launched in January 1998. Important components of the project included training of the County Environmental Departments in issuing integrated permits, building awareness in industry, and the drafting of guidelines and legislation. A draft act had been prepared by the end of 1999 and submitted to the Estonian Parliament for approval. By mid-2001 the act had not yet been approved by Parliament. Approximately 140 enterprises have been identified to be subjected to an integrated permit, including industrial enterprises, commercial farms and land fills. The costs of implementing the IPPC directive will mainly consist of replacing and upgrading old and worn out equipment in order to reduce emissions or the use of resources Cleaner production.

Estonia has given a high priority to the introduction of cleaner production by listing it among its policy goals in the National Environmental Strategy (NES). The goal has been worked out in 51 projects ranging from feasibility studies for new technologies to industrial training in environmental management. For the new NEAP, which was approved in the summer of 2001, very little funding has been secured for the implementation of the projects under this goal.

In 1992, a Cleaner Production Centre was started in Estonia. It provides professional development training and management consulting services for decision-makers from industries and governmental institutions. The Centre is operating as a self-sustaining and not-for-profit organization and has been involved in the IPPC project funded by the Danish Government by training both industries and local governments on IPPC.

Box 7.2: Kunda Nordic Cement

The Kunda Nordic Cement Plant in the North of Estonia is representative of the challenges that industry faced in the transition period. This state-run company had become technically outdated by the end of the 1980s and dust emissions exceeded norms by multiples of ten. Between 1993 and 1999 investments amounting to almost EK 700 million – of which 172 million were allocated for environmental improvement – were made in the production plant and the adjacent harbour. The new dust removal equipment installed in 1997 ensured that dust emissions remained below the concentration limits required in Estonia. Dust emissions related to production were reduced from 161 kg/t in 1993 to 0.7 kg/t in 1999. Kunda has implemented an Environmental Management System (EMS). In order to increase competitiveness on the international markets, the EMS was certified for ISO 14001 in 2000.

Estonia has signed the International Declaration on Cleaner Production. To assist the signatories of the Declaration, Guidelines for Implementation were made available from the UNEP Internet website in July 2001. The guidelines could prove to be very useful for Estonia, as they will consist of an overview of case studies, a toolbox of activities to assist implementation and methodologies for planning activities and measuring progress.

According to the Organisation for Economic Cooperation and Development, Estonia had reached a "Basic Capacity Level" for cleaner production by mid-1998. The basic capacity level included an active core of Cleaner Production experts and trainers, a set of Cleaner Production case studies, demonstration projects and model business plans, a functioning Cleaner Production Centre, training materials in the local language, university courses that include Cleaner Production as a topic, and monitoring and quality assurance.

Partnerships with the private sector

Initial steps have been taken by the Ministry of Environment to develop co-regulatory instruments. So far the Ministry has signed five voluntary agreements with enterprises. These agreements are non-enforceable and contain commitments from the enterprises on certain investments for further pollution abatement and environmental management initiatives such as the implementation of accredited Environmental Management Systems. The Ministry of Environment mainly commits itself to providing information on current and future legislation concerning the enterprises. Currently, another ten voluntary agreements are being developed with enterprises.

The privatization process in Estonia is almost complete; during the summer of 2001 the Privatization Agency was still working on a few privatisations of infrastructure. Although in most privatization cases 100% of shares has been sold to private investors, joint ventures between the State and private investors have been established for some former state enterprises such as public transport companies and waste-water treatment plants. The benefit of these joint ventures is that the government keeps control over the delivery of public services while attracting the necessary investments for improvement of services and environmental performance.

Currently, the state owns 100% of the shares of *Eesti Energia*, the company responsible for most of the electricity generation, transmission and distribution in Estonia. The two Power Plants in Ida-Viru County are economic units of *Narva Elektrijaamad* that is owned by *Eesti Energia*. In August 2000, an agreement on general conditions was signed between the State and a strategic investor for the sale of 49% of the shares of the company, worth 1,173 EK million (US$ 70.5 million). By selling a proportion of the shares to a strategic investor, *Narva Elektrijaamad* has secured funding for an investment plan for environmental improvements and the establishment of a fund for social programmes. Furthermore, the agreements included an energy price for the consumers and guaranteed minimum quantity of electricity volume arrangements between the investor and the Government.

The water supply and treatment plant in Tallinn – *Tallinna Vesi* – is managed through a joint venture between the municipality (49.6%) and a foreign investor (50.4%). In addition to the contract of sale amounting to EK 1.328 billion, agreements have been reached on further investments for renovating the sewerage system between 2001 and 2007. Arrangements on water prices for consumers have been made for the first three years, following which increases by the company will still be subject to approval by the local authorities.

Constraints to partnership with industry

The voluntary agreements seem a good step in the direction of better partnership with industry. The proposed measures and commitments might better reflect their "co-regulatory" nature. In the voluntary agreement between the Ministry and Kunda Nordic Cement Factory, measures were proposed to reduce the operating time of the kilns with the electric filters turned off, which allowed uncontrolled dust emissions. In the permit, special permission had been granted to operate under these conditions. Furthermore, the emission limits for dust in the Ambient Air Pollution Permit are higher by a factor of almost 40 for one particular process compared with the other processes. In the voluntary agreement, measures are proposed to reduce the operation time of uncontrolled dust emissions and invest in dust abatement techniques. In this way, the voluntary agreements seem to be an attempt to improve a weak permitting system rather then the development of a new instrument for policy-making. The voluntary agreements are by no means enforceable and it will therefore be hard for the Ministry of Environment to achieve a higher environmental performance from industries. The

backbone of environmental policy-making should still be strict standards and enforcement. Negotiating enforceable environmental targets that go farther than the permit requirements could improve the environmental performance of industry. The "win" situation for industry should be more attractive too. Information dissemination alone will not be an incentive for industry to go beyond compliance. For example, in The Netherlands, where negotiated agreements ("covenants") form an integral part of the environmental policy, there is a strong link between the permitting system and the negotiated agreements. The targets negotiated between the enterprise and the local authority become part of the environmental permit. If a company repeatedly fails to comply, this results in stricter emissions targets.

The application of cleaner production will be promoted by the increased standards required by integrated permits and the increase of pollution charges and resource taxes. The dissemination of information on cleaner production practices is crucial and should accompany the other instruments. Cleaner Production Centres are key institutes that could assume this responsibility. As the centre is self-sustaining, no financial means are provided for this information dissemination. Only when a project is externally funded, and money allocated for the spreading of the success stories, does dissemination take place. This has been the case in projects promoting the implementation of Environmental Management Systems in the food industry whereby workshops and newsletters were produced.

The environmental costs for industry will increase steadily over the coming years but the investments required for the implementation of integrated permits will increase efficiency and lead to savings. Commercial banks in Estonia do not give loans or provide better conditions for environmental projects. Only one bank would possibly require an Environmental Impact Assessment or Environmental Audit for a loan due to requirements of the European Bank for Reconstruction and Development (EBRD). Another bank has shown interest in cooperation with the Danish-Estonian IPPC project. This project suggested the possibility of establishing a revolving fund as part of the Environment Investment Centre. The statutes of the Centre provide for a loan component, although so far investments have only been by grants. Due to the restructuring of the Environmental Fund to the Environmental Investment Centre, the idea of a revolving fund has not been elaborated.

The initiatives in the field of privatization and public-private partnership have shown the potential of Estonia to attract investors and to include environmental concerns in the selling contracts. In addition to the cost price of the shares, investment plans are included in the privatization and concession contracts. It is especially attractive for local government to sell part of their assets as large amounts are involved. Attention should be paid, however, to a large number of issues that are involved with privatization and public-private partnerships. Cases have been reported of a privatized railway that went bankrupt because of limited passenger numbers, despite the subsidies provided. In Tallinn, a dispute arose on the payment of EK 40 million to *Tallinn Vesi*, the private water company, for storm-water treatment when this had not been part of the contract agreements. No guidelines exist for local government entering into partnership with the private sector. Issues like the effects on ratepayers, such as increases in prices for public services, and the quality and continuity of services, are of the utmost importance for partnerships' success.

