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Foreword

Environmental Performance Reviews (EPRs) for countries in transition were initiated by Environment Ministers at the second "Environment for Europe" Conference in Lucerne, Switzerland in 1993. As a result, the UNECE Committee on Environmental Policy decided to make the EPRs a part of its regular programme.

Ten years later, at the fifth Ministerial Conference "Environment for Europe" (Kiev, 2003), the Ministers confirmed that the UNECE programme of EPRs had made it possible to assess the effectiveness of the efforts of countries with economies in transition to manage their environment. The Programme has addressed tailor-made recommendations to the Governments concerned on improving environmental management to reduce their pollution load, to better integrate environmental policies into sectoral policies and to strengthen cooperation with the international community. The Ministers also reaffirmed their support for the EPR programme as an important instrument for countries with economies in transition, and they decided that the programme should proceed with a second cycle of reviews. This second round, while taking stock of the progress made since the first review, puts particular emphasis on implementation, integration, financing and the socio-economic interface with the environment.

Through the Peer Review process, EPRs also promote dialogue among UNECE member countries and harmonization of environmental conditions and policies throughout the region. As a voluntary exercise, the EPR is undertaken only at the request of the country concerned.

The studies are carried out by international teams of experts from the region working closely with national experts from the reviewed country. The teams also benefit from close cooperation with other organizations in the United Nations system, including the United Nations Development Programme and the United Nations Environment Programme, and with the Organisation for Economic Co-operation and Development.

This is the second EPR of Ukraine published by the UNECE. The report takes stock of the progress made by Ukraine in the management of its environment since the country was first reviewed in 1999. While looking closely at the implementation of the recommendations of the first review, the report also covers 10 issues of importance to Ukraine concerning policymaking, planning and implementation; the financing of environmental policies and projects; and the integration of environmental concerns into economic sectors and the promotion of sustainable development. Issues receiving special attention during the review included compliance and enforcement mechanisms; economic instruments and environmental funds; and environmental management in energy, industry and transport activities and in land management.

I hope that this Review will be useful in supporting policymakers and representatives of civil society in their efforts to improve environmental management and further promote sustainable development in Ukraine, and that the lessons learned from the Peer Review process will also benefit other countries of the UNECE region.

Marek Belka
Executive Secretary
Economic Commission for Europe

Preface

The second Environmental Performance Review (EPR) of Ukraine began in May 2005 with a preparatory mission, during which the final structure of the report was discussed and established. After this the review team of international experts was established. It included experts from Belarus, Germany, Hungary, Lithuania and Sweden and from the secretariats of the Organisation for Economic Co-operation and Development (OECD) and the United Nations Economic Commission for Europe (UNECE).

The review mission took place from 23 October to 3 November 2005. The draft EPR report, translated into the national language with support from the Organization for Security and Co-operation in Europe (OSCE), was submitted to Ukraine for comments in May 2006. Comments and suggestions were discussed during a follow-up mission by the secretariat in June 2006. In October 2006, the draft was submitted for consideration to the Ad Hoc Expert Group on Environmental Performance. During this meeting, the Expert Group discussed the report in detail with expert representatives of the Government of Ukraine, focusing in particular on the conclusions and recommendations made by the international experts.

The EPR report, with suggested amendments from the Expert Group, was then submitted for peer review to the thirteenth session of the UNECE Committee on Environmental Policy on 9 October 2006**.** A high-level delegation from Ukraine participated in the peer review. The Committee adopted the recommendations as set out in this report.

The UNECE Committee on Environmental Policy and the UNECE review team would like to thank the Government of Ukraine and its experts who worked with the international experts and contributed their knowledge and assistance. UNECE wishes the Government of Ukraine further success in carrying out the tasks involved in meeting its environmental objectives, including the implementation of the conclusions and recommendations in this second review.

UNECE would also like to express its deep appreciation to the Governments of Austria, Estonia, Germany, Hungary, the Netherlands and Sweden, as well as the OSCE and the United Nations Development Programme for their support to the Environmental Performance Review Programme and to this review.

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ACRONYMS AND ABBREVIATIONS

AAUs	Assigned Amount Units
ACPP	Avdiyivka coke-processing plant
ARC	Autonomous Republic of Crimea
BAT	Best available techniques
BOD	Biological oxygen demand
CAEs	Collective agricultural enterprises
CBD	Convention on Biological Diversity
CCT	Clean coal technologies
CDM	Clean development mechanism
CEE	Central and Eastern Europe
CFC	Chlorofluorocarbon
CITES	Convention on International Trade in Endangered Species
CLRTAP	Convention on Long-Range Transboundary Air Pollution
CMM	Coal mine methane
CoM	Cabinet of Ministers
COD	Chemical oxygen demand
CPI	Consumer price index
CSD	Commission on Sustainable Development
DAI	Road Transport Police
DANCEE	Danish Co-operation for Environment in Eastern Europe
DDT	Dichlorodiphenyltrichloroethane
DSTU	State standards of Ukraine
EBRD	European Bank for Reconstruction and Development
EE	Energy efficiency
EECCA	Eastern Europe, Caucasus and Central Asia
EECONET	European Ecological Corridor Network
EIA	Environmental Impact Assessment
EMAS	Environmental Management and Auditing Scheme
EMEP	Cooperative Programme for Monitoring and Evaluation of the Long-range Transboundary Air Pollution in Europe
EMS	Environmental management system
EPR	Environmental Performance Review
ERU	Emissions reduction units
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign direct investment
FEC	Final energy consumption
FIAC	Foreign Investment Advisory Council
GAP	Good agricultural practice
GDP	Gross domestic product
GEF	Global Environment Facility
GHG	Greenhouse gases
GIS	Green Investment Schemes
GMO	Genetically modified organism
GRE	Gamma-radiation exposure
HC	Hydrocarbons
HDI	Human Development Index
HFO	Heavy fuel oil
IAEA	International Atomic Energy Agency
ICPDR	International Commission for the Protection of the Danube River
IPPC	Integrated pollution prevention and control
ICP	International Cooperative Programme
IAEA	International Atomic Energy Agency