7.4 Conclusions and recommendations

The environmental problems caused by sectoral activities are widely acknowledged in Estonia. This is an important first step for effective policy-making. Sectoral strategies reflect the commitment and responsibility of the sectors, and, subsequently, action plans and programmes are developed to reduce their impact. The commitment could be improved, as insufficiently clear and measurable targets are set for the desired environmental quality. Currently, goals are translated in terms of "minimize" and "reduce" without operationalizing them into quantifiable and measurable targets. Setting clearer environmental targets will result in better accountability and improve sectoral integration. Environmental quality targets, set by the Ministry of Environment, should provide the basis for this target-setting.

Recommendation 7.1
The Ministry of Environment should further develop measurable goals as the desired outcome of the national environmental strategy. Based upon these environmental quality goals, clear, achievable, and measurable sector specific environmental targets should be set in the

respective action plans and programmes (see recommendation 3.5).

The Ministry of Environment has taken the initiative to co-operate more closely with private enterprises. So far, it has signed five voluntary agreements and another ten are expected in the near future. The voluntary agreements, however, seem rather to focus on improving a weak permitting system with low standards, all conditions that are very favourable to industry. In other places, co-regulatory instruments have proven to be useful instruments and, by making the agreements binding and more ambitious, they could be efficient in Estonia too. Ambitious targets, that normally are not set in permits, like improved energy-efficiency per production unit, could be negotiated. Co-regulatory instruments, however, will only fulfil their role as part of a combination of instruments of which strong legislation and permitting should form the basis.

Recommendation 7.2
The Ministry of Environment should negotiate enforceable agreements with both enterprises and sectors. These agreements should provide incentives to enterprises and go beyond normal compliance.

Cleaner production is an important element of the National Environment Strategy. The introduction of IPPC – including stronger enforcement – and the increase of resource taxes and pollution charges will motivate industry to increase the application of cleaner production. The dissemination of information on best practices, case studies and technical options is not currently taking place. Only when externally funded projects facilitate this, does industry become actively approached and involved. The IPPC website could be a platform for this dissemination. Furthermore, experiences from the cleaner production centre and other consultancies should be widely disseminated in industry.

Recommendation 7.3
The Ministry of Environment, in cooperation with the Ministry of Economic Affairs, should actively promote the dissemination of information on best practices with cleaner production in all sectors. A Clearing House, for example on the national website on Integrated Pollution Prevention and Control (IPPC) of the Ministry of Environment, should be established.

In the years to come, environmental costs for industry will increase considerably. On the one hand the implementation of integrated permits and Best Available Techniques will require investments in new technologies and processes. On the other hand, for those who do not invest in cleaner technology, the pollution charges and resource taxes should increase to a sufficient level to form an incentive for cleaner production investments (see Chapter 6). Currently, commercial banks are not really interested in providing favourable conditions for environmental investments. The Environment Investment Centre should consider the possibility of providing loans on favourable terms with a rapid pay-back time. Co-operation could be sought with institutions and organizations that have experience in revolving funds for environmental investments, like the Nordic Environment Finance Cooperation (NEFCO) and Environmental Funds in other countries.

Recommendation 7.4
The Ministry of Environment and the Ministry of Finance should consider providing favourable loans for cleaner production projects and investments required for the implementation of integrated permits through the Environment Investment Centre to facilitate environmental investments in enterprises.

Joint ventures and public-private partnerships have proven to provide a spin-off to secure investment for environmental improvements. The experience with these forms of partnership is, however, limited while more partnerships are expected in the near future due to the poor financial situation of many municipalities. It is important that the government become aware of the problems associated with partnerships and that experiences are shared in order to ensure long-term investments in public services.

Recommendation 7.5
The Ministry of Economic Affairs and the Ministry of Environment should develop guidelines on the development of public-private partnerships addressed to local authorities and disseminate case studies of such partnerships. The guidelines should draw upon national experiences (best practices) as well as experiences in other countries. In the case of public services with environmental impact, such as waste collection, water treatment and public transport, environmental authorities at both national and local levels should contribute to the design of these partnerships in order to ensure that local environmental concerns are represented.

ANNEXES

ANNEX I
IMPLEMENTATION OF THE RECOMMENDATIONS TO ESTONIA FROM ITS FIRST REVIEW

RECOMMENDATIONS TO ESTONIA FROM THE FIRST EPR

As approved by the CEP in January 1996

STATUS OF IMPLEMENTATION AT THE TIME OF THE SECOND REVIEW
As updated by the experts of the second review in 2001:

1. STRATEGIC ISSUES

It is recommended that the Commission on Sustainable Development should give consideration to the following cross-sectoral policy issues:

(1) Setting environmental objectives and targets for the main economic sectors;

Status: Goals and strategies have been developed for the various sectors, taking environmental issues into consideration. These strategies have been translated into programmes and action plans with quantifiable and measurable objectives and targets in a limited number of cases only. The Commission on Sustainable Development has not been particularly involved in their elaboration, but is preparing an official Governmental position on important agreements or protocols such as the Kyoto Protocol, the Long-Term Energy Programme, and the Agenda 21 Process.

(2) Ensuring the environmental assessment of economic and sectoral programmes and plans including privatization programmes;

Status: In general, the MoE has not been deeply involved in the elaboration of sectoral programmes (transport, energy and agriculture), except in the Health Programme where its participation was active in many joint meetings and working groups. The MoE participated in the privatization programme, producing written comments introduced as a separate environmental sub-section. An environmental assessment of the economic programmes is taking place through an official harmonization process, where different departments of the MoE elaborate their proposal and amendments during an official harmonization phase. For the most important of these economic programmes MoE experts were nominated to participate in joint working groups.

(3) Prioritizing environment-related investments, financed from both public funds and external sources;

Status: Within the different annual programmes (water, waste, etc.), there is a ranking system in place based on environmental and financial criteria. Economic benefits cannot be so clearly identified in every case. However, the system is quite transparent as proposed projects are discussed many times between different groups in MoE and the Environmental Investment Centre. Moreover, environmental investment plans are available on the Internet.

(4) Internalizing environmental costs in the prices of energy, water, raw materials and transport services by applying, step by step, the polluter-pays principle;

Status: Since 1996, there have been gradual increases in fees and charges of about 20% per year, and a similar increment will be pursued for the next 13 years to come. Those charges induced bigger polluters to pollute less and resource users to diminish their consumption. A good result is the decrease in domestic water use. However, the charges on industry still appear too low or not adequately targeted to seriously reflect the polluter-pays principle.

(5) Securing the implementation of environment-related requirements of the Association Agreement with the EU in different sectors;

Status: Estonia officially entered the EU accession process in 1998 with the EU/Estonia Association Agreement coming into force, and more concretely in 1998 with the National Accession Strategy. As of early 2001, Estonia had closed 18 negotiation chapters out of the 31 opened for negotiations. The Environment Chapter was closed in June 2001. In all approximation sectoral strategies elaborated within the framework of EU accession, environment-related requirements are expressed (see 2000 SAPARD, 1997 Energy Strategy, Transport development policies 1999-2006, etc.). The progress is the result of an impulse from EU accession, and not of a push from the CSD Committee.

(6) Promoting cooperative arrangements and partnerships with business and industry, to encourage better environmental management within enterprises;

Status: Created by the MoE, partnerships with industry have been developed, ranging from joint ventures to voluntary agreements with individual industries. Environmental Management Systems have increased in popularity though this is mainly because of demands of the international market (export requirements).

(7) Involving other informal sectors, particularly environmental NGOs, in strategic planning for sustainable development.