ISO	International Organization for Standardization
JI	Joint Implementation
LEA	Law on Environmental Audits
LEAP	Local Environmental Action Plan
LEE	Law on Ecological Expertise
MAC	Maximum allowable concentration
MDGs	Millennium Development Goals
MEAs	Multilateral Environmental Agreements
MEP	Ministry of Environmental Protection
MIP	Ministry of Industrial Policy
NAP	National Action Programme
NATO	North Atlantic Treaty Organization
NBU	National Bank of Ukraine
NCESP	National Comprehensive Energy Saving Programme
NCSD	National Council on Sustainable Development
NERC	National Energy Regulatory Commission
NGO	Non-governmental organization
NEAP	National Environmental Action Plan
NEF	National Environmental Fund
NEHAP	National Environmental Health Action Programme
NSPDURSE	National Support Programme for the Development of Unconventional and Renewable Sources of Energy
NSDS	National Sustainable Development Strategy
ODS	Ozone-depleting substances
OECD	Organization for Economic Co-operation and Development
OSCE	Organization for Security and Co-operation in Europe
PAC	Pollution Abatement and Control
PCBs	Polychlorinated Biphenyls
PCA	EU-Ukraine Partnership and Cooperation Agreement
PDF	Project development facility
PEBLDS	Pan-European Biological and Landscape Diversity Strategy
PM	Particulate matter
POPs	Persistent organic pollutants
PPI	Producer price index
PPP	Purchasing power parity
PRTR	Pollutant Release and Transfer Register
REAP	Regional Environmental Action Plan
REC	Regional Environmental Centre for Central and Eastern Europe
RES	Renewable energy sources
RIA	Regulatory Impact Analysis
SDEP	State department for environmental protection
SEA	Strategic Environmental Assessment
SEE	State Ecological Expertise
SEI	State Ecological Inspectorate
SEMS	State Environmental Monitoring System
SERIEE	Eurostat European System for the Collection of Economic Data on the Environment
SEZ	Special Economic Zone
SoE	State of Environment
STA	State Tax Administration
TACIS	Technical Assistance to the Commonwealth of Independent States
TPES	Total primary energy supply
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

US	United States
USAID	United States Agency for International Development
VAT	Value-added Tax
VOCs	Volatile organic compounds
WHO	World Health Organization
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization

SIGNS AND MEASURES

..	not available
-	nil or negligible
.	decimal point
°	degree Celsius
$	dollar
g	gram
Gg	gigagram
GW	gigawatt
ha	hectare
Hrv	Hryvnia
kBq	kilobecquerel
kg	kilogram
km	kilometre
km/h	kilometres per hour
km^2	square kilometre
kWh	kilowatt-hour
m	metre
m^2	square metre
m^3	cubic metre
mg	milligram
mg/m^3	milligrams per cubic metre
Mtoe	megaton of oil equivalent
MW	megawatt
t	ton
toe	ton of oil equivalent

CURRENCY

Monetary unit: Hryvnia (abbreviation Hrv, plural Hryvnias)

Year	Hryvnias / US$
1993	0.05
1994	0.33
1995	1.47
1996	1.83
1997	1.86
1998	2.45
1999	4.13
2000	5.44
2001	5.37
2002	5.33
2003	5.33
2004	5.32
2005	5.12

Source : IMF. International Financial Statistics, August 2006.
Note : From 1993 to 1996 the official currency was Karbovanets. The Hryvnia replaced the Karbovanets on 2 September 1996 at the rate of 1 Hrv = 100,000 Krb.

EXECUTIVE SUMMARY

This second Environmental Performance Review (EPR) of Ukraine was carried out seven years after the first Review in 1999. It intends to measure the progress made by the country in managing its environment since then, and in addressing upcoming environmental challenges.

POLICYMAKING, PLANNING AND IMPLEMENTATION

Since its first Environmental Performance Review in 1999, Ukraine's economy has improved remarkably, with a strong increase in GDP every year. The economy has also undergone multiple structural reforms, which, however, have resulted in a loss of clear direction in many sectors, including environmental management. In recent years, environmental protection and sustainable development have been low on the political agenda.

Although a series of new laws and revised technical standards have significantly improved the basis for enforcement… Environmental legislation continued to develop rapidly until 2000, but the pace has slowed since then. Overall, environmental legislation is now comprehensive, with about 200 laws and by-laws, but it is also complex and sometimes inconsistent. It now needs to be arranged into systematic codes and harmonized with the European Union *acquis communautaire*, a huge and expensive task which would require about US$ 1 billion. Still, pollution standards need to be simplified and updated. The single-media-permitting system inherited from the past is not based on best available technologies, and it applies uniformly to all kinds of small and large pollution emitters. The sharing of responsibility between national, regional and local inspection bodies is unclear. Priorities for inspections are not defined. Self-monitoring by enterprises is not properly carried out and related data are not closely analysed. Last but not least, findings from inspections end up in statistical databases and are not followed up with in-depth analysis and appropriate actions. Although the transparency of administrative mechanisms has improved, the dialogue between the environmental authorities and the regulated community is below reasonable standards. Ukraine needs to anticipate the introduction of an integrated permitting system by giving proper training to inspection staff.

…development of environmental policies and strategies still has a long way to go. The strategic directions of the country for protecting its environment are unclear and are still based on a 1998 document that the first EPR already qualified as too vague. A solid environmental strategy is urgently needed, along with updated priorities. Whatever the time necessary for its elaboration, successful implementation will depend on the establishment of more stable institutional structures. The instability of environmental institutions is a recurrent and critical problem in Ukraine.

Ukraine has considerably broadened citizens' rights with regard to accessing environmental information and participating in environmental decision-making, a fact that is praised by non-governmental organizations (NGOs) themselves. The country has also made *remarkable progress in environmental education.* The public, mostly through NGOs, has access to environmental information and can participate in environmental projects. On the other hand, *environmental monitoring still needs major improvement.* Even though a monitoring programme was adopted in 2004, the related budget strengthened and the monitoring network developed, there are still significant gaps in the monitoring coverage; priorities are often absent or contradictory; the treatment of data is inappropriate; and the data are practically unavailable. Moreover, there is no process for reconciling the data collected by different ministries, which results in different sets of values being issued for the same indicator. Some oblast environmental authorities have recently established online databases linking all monitoring institutions and polluting enterprises in their regions, an effort that needs to be replicated in other oblasts and at the national level.

Ukraine's record of achievements in international cooperation is mixed. International technical assistance is based on a sound set of national laws and on three-year programmes that establish national priorities, but a reporting system would help give an accurate and updated picture of progress in project execution. Ukraine's implementation of international conventions benefits from effective laws and has in recent years been carried out actively in the area of nature and biodiversity protection. However, certain projects have been suspended

and are being audited upon donors' request. Another important issue for Ukraine is the Kyoto Protocol, which it ratified in 2004 and under which it could benefit from its unused carbon dioxide quotas by trading them, and from the introduction of cleaner technology through joint implementation mechanisms. Thus far, however, Ukraine has been slow to set up the necessary infrastructure and procedures to put the Kyoto mechanisms into practice, and many national enterprises are queuing up to secure a government decision on their proposed projects.

MOBILIZING FINANCIAL RESOURCES FOR THE ENVIRONMENT

Since the first review, there has been little progress in the development of economic instruments as incentives for environmental protection. The taxes on natural resources (mainly on land, extracted minerals and water) make the bulk of the environmental revenues and represented an average 1.1 per cent of GDP over the period 1998–2004. Revenues from emissions charges, which constitute a more modest 0.1 per cent of GDP, have doubled since 1998, mostly due to improved tax collection and some rate adjustments. Also positive is the decrease in the subsidization of energy, heat, water and other utility prices since 1998. Nevertheless, the system of environment-related taxes and pollution charges is still too complicated and the charge levels too low to act as a sufficient incentive for complying with regulatory targets.

There are more than 10,000 environmental funds in Ukraine over which the revenues from pollution charges are scattered, making the fund expenditures difficult to prioritize, rationalize and streamline within the scope of often unclear environmental priorities. In 2003, 84 per cent of National Environmental Fund expenditures were capital expenditures spent on water protection (36%), waste management (20%) and air protection (11%). However, it is a real challenge to assess whether local environmental funds spend money efficiently and on environmental purposes and priorities. The number of environmental funds needs to be reduced, their expenditures aligned with environmental priorities, and their managerial structures improved to follow international best practices.

Environmental expenditures doubled in absolute terms in the period 2002–2004, 80 per cent of them by enterprises. Expenditures from the environmental funds have also increased significantly since 1998. However, it is difficult to identify on what issues the money is actually spent, because the methodology for data collection, reporting and accounting for environmental expenditures is neither unified nor easy to trace. Also, there are no clear priorities for public and private investors regarding what Ukraine should focus its environmental spending on, as there is no national environment strategy giving directions, priorities and targets.