Status: The elaboration phase of the first NEAP has been remarkable for the efforts to involve all stakeholders in its elaboration, a process that is even more extended in the ongoing elaboration phase of the second NEAP. NGOs and other informal sectors have been involved in a large forum, together with administration, scientists, business, industry and local people. The future National Strategy on Sustainable Development that will be worked out in 2001-2002 will proceed along the same lines. The Internet will be widely used to facilitate communication between the participants.

2. LEGISLATIVE AND INSTITUTIONAL STRENGTHENING

(8) Fill in as soon as possible the existing legislative gaps, particularly on energy, air, noise, environmental impact assessment (EIA) and auditing, the management of chemicals and the clean-up of contaminated sites;

Status: Much progress has been achieved in building the legal environmental framework with key laws either adopted (EIA and audits in 2000, monitoring in 1999, environmental charges in 1999, environmental supervision in 1997, air in 1998, chemicals in 1998, waste in 1998, packaging in 1995) or amended (water in 2000, hunting, fishing in 2001, forestry 1998, …); the legal framework is now almost in line with the requirements of the EU (see Chapter 1, second EPR).

(9) Draw up and agree upon priorities for the development and revision of environmental standards;

Status: Environmental standards were gradually modified and will continue to be so in order to conform to EU standards. However, progress was hampered by the limited capacities of the Standardization Committee. New standards have been introduced in the fields of construction, air emission, and drinking water. Further work is needed on this issue.

(10) Streamline environmental regulations and permit conditions introducing the integrated approach to pollution prevention and control;

Status: A Law on IPPC is ready that is in line with the EU Directive 96/61/EC, and is awaiting the Parliamentary decision. Secondary legislation has already been prepared, as well as an implementation plan. Training activities have been undertaken since 1998. A list of enterprises that must apply for an integrated permit is ready as well. The new permitting system should be put in place in early 2002. Estonia is assisted by the Danish Environmental Agency to approximate this EU Directive.

(11) Improve the system of monitoring compliance and enforcement of environmental legislation by introducing, in particular, self-monitoring and self-reporting procedures;

Status: The monitoring of the state of the environment is under continuous development and improvement: the capacities and laboratory equipment have been improved and staff of the labs and inspectorates received training (PHARE funds). With the now independent antenna of the National Inspectorate at the local level, inspectors are closer to the field and receive training to be more efficient. The Inspectorate covers coastal and inland waters, air, waste, forestry and biodiversity and mineral resources. Self-monitoring and reporting are included in the monitoring programme but are not yet sufficiently enforced. An electronic database on permits is being set up and will be on direct access on the Internet.

(12) Create or strengthen environmental units in economic and sectoral ministries, particularly those responsible for industry, transport, agriculture and privatization;

Status: An environment unit has been set up in the Ministry of Agriculture as several directives (nitrates, pesticides) necessitate close cooperation. With the Privatization Agency, a mechanism has been created so that the MoE is systematically consulted and involved in privatization of assets through ad hoc working groups and on a case-by-case basis. There is no formal arrangement for cooperation with the Ministries of Transport, Industry and Economic Affairs. Further work is needed on this issue (see Chapter 7 of the second EPR).

(13) Improve coordination between environmental authorities at the national, county and municipal levels and clarify their respective responsibilities;

Status: The restructuring exercise of early 2000 put the County Environmental Department directly under the MoE (see chapter 1 on the new structure of the MoE). In spite of the progress made in the clarification of the structure and task sharing, there are still problems in the command line (see recommendation in Chapter 5 of the second EPR)

(14) Develop a training programme to strengthen the capabilities of municipalities to cope with their environmental responsibilities;

Status: Training of local capacities is a continuous ongoing task. Much training has been undertaken through bilateral cooperation and twinning arrangements with cities in Finland and Sweden. The Internet is now largely accessible in the countryside as one of the key instruments for information-dissemination and training, and 30% of people outside Tallinn have access to the Internet at home, more in the Capital. The MoE uses the Internet as a channel for environmental information. But the capacities of local authorities in environmental management are still too weak (see recommendation in Chapter 1 of the second EPR).

(15) Taking into account the general structure and organization of the national administration in Estonia, undertake a feasibility study on the creation of an environmental agency subordinated to the Ministry of the Environment and responsible for, inter alia, monitoring and compliance with environmental legislation, management of protected areas, environmental research and development.

Status: There is no environmental agency, and none has been created at sector level (water, waste, air, monitoring). At the present time, the MoE is fulfilling tasks that should go to such an agency (for instance, preparation of projects and procurement tenders). On the other hand, outsourcing is the rule today in Estonia. The trend in recent years has been to privatize all research centres or to make them work through annual contracts obtained through tenders and procurements that are obligatory. All these Centres work in open competition on a short-term basis. This might be detrimental to long-term research and even to applied research. The level of expenditure on environmental research and development work is very low.

3. INTEGRATING ENVIRONMENTAL AND ECONOMIC DECISIONS

(16) Formulate environmental objectives and targets in an operationally precise manner; their feasibility should be evaluated, before adoption, according to their likely costs and benefits and the financial, technical and human resources available for their timely implementation; the commitment of all respective ministries and other actors involved should be obtained;

Status: While the 1997 NES gives global environmental targets, the development strategies of other economic sectors do not spell out the specific and concrete environmental targets to be reached in their respective sectors or sub-sectors. Environmental projects contributing to general goals and objectives are identified in the NEAPs. No desired environmental quality targets are identified, neither are the measurable environmental benefits of the projects under the NEAPs. This recommendation has not been satisfactorily fulfilled.

(17) Enhance the economic analysis capacities within the Ministry of the Environment and the environmental policy analysis capabilities in the economic and sectoral ministries;

Status: The economic analysis capacities of the MoE have been improved. MoE departments are undertaking such policy analyses and also use relevant expert assistance. Projects financed by foreign institutions go through a specific economic assessment. Environmental policy analysis sections have been set up in the Ministries of Agriculture, Economic Affairs and Transport. However, these environmental policy analysis capabilities are still insufficient in the EU context (see Chapter 6, second EPR 2001).

(18) Extend the use of economic instruments and aim at charges covering fully the environmental costs involved: the user-pays principle and the polluter-pays principle should be more rigorously applied, even if step by step during the transition period, and implemented, in particular, in natural resource pricing, in waste, air-pollution and waste-water charges; the cost-recovery mechanisms of taxes and charges at the local level should be considerably improved.

Status: The 1997 National Environmental Strategy includes a special chapter on "Instruments for sustainable use of natural resources and environmental management." The aim of using economic instruments for environmental management has been, from the outset in 1991, to influence both producers and consumers to prevent pollution and waste generation as much as possible. From the very beginning they induced serious polluters to pollute less and helped to avoid violation of legal regulations. This full range of economic instruments has been introduced step by step to take account of the difficult economic situation in the aftermath of independence.

(19) Strengthen the role of the Environmental Fund as an important instrument of environmental financing in a transition period by, inter alia, improving its operational procedures, project appraisal and financial management practices; give consideration to increasing its income with some of the proceeds of privatization to be used for environment restoration, donor grants and loans from international financial institutions following relevant internationally agreed guidelines;

Status: In the period 1995-2000, this recommendation was fully implemented except that donor grants and loans were not managed by the Fund. The Environmental Fund was reorganized in mid-2000 into a new fund, the Environmental Investment Centre (EIC), under the Ministry of Finance. All funding is received directly from or through the State budget as a total of the budgets of selected projects. Also, loans are now transferred to the EIC for their management (see Chapter 6).

(20) Bring into operation, as early as possible, the recently approved integrative instruments, in particular the legislation on land-use planning;

Status: The 1995 Planning and Building Act called for a National Spatial Plan (EESTI 2010). The Plan was approved in 2000. County spatial plans have been worked out in 13 counties (two are still awaited), and half of them have completed their related implementation action plan. Social and economic

development objectives have also to be expressed as well as nature protection concerns (green areas and valuable landscape reservations). Land use plans at municipal level are also being elaborated.