INTEGRATION OF ENVIRONMENTAL CONCERNS INTO ECONOMIC SECTORS, AND PROMOTION OF SUSTAINABLE DEVELOPMENT

Since 2002 there has been a slight decoupling between economic growth on one hand, and energy intensity and related pollution on the other hand. The insufficiency of domestic energy sources is a serious problem for Ukraine, which is only rich in low-quality coal with a high sulphur and ash content. In this context, energy savings are of key importance. The observed decoupling was partly due to the implementation of the Programme on Energy Savings (1997) and the decrease in the use of domestic coal. However, this trend is being increasingly offset by the resurgence of heavily polluting traditional industries, such as metallurgy, which are still using obsolete technologies. In 2006 Ukraine updated its Strategy on Energy until 2030, and it is adopting many new laws in this field. Economic measures are being introduced to promote energy efficiency. Nevertheless, energy supply remains a difficult problem. Energy prices are still cross subsidized, and the ever-rising world-market prices for natural gas and oil are slowing down the scheduled closure of coal mines and causing a new increase in the use of domestic coal. In parallel, the political trend toward energy independency for the country is reactivating projects to expand nuclear energy production. Meanwhile, the development of renewable energy sources is not getting enough attention.

The environmental pressure from industry has remained almost unchanged since the first review (in particular those from the heavy manufacturing industries), as the structure of industry is still the same. Overall, air emissions have increased, as have greenhouse gas emissions, a large proportion of which come from methane emissions from mines. Environmental data related to industrial activities (for example, on common and hazardous waste, wastewater, pollution of soil and water bodies) is lacking, and therefore the exact environmental impact is

difficult to evaluate. Although overall capital investments have grown significantly since 2002, the environmental performance of industry has not improved much. This is shown by the small number of enterprises that have introduced environmental management systems (about 30 enterprises had ISO 14000 certification by the end of 2005), the handful of pilot projects initiated on the introduction of integrated pollution prevention and control, and the insufficient capacity and low efficiency of clean technology centres. Moreover, the industrial sector lacks strategies and policies for its sustainable development. Political pressure to encourage industry to put priority on environmental protection is strongly needed. There is a big potential to modernize industrial technology through developing joint implementation projects under the Kyoto protocol, but this potential is unexploited.

The growing environmental pressures from the transport sector have not yet caught sufficient attention of the authorities. There is no national strategy for transport. The little interest paid to the environmental impacts of this sector is reflected in the very poor related statistical data available. The deteriorating quality of urban air is a growing concern, linked to the use of bad quality fuels, obsolete vehicle engines, increasing number of private cars and resulting traffic congestion problems. With the economic recovery and improving standards of living, the ageing public transportation fleet is at risk to be offset by the development of private cars. The government and the municipalities underestimate the environmental problems brought by the transport sector. Strategic concepts for the sustainable development of this sector are badly needed, as the sector is under rapid and profound transformation.

The sustainable management of rural and urban land is another challenge for Ukraine. With the privatization process well advanced, the number of landowners and land parcels in private ownership has increased dramatically. This has not solved the many existing land management problems: large areas of eroded land (5.8% severely eroded), land degraded by human activities (18%), reduced soil fertility and contaminated land; soil acidification, compaction and salinization caused by agricultural practices; fragmentation of habitats; uncontrolled development of infrastructure; and urban sprawl. The state has permitted privatization of areas that should have been protected, and it now needs to buy back plots if it wants to increase the share of protected land (currently only 4.5% of the territory). The Land Code of 2001 stipulates all the provisions for sustainable land management, but the key tools are still missing: there is no land cadastre or title registry system, and therefore the land market is not functioning properly. Moreover, privatization has resulted in land fragmentation, which seriously complicates the implementation of good agricultural practices and impairs the protection of biodiversity. Urban development, land protection and land use lack an appropriate strategic, legal and institutional framework that would ensure a more rational use and protection of land.

INTRODUCTION

I.1 Physical context

Ukraine is the second largest country (total area 603,548 km^2) in Europe, with seven neighbouring countries. It is bordered in the north by Belarus (border length 891 km), in the northeast and east by Russia (border length 1,576 km), in the south by the Black Sea and the Sea of Azov, in the southwest by the Republic of Moldova (border 939 km) and Romania (south 169 km and west 362 km); and in the west by Poland (border 428 km), Slovakia (border 90 km) and Hungary (border 103 km). (See Map I.1.)

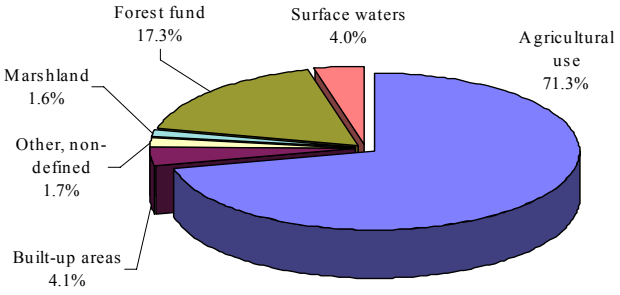
The highest elevations are found in the Carpathian Mountains in the west and the Crimean Mountains at the southern end of the Crimean peninsula. The highest peak, Mount Hoverla (2,061 m), is in the Carpathian Mountains. The mountainous areas cover only about 5 per cent of Ukraine's territory, while most of the country is rolling upland plain. A lowland region of wooded bogs and swamps, called the Polissya (Poles'ye) or the Prypyat Marshes, is located in northern Ukraine. Much of this marshland region has been drained and cleared for agriculture. Low-lying plains are found in southern Ukraine in the lower Dnipro (Dnepr) River Basin and the Black Sea coastal region.

The landscape of fertile plains, steppes and plateaus is crossed by rivers and dotted by more than 3,000 lakes, which cover about 4 per cent of the country's territory. The only major northward-running river, which joins the Wisla River in Poland, is Zahidnyi Buh (Western Bug, 401 km); all other major rivers flow southward and empty into the Black Sea or the Sea of Azov. Ukraine's longest, and Europe's third longest, river, the Dnipro, runs 1,121 kilometres of its total length of 2,290 kilometres within the country's borders and forms a river network to which over half the rivers in the country belong. Other major rivers are the Dnister (925 km), the Pivdennyi Buh (Southern Bug, 806 km) in the west and the Siverskyi Donets (700 km) in the east. The Dunai (Danube) Delta in the southwest forms part of Ukraine's border with Romania. In addition, Ukraine has 2,782 kilometres of Black Sea coastline.

Ukraine has rich and varied natural resources. About half of the country, especially in the central and southern regions, is covered with the exceptionally fertile black chernozem soil, which is ideally suited for agriculture. Forest resources also abound, covering 17 per cent of the territory.

The Donetsk Basin (Donbas) in the southeast has large deposits of coal, while the east central Kryvyi Rih area is rich in iron ore. Ukraine also has some of the world's largest manganese deposits, located in southern Ukraine at Nikopol'. There are deposits of oil and natural gas in the Carpathian foothills and the Donetsk Basin and along the Crimean coast.

Figure I.1: Land use, 1 January 2002



Source: State Statistics Committee of Ukraine: Statistical Yearbook 2003. Kyiv 2004.

The largest cities include Kyiv (Kiev) (pop. 2.639 million), the country's capital and economic, cultural, and educational centre; Kharkiv (pop. 1.464 million), where engineering expertise, machinery plants and educational institutions are concentrated; Dnipropetrovsk (pop. 1.063 million), a hub of metallurgical and aerospace industries; and Donetsk (pop. 1.004 million), a mining and metallurgy centre. Odesa (Odessa) (pop. 1.013 million), on the Black Sea coast, is the country's largest seaport.

The moderate, continental climate has four distinct seasons, with cold winters and warm summers. In eastern Ukraine, air masses from the steppes of Central Asia often make summers warmer and winters colder than in the west. The Crimean coast has a Mediterranean climate, with mild, wet winters and hot, dry summers. The average temperature in Kyiv is -6°C in January and 20°C in July. The average annual precipitation is 500 mm, although there are considerable regional variations. The precipitation is highest in the Carpathian Mountains and lowest on the Black Sea coast, and in general the rainfall tends to be heaviest in the summer months throughout the country.

I.2 Human context

The diminishing population is the most notable feature of Ukraine's demographic development. A 9.2 per cent population decrease between 1990 and 2005 brought the total population down to 46.9 million. This development is related to the social and economic upheaval of the 1990s, when a deep economic recession caused economic emigration while worsening social conditions led to reduced fertility, a rising death rate and falling life expectancy. The total fertility rate dropped to a very low 1.2 in 2003, the general mortality rate increased and the average life expectancy fell from 70.5 years in 1990 to 68.0 years in 2005. The only positive development was the trend in the infant mortality rate, which decreased by 23.0 per cent to 10.0 deaths per 1,000. The average density of the population in 2005 was 77.8 inhabitants/km^2. The industrial regions in the east and southeast are the most densely populated, and about 70 per cent of the population lives in urban areas. (See Table I.1.)

Ukraine's two main ethnic groups, Ukrainians (77.8%) and Russians (17.3%), make up over 95 per cent of the total population. Other ethnic groups are small and include Belarusians (0.6%), Moldovans (0.5%), Crimean Tatars (0.5%), Bulgarians (0.4%), Poles (0.3%), Romanians (0.3%), Hungarians (0.3%) and Jews (0.3%).

Ukrainian has the status of state language, while widely spoken and linguistically closely related Russian is very important culturally and economically. Russian is understood throughout the country. Ukrainian is mainly spoken in the western part of the country, while in the eastern Ukraine Russian's influence is strong and in the Crimean peninsula Ukrainian is virtually unused.

Education is compulsory between the ages of 7 and 15, and the literacy rate is almost 100 per cent. The institutions of higher learning include 38 universities and a number of institutes and academies. The Lviv State University (founded in 1661) is the country's oldest university.

The United Nations Development Programme's Human Development Index (HDI) for Ukraine was 0.665 (on a scale from 0 to 1) in 1995, when Ukraine ranked 102nd out of 174 countries reviewed; the 2003 HDI figure was 0.766 and Ukraine placed 78th out of 177 countries reviewed.