(21) Ensure that privatization procedures include environmental requirements for all privatization schemes: environmental audits should be a key component of the privatization procedure for industrial enterprises; establish detailed regulations relating to environmental liability when privatizing enterprises; and consider introducing a procedure to allocate part of the purchase price of privatized enterprises to finance third-party environmental damages and clean-up costs;

Status: A governmental resolution required that 5% of the funds from an enterprise privatization be devoted to the environment, a measure that was continued under the EIA procedure. The money was channelled to rehabilitation work. At negotiation time, it can be agreed either that the burden of past damage remains the responsibility of the State, or that it becomes the liability of the new owner. In the latter case, the selling price is decreased and the new owner is obliged to rehabilitate the damage (see Silmet Ltd. and the rehabilitation of the lagoon containing heavy metals, ammonium, and radionuclides).

(22) Strengthen the role and involvement of the Ministry of the Environment in the privatization process, in particular by establishing an inter-ministerial unit between this Ministry and the Estonian Privatization Agency to address issues of environmental requirements in privatization, such as the assessment of environmental damage costs and the resolution of environmental liability questions.

Status: By Governmental Decision, environmental provisions have been incorporated into the privatization programme that specify how the Privatization Agency should take into account environmental aspects in the privatization process (EIA, liability for past damage, liability for future polluting emissions) and how to involve the MoE in the process.

Since 1996, a Government Plan for Privatization is adopted each year. The Privatization Agency liaises with the MoE, which nominates an expert (or an expert group) that will be able to participate in the privatization process of a specific asset and elaborate the "environmental agreement" between the state and the new owner.

Sectoral integration: energy

(23) Ensure that the policies for the production and use of energy are fully in line with the concept of sustainable development, through, in particular, full-cost pricing of energy resources including external environmental costs in accordance with the polluter- and user-pays principles in a step-by-step approach;

Status: For strategic reasons, Estonia has decided to continue using domestic oil shale as the main energy source. This decision has not been subjected to a strategic environmental assessment. The polluting aspects related to air pollution and waste generation will be tackled and require huge investments. In particular, abatement equipment for cleaning air emissions is included in the environmental permit of the two big Thermo Power Plants burning oil shale. The replacement of two boilers has been decided. New fluidized-bed boilers comply with BAT requirements. Solid waste (ash) treatment is under research. A pilot ash and water mixer for producing a high-density mixture began working in late 2000. The Hungarian technology being used is promising, but the pilot step is not yet completed. At present, the concept of sustainable development is still not assured on this extremely complex issue.

(24) Draw up a national energy programme which should, in particular, ensure energy-saving in all industries and buildings; set targets and a timeframe for the modernization of the energy industry; and make provision for an eventual transition of energy prices to market prices which ensure resources for necessary investments. The privatization objectives and plan for the energy and mining sectors should be formulated at an early date;

Status: The Long-term Development Plan for the Estonian Fuel and Energy Sector was approved by the parliament in 1998 and the government approved the Target Programme on Energy Efficiency in the year 2000. A national Energy Strategy was drafted in 1998 and a Programme on Energy Conservation in 1999. Excepting a reduction in CO_2 of 8% compared with the 1990 level, no other precise targets have been set. Estonia gave up subsidies on fuels and energy prices. Oil shale will remain the principal energy source (for the next 10-20 years) according to the energy strategy. Oil-shale mining is subsidized. There is no national plan or programme for the mining sector. The government approved a national oil-shale energy-restructuring programme for 2001-2006 on 27 March 2001.

(25) Undertake a comprehensive analysis of the mining and processing of oil shale, draw up and compare environmentally sound options relating to the long-term use of this fuel, taking into account employment and other social considerations;

Status: In 2000, a study on Estonia's oil-shale-related activities was contracted by the EU in the framework of Estonia's preparations for EU accession. The study provides a comprehensive analysis of the mining and processing of oil shale and linked implications. It concludes that while the problems of this activity are important, and compliance with EU environmental *acquis* is difficult, they can be addressed adequately. In 2001, the drafting of a Restructuring Plan of the Estonian Oil-Shale Sector has been undertaken. The decrease of the harmful impact of the sector on the environment is among the key objectives. A national oil-shale energy-restructuring programme for 2001-2006 was approved by the government on 27 March 2001. The main objectives of the programme are measures to reduce the negative environmental impact and include an investment plan. Currently, in the EU approximation context, Estonia is preparing a special position on oil shale.

(26) Review the consistency of the current policy, which encourages the use of local fuels like peat and wood, with the goal of sustainable development;

Status: In 1999, in a study for the Ministry of Economy, the State Company "Estonia Energy" reviewed the possible renewable resources available such as wind, wood and peat. Overall, the production of renewable fuel has been regularly decreasing since 1997 and made up only 8.6% of the primary energy balance in 1999. The Ministry of Economic Affairs has established the Renewable Energy Council whose responsibility is to advise Ministers on alternative energy issues. The Council is drafting a Programme of possibilities and measures relating to the use of renewable energy.

The Energy Law stipulates that a higher price should be paid to the producer for energy produced from alternative sources, to stimulate production, although this energy is more costly to produce.

(27) Consider possibilities for mobilizing financial resources for installing desulphurization and dust control facilities at power plants.

Status: The majority of involved enterprises are now privatized and have their own plans to meet and comply with environmental requirements. The two main power plants are being privatized and the environmental responsibilities were assumed by the new owners. The companies have committed themselves to following the standards and meeting the deadlines fixed by the Air Protection Law and the Waste Law. Otherwise no special efforts to raise financial resources have been identified. The only measure may be the "substitution act" allowing companies to deduct charges from their own investments. But this measure is an incentive and not a capital-raising mechanism.

4. REDUCING THE POLLUTION BURDEN

Air

(28) Adjust the number of ambient air quality standards to a realistic and measurable level;

Status: An MoE regulation on "The limit values of the level of air pollution" set limit values for 80 substances. Estonia reduced the number of ambient air quality standards (previously for 200 substances) although they remain more numerous than in EU countries.

(29) Draw up national and regional plans for air pollution abatement, which set out reduction targets for air pollution from both stationary and mobile sources, and measures to improve air quality, in particular in the north-east of the country; and integrate these plans with a national energy programme;

Status: On 25 July 2000 the Programme on Reducing Pollutant Emissions from Large Combustion Plants 1999-2003 was approved by the government. It focuses on 13 plants with a heat output capacity of 50 MW or more that are major pollution sources. The plants of the highest output capacity are concentrated in Ida-Viru County, Tallinn and Harju County. The main objective of the Programme is:

- To reduce the emissions into ambient air with the aim of protecting human health and the environment against the adverse effects of pollutants from large combustion plants.

- To comply with the regulation on "Emission limit values for pollutants in waste gases from LCP". This regulation takes effect on 1 January 2000 with regard to new combustion plants and on 1 January 2003 for the existing ones.

- To comply with the Geneva Convention on Long-range Transboundary Air Pollution and its protocols.

- To decrease solid particles by 56%, sulphur oxides by 23%, and nitrogen oxides by 11% through implementation of the programme.

(30) Introduce sulphur content standards for fuel oil;

Status: In order to reduce the negative effects of the energy sector, the NES calls for terminating the use of high-sulphur fuel oil by 2003. But, so far, neither standards for limiting the sulphur content in fuel oil nor any economic incentives to favour the use of low-grade sulphur fuels have been introduced.

(31) Address problems associated with the growth in transport by, in particular, raising fuel and emission standards for motor vehicles and reversing the price differentiation between leaded and unleaded petrol to make unleaded petrol cheaper;

Status: Estonia has switched its fuel consumption over entirely to unleaded fuel. Only unleaded gasoline is sold for cars. For technical reasons, this unleaded gasoline still contains a small amount of lead (0.013 mg/l); but by 2003 it will be reduced to 0.005 mg/l.

(32) Ensure that transport programmes provide for strengthening environmentally sound water, rail and public transport systems, while improving at the same time their efficiency and performance.

Status: Transport policies favour public transport that is extensively subsidized to make it more competitive with less environmentally friendly means of transport. These strategies have not been incorporated into operational goals and targets.

Water

(33) Establish emission limits for industrial waste water and update water-quality standards, particularly drinking-water standards;

Status: The last drafted revision (in early 2001) of the Water Act has general provisions for discharges containing dangerous products that are to be designated in two lists. The permit for these discharges requires a water study; conditions are in terms of concentration and permissible load per unit of production. There is no statement about the permissible load according to the acceptance capacity and the quality objectives for the receiving aquatic ecosystem. Nevertheless, quality objectives for dangerous substances in groundwater and in soil have been established.

Improved quality standards for urban waste-water and drinking water have been issued. They are closer to EU standards but not identical. Requirements for treated waste-water are stricter than stated in the relevant EU directives, mainly based on the Helcom recommendations. However, most work done on existing or new treatment plants are engineered within EU compatibility perspectives. Urban waste standards are now met in some of the main cities and a compliance programme exists.

Amendments to the Water Act and its implementing legislation improved the compliance permit system, but monitoring and evaluation of discharges is still too weak. Many regulatory documents are not yet drafted or implemented owing to a serious lack of trained personnel.

(34) Strengthen the implementation, enforcement and monitoring of compliance with the permit system by, in particular, focusing first on the main point polluters, namely cities and large industrial sites;

Status: Inspectorates are respected by water users, who are fearful of being stigmatized, fined or sued, although most fines are light. Inspectorates act mainly on information received, but have no definite objectives or plan of action. Systematic monitoring of compliance with permits stems from the charge collection scheme managed by county environmental departments. The process of evaluating discharge is unreliable and the calculation of the pollution charges tends to be excessively negotiated.

There is not enough synergy between the inspectorates and county departments.

(35) Draw up programmes and good practice guidelines for the control of water pollution from non-point sources, particularly from agricultural sources;

Status: The amended Water Act includes rather detailed prescriptions against agricultural pollution: fertilizers and livestock load per hectare, spread of excess manure from concentrated cattle breeding, and sensitive areas for NO_3. However, more attention should be paid to the management of sludge from industrial or urban waste-water treatment, introducing rational fertilizing, taking into account leftover fertilizer from past crops, and setting specific restrictions in the vicinity of surface water bodies and drinking-water intakes.

A few information and pilot programmes are already being implemented. The local agricultural advisers will be trained and become involved in the process of providing information to farmers (field meetings around pilot projects, on rational fertilizing, and plot-by-plot fertilizing registers).

MoE and MoA cooperate on policy and action. Hopefully, this could lead to a common scheme for advising, monitoring, regulating and financing the prevention of agricultural pollution.

(36) Review and clarify the present distribution of responsibilities between the national level, the county authorities, municipalities and the water companies; and develop a more participatory and transparent approach involving municipalities and the growing private sector, in particular when setting charges and providing subsidies for investments;

Status: Estonian environmental institutions were reformed and responsibilities clarified: the Public Water and Supply Act clearly shares responsibilities among state, municipalities, water companies and clients. Municipalities have the responsibility for providing the service; the actual service provider can be one (or several) specific business entities still mostly held by municipalities. Municipalities are progressively devising deals with private water companies, selling part of the business entity shares, organizing investments and operating contracts.

(37) Encourage the use of environmental auditing in public waterworks and sewage works;

Status: The Environmental Assessment and Auditing Act provides a very good basis for environmental auditing of public water-works and sewerage works. It would be useful to draft terms of reference for

such audits. Environmental auditing is conducted for new works or important modifications. Some kind of periodical auditing of existing works is suggested.

(38) Develop training programmes for personnel at drinking-water preparation facilities and waste-water treatment plants.

Status: Training programmes are offered by Tallinn Technical University and Tartu University for waste-water treatment plants and drinking plant operators. Operational guidelines have been drafted. A main target of the Estonian-Swedish and French twinning project is to compose training programmes for implementers of water-related directives. However, details of financing, schedules, and number of trainees are not yet available for these programmes.

Waste and contaminated soils

(39) Stop the uncontrolled disposal of hazardous wastes, including asbestos waste, as soon as possible; and establish the necessary separate collection, storage, treatment and disposal facilities starting with the most hazardous wastes;

Status: Two hazardous waste transfer and reloading stations and one hazardous waste landfill have been set up (Tallinn transfer station in 1998; transfer station and the first hazardous waste landfill in Vaivara-in Ida-Viru county in 2000). The hazardous waste landfill has a capacity to dispose of 30,000 t/a of mainly inorganic hazardous wastes, including asbestos waste. The capacity is deemed to be sufficient for 30 years. Organic hazardous waste, except waste containing halogens, can be treated in the oil-shale industry and cement kilns of Kunda Nordic Cement Ltd.

Fifty-four hazardous waste collection stations have been put into operation around the country and there is additionally a possibility for citizens to leave municipal hazardous wastes at gasoline stations in Tallinn and Tartu.

Extremely hazardous outdated and abandoned pesticide wastes are now stored in a safe way. Some pesticides have been sent abroad for safe destruction.

(40) Improve the implementation of the permitting system; review the list of enterprises needing a permit to cover consistently all waste generators;

Status: Disposal and recovery of waste as well as collection and transportation of hazardous waste, transportation of non-hazardous waste on a commercial basis plus a list of industrial activities, require a waste permit granted by the county environmental authority under the MoE. Collection and recovery of metal waste and scrap has been subject to closer regulatory action recently. In addition, handling of hazardous waste generated by another waste producer requires a hazardous waste handling licence granted by the Minister of the Environment. Forty-five such licences have been issued so far. Compliance with these permits is supervised by the Environmental Inspectorate (see Table 6.4, Chapter 6, on the environmental fines and violations in waste management). The authorizing system will be somewhat improved with regard to some waste producers and restructured with the adoption of the IPPC.

(41) Ensure the finalization of the solid waste management programmes at the county level, which should, in particular, address specific regional waste problems, such as the management of oil-shale waste in the north-east;

Status: With the Waste Act of 1998, the waste management planning system was changed. County level waste management plans were adopted and fine-tuned into the framework of the upcoming National Waste Management Plan within one year of the adoption of the Plan. The latter is, however, still awaiting final acceptance and is expected perhaps towards the end of the year 2001. County waste management plans and programmes, waste management and feasibility studies and site selection projects have been worked out since 1994 and now seem to cover the entire country, with emphasis on

local problems (such as those caused by the oil-shale wastes) and often also location of landfills in the respective areas. When the national waste management plan is adopted, existing county waste management plans will have to be updated and amended if necessary.

(42) Complete the inventory of hazardous waste dumping sites and of contaminated sites, including those contaminated by military activities, assess the risk that they pose to human health and the environment, and establish priorities for remediation on the basis of this assessment, applying basic remediation in urgent cases;

Status: The inventory of *military sites* has been completed. Information has been collected, more or less all sites have been evaluated in a preliminary way and classified; the risks of selected sites have been assessed in more detail and preliminary measures have been undertaken in order to eliminate the risks of further spreading of contaminants from the most urgent sites. Further remedial action needs to be based on more detailed investigations, risk assessments and cost-benefit analysis. The number of polluted military areas totals almost 2,900.

Industrially contaminated sites are attracting more attention. However, information collection, investigations and simple risk assessments are still in their early phases. Some activities have been devoted to oil terminals and other oil storage facilities. Altogether some 200 sites have been partly or completely rectified. Liability and landowner responsibility problems have not been solved.

(43) Introduce economic incentives to encourage effective waste recycling and reuse;

Status: The packaging excise duty tax for packaging of beverages was introduced in 1997. Pollution charges levied from air and water polluting or waste producing activities are defined by a specific Act. Levying of pollution charges can be avoided by making a contract between the polluter and the MoE, if the sum of the charges is invested in environmental improvements by the company concerned or it participates in the financing of national or regional environmental programmes or projects sponsored by the MoE.