I.3 Institutions

Executive system

In the wake of the "Orange Revolution", a series of popular protests and political events that took place throughout the country during the Presidential election in late 2004, democratic changes were made to the executive system. As of 1 January 2006, a constitutional reform established a parliamentary-presidential system. The President is elected by popular vote for a five-year term. A coalition in the Verkhovna Rada (Parliament), representing majority of members of Parliament, nominates Prime Minister. The President then submits the Prime Minister nomination to the whole Parliament. The appointed Prime Minister is responsible for appointing the Cabinet of Ministers, which has to be approved by a majority in the Parliament. The Minister of Defence, the Minister of Foreign Affairs, the Head of the Security Service and the Secretary of the Council of National Security and Defence are also appointed by the President.

Table I.1: Demography and health indices, 1990 and 1995–2005

	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Birth rate (per 1,000)	12.7	9.6	9.2	8.7	8.4	7.8	7.8	7.7	8.1	8.5	9.0	9.0
Fertility rate	..	1.4	1.3	1.3	1.2	1.2	1.2	1.1	..	1.2	..	..
Mortality rate (per 1,000)	12.2	15.5	15.3	14.9	14.4	14.9	15.4	15.3	15.7	16.0	16.0	16.6
Infant mortality rate (per 1,000)	13.0	14.8	14.5	14.0	12.8	12.8	11.9	11.3	10.3	9.6	9.5	10.0
Life expectancy at birth (years)	70.5	66.9	67.2	67.4	68.1	68.3	67.9	68.3	68.3	68.2	68.2	68.0
Female life expectancy at birth (years)	75.0	72.6	72.9	73.0	73.5	73.7	73.6	74.1	74.1	74.1	74.1	74.0
Male life expectancy at birth (years)	65.7	61.3	61.7	61.9	62.7	63.0	62.4	62.8	62.7	62.6	62.6	62.2
Population aged 0–14 years (%)	21.4	20.3	19.9	19.3	18.6	17.9	17.2	16.5	15.8	15.3	14.8	14.7
Population aged 65 years or over (%)	12.1	13.7	13.9	14.1	13.9	13.9	14.1	14.4	15.0	15.5	16.0	16.1

Sources: WHO. Health for All database for the years 1990, 1995, 1996 and State Committee on Statistics for the 1997-2005

The highest executive power lies with the Cabinet of Ministers. The Cabinet of Ministers answers to the Parliament. Execution of the Cabinet of Ministers resolutions is mandatory. The Prime Minister can be dismissed by a resolution of no confidence in the Cabinet of Ministers passed in Parliament.

The unicameral 450-member Parliament is the country's legislative body, which initiates legislation, ratifies international agreements, approves the budget, appoints a number of officials and elects judges. The parliamentary electoral system has been constantly altered, and therefore each convocation of the Verkhovna Rada since independence has been elected under a different set of laws. A fundamental change has been the gradual but consistent transformation from a purely majoritarian Soviet-era election model to a purely proportional model, which was introduced in the 2006 elections. Five parties and political blocs crossed a required 3-per cent threshold and received seats in the 2006 Parliament.

Judicial system

The judicial system has four levels. Lowest are *local courts* of general jurisdiction (combining criminal and civil jurisdiction), which include rayon, rayon in town and town courts; oblast courts; administrative local courts; military local courts; and the city courts of Kyiv and Sevastopol. One step up are *appeals courts,* which include the appeals court of the Autonomous Republic of Crimea; oblast appeals courts; the appeals courts of the cities of Kyiv and Sevastopol; the appeals court of the Ukrainian Navy; oblast military appeals courts; economic appeals courts; administrative appeals courts; and High Specialized courts. At the third level is the Appeals Court of Ukraine, which covers civil, criminal and military cases. The highest court in general jurisdiction is the Supreme Court, which has judicial chambers for criminal, civil and arbitration cases.

The Constitutional Court of Ukraine is above the general jurisdiction level. It is composed of 18 judges appointed in equal shares by the President, the Parliament and the Congress of Judges. The Constitutional Court has the power to nullify any laws, acts of the Parliament and the Cabinet, presidential decrees or acts of the parliament of the Autonomous Republic of Crimea if they are found to violate the Ukrainian constitution.

Administrative system

Administratively Ukraine is divided into 24 oblasts (regions), two special-status cities, Kyiv (Kiev) and Sevastopol, and the Autonomous Republic of Crimea. Oblasts are divided into smaller administrative units – rayons (districts). Each oblast and rayon has its own elected Council of Deputies and a parallel state administration, the heads of which are appointed by the President. Local councils and city mayors are popularly elected every four years and exercise control over local budgets, being responsible for their jurisdiction's taxes, schools, roads, utilities, and public health. A governor appointed by the President leads the state administration in each oblast and rayon. The governments of the cities of Kyiv and Sevastopol operate independently of oblast authority and are responsible only to Ukraine's central government. The Autonomous Republic of Crimea has its own constitution, legislature and Cabinet of Ministers but is prohibited from implementing policies that would contradict the constitution of Ukraine.

I.4 Economic context

With its rich farmlands, a traditionally well-developed industrial sector, a highly trained labour force, a good education system, and a domestic market of 47 million people, Ukraine has a good base for a prosperous economy. However, it inherited a Soviet-style industrial-economic system based on heavy industries like steel, chemicals, shipbuilding, coal, machine tools and arms production, having been fully integrated into the economy of the Soviet Union. With the collapse of the Soviet Union, Ukraine's economy and production base were hard hit by the loss of traditional export markets. The confusion of the transition process brought with it hyperinflation, currency depreciation, high budget deficits and deterioration of living standards – even poverty – for a large part of the population.