At present the Package Excise Duty Act is the only act dealing with recycling. The effects so far have been limited. Efforts are being made to improve the logistic requirements to make a refund/deposit system successful. The present rates are extremely low, however, and decided solely by the Ministry of Finance.

The right of local governments, as defined in the Waste Act, to collect periodic encumbrance fees to cover waste management costs has not been implemented in practice.

(44) Launch training programmes on waste management issues for personnel in both the public administration and industry, accompanied by a public awareness campaign on this subject;

Status: Training related to wastes and waste management is generally organized in connection with foreign assistance and as a fundamental element of the assistance. There is also domestic training organized by professional educational and consulting organizations. Public awareness campaigns and cleaning-up days for roadsides and parks have been organized and flyers on waste management produced, e.g. by the MoE and NGOs. Changes in municipal waste regulations and management are advertised and announced in the local press and other media.

(45) Carefully consider the best siting for construction of new waste landfilling, treatment and incineration facilities and future oil-shale ash fields following the provisions of the 1995 Action Planning and Construction; give particular consideration to human health, cost-effectiveness and acceptance by the local population; encourage municipalities to seek joint solutions for the sitting and use of waste facilities where appropriate and to conclude cost-sharing arrangements for this purpose.

Status: Identification of optimal sites for landfills and other waste recovery and disposal facilities have been touched upon in the majority of regional and national waste management plans and programmes

summarized and utilized in the drafting of the national waste management plan. In the plan, 23 references are made to the literature, naming nine counties and in six cases concentrating exclusively on site selection.

Oil-shale ash fields are covered in the Ida-Viru county waste management programme. However, site selection for power plant ashes or oil-shale industry wastes is not an issue of significance, since the old dumps and waste fields are still in use and will probably be used until the end of 2009. From that date, all landfills have to comply with the requirements of the landfill directive. Before that date, the oil shale and power industry will have to find new ways of handling or recycling (or recovering) their wastes.

Cost-effectiveness and joint efforts in organizing municipal waste management is sought in the planning instruments of waste management and involving all stakeholders in the planning process. Rural municipalities and towns are encouraged to join forces in establishing commonly owned waste management companies and landfills.

The activities of waste permit holders must be in compliance with the local waste management plans that take into account the county plans which in turn are in harmony with the national plan.

5. CONSERVING NATURE AND MANAGING NATURAL RESOURCES

(46) Speed up the finalization of the National Action Plan on Biodiversity; ensure that it includes detailed guidelines for the preservation and improvement of the network of protected areas; and introduce concrete nature conservation measures outside protected areas in order to strengthen the protection of endangered species and biotopes;

Status: The Estonian Biodiversity Strategy and the Action Plan were finalized in 1999. However, both are over-ambitious and not approved by Government and Parliament. They are being revised (more realistically) in order to get Government approval. Independently of the strategy and action plan, progress has been made in the management of protected areas and concrete measures initiated outside protected areas (e.g. agro-environmental programme "key habitats" in forests).

(47) Meet the current objective of maintaining half the forests as State-owned; revise the Forest Act and strengthen provisions on forest protection and their enforcement in order to avoid conflicts between the economic, short-term interests of forest owners and the broader interests of sustainable management of forests;

Status: So far, the objective of maintaining half of the forest in state ownership has been met. The Estonian Forest Policy (1997) states that out of the total of 2,143 million ha of forests in Estonia, about 1 million ha should remain in state ownership. With the end of the privatization process, it is estimated that the share of private forests might be 60%. The problems in relation to illegal cutting in private forests became less severe after 1995. The provisions of the forest law are strict and illegal cutting is, in principle, punished with tough financial penalties and compensation rules. However, the enforcement is complicated and should become easier after the ongoing revision of the Forest Act.

(48) Draw up clear guidelines and prepare manuals for county administrations and municipalities on listing protected species on their territories, describing their habitats and related conservation measures;

Status: There are no guidelines or manuals for county administrations and municipalities in this respect. However, a number of status surveys have been or are being carried out (e.g. coastal meadow survey, old growth forest survey, swamp survey, ongoing survey of 40 protected areas; 20 protected area surveys completed). Status surveys are now also being carried out within the framework of NATURA 2000 implementation. On the basis of these status surveys, management plans are drawn up with the active participation of the local population.

(49) Reinforce the protection regime in the existing protected areas, strengthen the criteria for their designation in line with internationally recognized criteria and clarify the responsibilities for managing the various protected areas and strengthen compliance monitoring and enforcement;

Status: The review and revision of the existing protected area system continues. Since 1995, 80% of protected territory has been reviewed and reinforced, bringing the different zones of protected areas into line with internationally recognized IUCN protected area categories. Responsibilities for the management of protected areas are clarified, but there seems to be a lack of management capacity. More than 22% of the territory of Estonian protected areas is covered by management plans. No information was provided on how much of the protected area was already covered by earlier plans. With respect to effective enforcement, there were problems in the past, but reforms in the Environmental Inspectorate could have a positive impact in the future.

(50) Provide human and other resources necessary to ensure the application of a strict protection regime on 2% of the territory of Estonia by the end of the century, and on 5% of the territory by the year 2010;

Status: By 1 January 2001, 3.72% of the continental territory of Estonia could be classified as strictly protected (IUCN categories 1 a + b). The classification has been carried out so far only for the reviewed and revised protected areas, which accounts for only 80% of all protected areas, as 20 % of all protected areas are as yet not classified. This, and the likelihood that the strictly protected forest area will be increased, suggests that by 2010 the 5% strictly protected area objective will be reached.

(51) Resolve uncertainties relating to property rights and to the conservation regime to be maintained in protected areas, ensure that these rights are enforceable, particularly in relation to the abstraction and use of natural resources; consider opportunities for broadening the scope of compensation measures for landowners if restrictions on land use and resource abstraction apply;

Status: The process of land reform is generally slow. The procedures for exchanging private land in protected areas for land outside protected areas is complicated and time-consuming. There are now plans to adopt the solution of the state buying up private land in protected areas. In the year 2000, subsidies were introduced for the management of semi-natural areas.

(52) Encourage the maintenance of traditional forestry and agricultural practices (such as grazing, drainage network maintenance, extensive farming, etc.) in those protected areas which need this protection regime for their conservation, inter alia, by providing subsidies to farmers to ensure their livelihood while maintaining the ecological balance on their lands;

Status: The Ministry of Environment introduced subsidies of more than US$ 1,000,000 for the management of semi-natural areas within and outside protected areas in 2001. The Ministry of Agriculture has introduced a number of support measures for extensive farming within the framework of its agro-environmental programme, which is also part of the Agriculture and Rural Development Programme (SAPARD 2000 – 2006). A Code of Good Agricultural Practice is being prepared.

(53) Define measures for ensuring the sustainable management of the main natural resources such as peat, forests and fisheries;

Status: Peat is a non-renewable natural resource, and its extraction is strictly regulated. The opening of new extraction sites is limited and subject to conditions. There is a rule on the recultivation of abandoned peat extraction sites, and a decree is being drafted which should ensure that extraction fees are paid into the Environment Investment Fund for recultivation.

Forestry is traditionally carried out in accordance with management plans, thus ensuring at least the sustainability of the timber yield. Some support programmes have been introduced to strengthen the ecological function of forests (e.g. “Key habitats”). The Forest Policy (1997) and the draft Estonian Forestry Development Plan contain objectives and actions towards biodiversity conservation.

Fishery problems in relation to the sustainable management of fish resources seem to persist (e.g. over-fishing of some coastal marine areas, hydropower dams blocking spawning migration of river fish resources etc.).

(54) Expedite the preparation of integrated regional development plans for the areas most affected by natural resource management problems (e.g. Ida Virumaa) or where economic opportunities for development are closely related to the natural resources stock. Ensure that plan preparation takes sufficient account of both economic and employment needs and requirements for the sustainable management of natural resources;

Status: Since 1998, all counties except two have their own spatial plans and a plan for the social and economical development of their territory (including natural resource use). For 2002, counties are to prepare a policy on Environmental Preconditions for Settlements and Land Use that should integrate nature protection concerns. Designated "green layers" are presently being prepared at a local level for the National Spatial Plan (EESTI 2010). Integrated rural development plans have not been prepared so far, but it is expected that with the support of the European Union the implementation of the Agriculture and Rural Development Programme (SAPARD 2000 – 2006) will bring about a necessary change in the approach to problem solutions. (an integrated approach, "bottom up" planning, etc.).

(55) Draw up and launch, in cooperation with counties and municipalities as well as NGOs, a national landscapes programme.

Status: No concerted "National Landscape Programme" has been drawn up but different concepts (e.g. Valuable Landscapes" or "Green Network" or ENECONET) were or are being prepared. They could be combined into a consolidated programme. Two attempts were made to formulate an Act on Landscapes, but the drafts resembled technical guidelines rather than codified legislation.

6. STRENGTHENING INTERNATIONAL COOPERATION

(56) Improve the management and coordination of foreign assistance programmes, and in particular strengthen the project management unit at the Ministry of the Environment. Regularly update and make available, in particular to foreign investors, the information concerning progress made in investment projects which involve international funding;

Status: Before 1999, a lot of projects were implemented through a PHARE Unit that also worked with EBRD and WB and bilateral projects. In the year 2000, a special unit was created in the MoE, the Investment Department, to manage the technical aspects of ISPA projects. Financial aspects will be managed by the National Environmental Fund Centre under the Ministry of Finance.

(57) Fully apply policy measures, practices and instruments contained in or agreed under the international environmental conventions to which Estonia is a party or to which it is intending to accede, in particular on EIA, industrial accidents and water management in a transboundary context;

Status: The UNECE Conventions on Environmental Impact Assessment in a Transboundary Context, on Transboundary effects of Industrial Accidents, and on Protection and Use of Transboundary Waters and International Lakes, have been ratified as well as the Convention on Transboundary Air Pollution and some of its protocols, while related instruments were adopted for implementation at national level. For instance, the implementation of the Convention on Industrial Accidents is under the responsibility of the Rescue Board under the Ministry of Internal Affairs.

(58) Improve the implementation of international conventions by strengthening links between the Ministry of the Environment and other ministries as many provisions of environmental conventions are of cross-sectoral nature;

Status: Inter-ministerial cooperation on the implementation of conventions has greatly improved. MoE now cooperates satisfactorily with Customs in the implementation of CITES, radioactive waste, and waste covered by the Basel Convention, and with the rescue board of the Ministry of Internal Affairs for the Convention on Transboundary Industrial Accidents and Oil Spills in the Baltic Sea.

(59) Accede to the Convention on Long-range Transboundary Air Pollution and its EMEP protocol, and consider the accession to the recent protocols on volatile organic compounds and sulphur taking into account, in particular, the investment requirements;

Status: The ratification of the Convention and of the EMEP protocol in 2000 have taken time because the capacities of the MoE in air management are weak. The obligations of EMEP were expensive to fulfil as it necessitated the upgrading of the Estonian EMEP stations. Finland has given its support and funding through the bilateral agreement it has with Estonia on air, an agreement due to be updated in May 2001.

(60) Prior to joining further conventions, evaluate both their environmental benefits and likely implementation costs in the light of international environmental responsibilities and commitments;

Status: It is now an established procedure to evaluate the environmental benefits and assess the implementation costs (for the government, the citizen and industry) of any convention before proposing it for ratification to the government.

(61) Speed up the ongoing negotiation of bilateral agreements with Latvia and the Russian Federation concerning the protection and use of transboundary water bodies, in particular the shared groundwaters and the Narva River basin, including Lake Peipsi.

Status: A bilateral agreement with Russia about the protection and use of water resources was concluded in 1997. It covers underground, lake and river waters. However, so far only Estonia fulfils its obligations regarding the monitoring of Lake Peipsi. There is no real basis on which to establish a bilateral agreement on waters with Latvia.

ANNEX II

SELECTED ECONOMIC AND ENVIRONMENTAL DATA

Selected environmental data

	Estonia 1995 a/	Estonia 1999 b/
LAND		
Total area *(1 000 km^2)*	45.3	...
Protected areas *(% of total area)*	7.8	11.8
Nitrogenous fertilizer use *(ton/km^2 arable land)*	2.7	0.8
FOREST		
Forest area *(% of land area)*	47.6	47.5
Use of forest resources (harvest/growth) *%*	0.9	...
Tropical wood imports *(US$/inh.)*	...	...
THREATENED SPECIES		
Mammals *(% of known species)*	26.2	28.3
Birds *(% of known species)*	13.0	25.7
Fish *(% of known species)*	2.8	36.1
WATER		
Water withdrawal *(% of gross annual availability)*	18.0	14.0
Fish catches *(% of world catches)*	0.1	0.1
Public waste water treatment *(% of population served)*	...	70.0
AIR		
Emissions of sulphur oxides *(kg/inh.)*	95.6	67.6
Emissions of sulphur oxides *(kg/US$ 1 000 GDP)*		...
Emissions of nitrogen oxides *(kg/inh.)*	26.0	10.0
Emissions of nitrogen oxides *(kg/US$ 1 000 GDP)*		...
Emissions of carbon dioxide *(ton/inh.)*	15.0	14.5
Emissions of carbon dioxide *(ton/US$ 1 000 GDP)*	...	...
WASTE GENERATED		
Industrial waste *(kg/US$ 1 000 GDP)*	42.3	...
Municipal waste *(kg/inh./day)*	336.0	393.3
Nuclear waste *(tonnes)*	...	...
NOISE		
Population exposed to leq > 65 dB (A) *(million inh.)*	...	...

Sources: Estonian Ministries of Economics and Transportation; Statistical Office of Estonia; OECD; UNECE; World Bank Atlas (1995).

a/ Data refer to 1993 or the latest data available.
b/ Data refer to 1999 or the latest data available.
c/ Change over the period: 1980-1993
d/ Change over the period: 199?-1999

Selected economic data

	Estonia 1995 a/	Estonia 1999 b/
TOTAL AREA *(1 000 km²)*	45.3	45.3
POPULATION		
Total population *(100 000 inh.)*	15.2	14.4
- % change	3.0 c/	... d/
Population density *(inh./km²)*	33.5	31.8
GROSS DOMESTIC PRODUCT		
GDP *(US$ billion)*	...	4.8 e/
- % change	...	...
per capita *(US$ per capita)*	...	3.4
INDUSTRY f/		
Value added in industry *(% of GDP)*	24.0	18.0
Industrial output		
- % change	...	...
AGRICULTURE		
Value added in agriculture *(% of GDP)*	10.3	5.2
ENERGY SUPPLY		
Total supply *(Mtoe)*	5.4	...
- % change	...	...
Energy intensity *(toe/ US$ 1 000)*	0.5	...
- % improvement	...	...
Structure of energy supply *(%)*	...	...
- Solid fuels	67.5	70.0
- Oil	25.8	11.0
- Gas	6.7	10.0
- Nuclear	-	...
- Others (hydro, etc…)	-	...
ROAD TRANSPORT		
Road traffic volumes		
- *million veh.-km*	...	...
- % change	...	...
- per capita *(1 000 veh.-km/inh.)*	...	...
Road vehicle stock		
- 10 000 vehicles	39.8	...
- % change	157.1 c/	... d/
- private cars per capita *(veh./1 000 inh.)*	26.5	...