The economy's downward circle came to an end in 1999 when the country's GDP bottomed out at 40.9 per cent of its 1990 level. The upswing was a product of several simultaneous contributing factors. In 1999, the belated effect of the 1998 currency devaluation, together with expanded demand from Ukraine's major trading partners, caused strong growth in Ukrainian exports and a significant drop in imports. This led to both a positive trade balance and a current account balance for 1999. Export-led growth was supported with a balanced budget and tighter monetary policy. In 2000, a reduction of wage arrears and growth of real wages sustained private consumption, which, alongside net exports, supported continued growth. The 10-year GDP decline ended in 2000 when GDP grew 5.9 per cent.

Table I.2: Ministries and other state authorities

Ministries
Ministry of Environmental Protection
Ministry of Agrarian Policy
Ministry of Coal Industry
Ministry of Construction, Architecture and Housing and Communal Services
Ministry of Culture and Tourism
Ministry of Defense
Ministry of Economy
Ministry of Education and Science
Ministry of Finance
Ministry of Foreign Affairs
Ministry of Fuel and Energy
Ministry of Health
Ministry of Industrial Policy
Ministry of Internal Affairs
Ministry of Justice
Ministry of Labor and Social Policy
Ministry of Transport and Communications
Ministry of Family and Sport
Ministry of Ukraine of Emergencies and Affairs of Population Protection from the Consequences of Chornobyl Catastrophe (Ministry of Emergencies)
State Committees and other central authorities
Central Control- Revision Administration
Higher Examination Board
Committee)
Pension Fund of Ukraine
State Committee for State Material Reserve
State Committee for TV and Radio Broadcasting
State Committee for Water Management
State Committee on Archives
State Committee on Land Resources
State Committee on Nationalities and Migration
State Forestry Committee
State Nuclear Regulation Committee
State Office for Motor Roads (Central Authority which status is equal to the State Committee)
State Treasury
Ukraviatrans
Central authorities with special status
Antimonopoly Committee
Main Department of Civil Service
National Commission for Communications Regulation
National Electricity Regulation Commission
Security Service
State Commission for Regulation of Financial Services Markets
State Commission for Securities and Stock Market
State Committee for Financial Monitoring
State Committee for Technical Regulation and Consumer Policy
State Committee of Statistics
State Committee of Regulatory Policy and Entrepreneurship
State Court Administration
State Customs Service
State Department of Execution of Punishment
State Frontier Service
State Property Fund
State Service of Export Control
State Tax Administration
State-Owned Guard and Protection Service

GDP continued to expand strongly until 2004 (see Table I.3), but the trend seems to have slowed in 2005. This continuous five-year increase in economic activity has enabled the GDP in current prices (in US dollars) almost triple since 1999. A similar development in industry, with over 10 per cent annual growth in the same period, has brought industrial production almost back to its 1989 (pre-independence) level.

Hyperinflation, which peaked at 4,700 per cent in 1993, was brought under control in the late 1990s. Ukraine introduced a new currency, the hryvnia (Hrv), in September 1996. Since January 2000, the National Bank of Ukraine (NBU) has had a managed floating exchange rate regime coupled with a relatively prudent monetary policy, which have kept the exchange rate stable. However, these measures have not been able to fully control inflation, and the consumer price index (CPI), which had fallen to an annual rate of 0.8 per cent in 2002, crept up to 9.0 per cent in 2004. While Ukraine's economy has been booming since 2000 and there is a reasonable prospect of macroeconomic stability, foreign direct investment (FDI) has stalled at a very low level. The total cumulative FDI of Ukraine as of January 2005 was approximately US$ 9.0 billion, which, at US$ 192.1 per capita is a very low figure. However in 2005 FDI increased considerably. The main reason was the sale of Kryvorizhstal metallurgy company to Mittal Steel, which brought in about US$ 4.5 billion.

The typical reasons given for the low FDI are the complexity of laws and regulations, poor corporate governance, weak enforcement of contract law by courts, and corruption. Corruption is a major problem in Ukraine. Transparency International's Corruption Perceptions Index of 2005 ranked Ukraine as 107th among countries surveyed, with a score of 2.6 (with 10 indicating the least possible amount of corruption). The level of corruption is reported to deter foreign investment and economic development.

A salient feature of the Ukrainian economy is its high energy dependence. Ukraine imports 90 per cent of its oil and most of its natural gas. The main supplier of oil is Russia, while natural gas imports come from two sources. Russia provides 23 per cent of Ukraine's natural gas as a barter payment for the transportation of Russian gas to Western Europe, while Turkmenistan supplies 55 per cent of the country's natural gas for a combination of cash and barter. In early 2006 Ukraine and its main gas suppliers negotiated a new gas price and transportation fee agreement, which led to significant increases in both sets of prices.