Sources: Estonian Ministries of Economics and Transportation; Statistical Office of Estonia; OECD; UNECE; World Bank Atlas (1995).

a/ Data refer to 1993 or the latest data available
b/ Data refer to 1999 or the latest data available
c/ Change over the period: 1980-1993
d/ Change over the period: 199?-1999
e/ GDP at 1991 prices and purchasing power parities
f/ Includes mining and quarrying (ISIC 2), manufacturing (ISIC 3), and gas, electricity and water (ISIC 4)

ANNEX III
SELECTED MULTILATERAL AND BILATERAL AGREEMENTS

	Worldwide agreements		Estonia until 1995	Estonia from 1995 to 2001
as of 16 April 2001				
1949	(GENEVA) Convention on Road Traffic	**y**		
1957	(BRUSSELS) International Convention on Limitation of Liability of Owners of Sea-going Ships	**y**		
1958	(GENEVA) Convention on Fishing and Conservation of Living Resources of the High Seas	**y**		
1960	(GENEVA) Convention concerning the Protection of Workers against Ionizing Radiations	**y**		
1963	(VIENNA) Convention on Civil Liability for Nuclear Damage	**y**	**R**	
	1997 (VIENNA) Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage	**y**		
1963	(MOSCOW) Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water	**y**		
1969	(BRUSSELS) Convention on Civil Liability for Oil Pollution Damage	**y**	**R**	
	1976 (LONDON) Protocol	**y**		
1969	(BRUSSELS) Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties	**y**		
1971	(RAMSAR) Convention on Wetlands of International Importance especially as Waterfowl Habitat	**y**	**R**	
	1982 (PARIS) Amendment	**y**	**R**	
	1987 (REGINA) Amendments	**y**		
1971	(GENEVA) Convention on Protection against Hazards from Benzene (ILO 136)	**y**		
1971	(BRUSSELS) Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage	**y**	**R**	
1971	(LONDON, MOSCOW, WASHINGTON) Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-bed and the Ocean Floor and in the Subsoil thereof			
1972	(PARIS) Convention on the Protection of the World Cultural and Natural Heritage	**y**		
1972	(LONDON) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter	**y**		
	1978 Amendments (incineration)	**y**		
	1980 Amendments (list of substances)	**y**		
1972	(GENEVA) International Convention for Safe Containers	**y**		
1973	(WASHINGTON) Convention on International Trade in Endangered Species of Wild Fauna and Flora	**y**	**R**	
	1983 (GABORONE) Amendment	**y**		
1973	(LONDON) Convention for the Prevention of Pollution from Ships (MARPOL)	**y**		
	1978 (LONDON) Protocol (segregated balast)	**y**	**R**	
	1978 (LONDON) Annex III on Hazardous Substances carried in packaged form	**y**	**R**	
	1978 (LONDON) Annex IV on Sewage		**R**	
	1978 (LONDON) Annex V on Garbage	**y**	**R**	
1974	(GENEVA) Convention on Prevention and Control of Occupational Hazards caused by Carcinogenic Substances and Agents (ILO 139)	**y**		
1977	(GENEVA) Convention on Protection of Workers against Occupational Hazards from Air Pollution, Noise and Vibration (ILO 148)	**y**		
1979	(BONN) Convention on the Conservation of Migratory Species of Wild Animals	**y**		
	1991 (LONDON) Agreement Conservation of Bats in Europe	**y**		
	1992 (NEW YORK) Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS)	**y**		
	1995 (THE HAGUE) African/Eurasian Migratory Waterbird Agreement (AEWA)	**y**		
	1996 (MONACO) Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)			
1982	(MONTEGO BAY) Convention on the Law of the Sea	**y**		
	1994 (NEW YORK) Agreement Related to the Implementation of Part XI of the Convention	**y**		
	1994 (NEW YORK) Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks			
1985	(VIENNA) Convention for the Protection of the Ozone Layer	**y**		**R**
	1987 (MONTREAL) Protocol on Substances that Deplete the Ozone Layer	**y**		**R**
	1990 (LONDON) Amendment to Protocol	**y**		**R**
	1992 (COPENHAGEN) Amendment to Protocol	**y**		**R**
	1997 (MONTREAL) Amendment to Protocol			
1986	(VIENNA) Convention on Early Notification of a Nuclear Accident	**y**	**R**	
1986	(VIENNA) Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	**y**	**R**	
1989	(BASEL) Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	**y**	**R**	
	1995 Ban Amendment			
	1999 (BASEL) Protocol on Liability and Compensation			
1990	(LONDON) Convention on Oil Pollution Preparedness, Response and Cooperation	**y**		
1992	(RIO) Convention on Biological Diversity	**y**	**R**	
	2000 (CARTAGENA) Protocol on Biosafety			
1992	(NEW YORK) Framework Convention on Climate Change	**y**	**R**	
	1997 (KYOTO) Protocol		**S**	
1994	(VIENNA) Convention on Nuclear Safety	**y**		
1994	(PARIS) Convention to Combat Desertification	**y**		
1997	(VIENNA) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management			
1997	(VIENNA) Convention on Supplementary Compensation for Nuclear Damage			
1998	(ROTTERDAM) Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade			

Source:

y = in force; **S** = signed; **R** = ratified; **D** = denounced.

Selected bilareral and multilateral agreements *(continued)*

	Regional and subregional agreements		Estonia until 1995	Estonia from 1995 to 2001
as of 16 April 2001				
1950	(PARIS) International Convention for the Protection of Birds	**y**		
1957	(GENEVA) European Agreement - International Carriage of Dangerous Goods by Road (ADR)	**y**		
1958	(GENEVA) Agreement - Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts.	**y**	**R**	
1968	(PARIS) European Convention - Protection of Animals during International Transport	**y**		
	1979 (STRASBOURG) Additional Protocol	**y**		
1969	(LONDON) European Convention - Protection of the Archeological Heritage	**y**		
1973	(GDANSK) Convention on fishing and conservation of the living resources in the Baltic Sea and the Belts	**y**		
	1982 (WARSAW) Amendments	**y**		
1974	(Helsinki) Convention on the Protection of the Marine Environment of the Baltic Sea Area	**y**	**R**	
1979	(BERN) Convention on the Conservation of European Wildlife and Natural Habitats	**y**	**R**	
1979	(GENEVA) Convention on Long-range Transboundary Air Pollution	**y**		**R**
	1984 (GENEVA) Protocol - Financing of Co-operative Programme (EMEP)	**y**		
	1985 (HELSINKI) Protocol - Reduction of Sulphur Emissions by 30%	**y**		**R**
	1988 (SOFIA) Protocol - Control of Emissions of Nitrogen Oxides	**y**		**R**
	1991 (GENEVA) Protocol - Volatile Organic Compounds	**y**		**R**
	1994 (OSLO) Protocol - Further Reduction of Sulphur Emissions	**y**		
	1998 (AARHUS) Protocol on Heavy Metals			
	1998 (AARHUS) Protocol on Persistent Organic Pollutants			
	1999 (GOTHENBURG) Protocol to Abate Acidification, Eutrophication and Ground-level Ozone			
1991	(ESPOO) Convention on Environmental Impact Assessment in a Transboundary Context	**y**		**R**
1992	(HELSINKI) Convention on the Protection and Use of Transboundary Waters and International Lakes	**y**	**R**	
	1999 (LONDON) Protocol on Water and Health			
1992	(HELSINKI) Convention on the Transboundary Effects of Industrial Accidents	**y**		**R**
1992	(HELSINKI) Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992	**y**	**R**	
1992	(PARIS) Convention for the Protection of the Marine Environment of the North-East Atlantic			
1993	(OSLO and LUGANO) Convention - Civil Liability for Damage from Activities Dangerous for the Environment			
1994	(LISBON) Energy Charter Treaty		**S**	
	1994 (LISBON) Protocol on Energy Efficiency and Related Aspects		**S**	
1998	(AARHUS) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters			**R**

Source:

y = in force; **S** = signed; **R** = ratified; **D** = denounced.

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