Ukraine is a member of the International Monetary Fund, the World Bank and the European Bank for Reconstruction and Development. The European Union granted a market-economy status to Ukraine in November 2005. Ukraine applied for membership in the World Trade Organization (WTO) in November 1993, but its accession process has been stalled for several years. However since 2005 the negotiations on accession to WTO intensified. The Government views accession to WTO as a key trade policy objective. To assure that Ukrainian laws conform to WTO requirements, the Parliament has adopted a number of key bills, including on intellectual property rights. Although several WTO-related bills, particularly on agricultural issues, have faced strong parliamentary opposition, many significant tariff cuts have been ratified. Currently Ukraine has observer government status at the WTO.

I.5 Main sectors of economic activity and their impact on environmental quality

In 2003 industry's share of Ukraine's GDP was 29.8 per cent. The dependence on heavy industry, together with relatively low energy prices and aging industrial infrastructure, has caused the country's industrial sector to be several times as energy intensive as those in Central and Eastern Europe (CEE) and Western Europe. High energy consumption by industry has been aggravated by the rapid, industry-led economic expansion since 2000.

Energy

Ukraine's energy intensity is several times higher than in Western European countries. Aging energy infrastructure, inefficient production and use of energy, and energy intensive structure of industrial production with a high share of the steel industry are among major factors contributing to such high consumption.

Industry consumes over 40 per cent of total energy. Steel production, one of the main export industries, is the main consumer. Over 60 per cent of the sector's output is produced with outdated open-hearth production method, causing energy expenses to be more than 40 per cent of total production costs, compared to average 20 per cent in Great Britain.

Another big energy consumer is the heating sector, in particular district heating. Outdated equipment and infrastructure and their poor maintenance are the causes of low efficiency and considerable distribution losses.

With the 54GW of installed power generating capacity Ukraine's power sector is the twelfth largest in the world and has enough capacity to supply more than twice the electricity the country needs. In 2004, installed thermal power plants capacity was 67 per cent of the total but, due to the low capacity utilization rate, they generated only 40 per cent of the total electricity. A startling number, 96 per cent of all thermal plants, have reached or exceeded the end of their service life and are becoming obsolete almost simultaneously. Losses in transfer and distribution are about 10 per cent of all produced energy.

Manufacturing

The manufacturing sector accounts for over 75 per cent of total industrial production and has been driving Ukraine's sustained economic growth since 2000. Metallurgy accounted for around 27 per cent of industrial output in 2004. Other sectors such as engineering, food and light industries have become increasingly important contributors to growth. In 2003, machine building was the fastest-growing branch of the manufacturing sector, accounting for 13.4 per cent of industrial output.

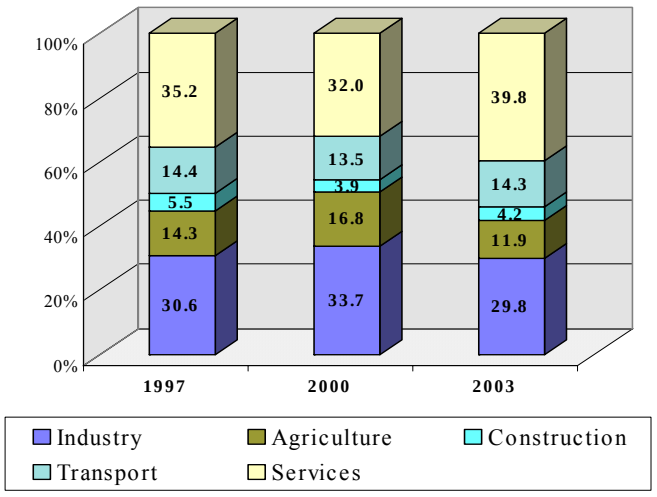
The steel industry dominates the Ukrainian economy. During the first 10 months of 2004 it produced 27 per cent of the country's total industrial output and accounted for 44 per cent of exports. In addition, the steel industry is by nature a huge energy consumer and consequently also a major source of pollution emissions. In 2004, the capacity utilization of Ukraine's steel industry was at a high 89 per cent, and Ukraine was the seventh biggest metal producer in the world, producing 7.5 per cent of the world's steel. The steel industry created the biggest FDI inflow in the country's history when Mittal Steel invested US$ 4.8 billion in the acquisition of the Kryvorizhstal plant in 2005. The overcrowded world steel market will pose a threat to the development of the steel industry in Ukraine. The rise of gas prices (which constitute 7–12% of steel production costs) in early 2006 is likely to erode the profitability of steel plants and adversely affect Ukraine's economy.

Extraction industry

The mining industry accounted for 9 per cent of industrial production in 2003. Ukraine is the world's fifth largest producer of iron ore (63 million tons in 2003) and exports about 15 per cent of its total output. Ukraine is also one of the largest producers of manganese, coal, titanium, graphite and kaolin. Mining of energy-producing materials is dominated by the extraction of coal, oil and natural gas.

Most of Ukraine's 37.6 billion tons of proven (2003) coal reserves consist of low-quality coal with a high sulphur content. All extracted coal is consumed domestically; about two thirds of it by power stations and the rest to produce coke for the metallurgy sector. After 1995 coal production stabilized at about 80 million raw tons per year. The coal industry has a large number of unprofitable mines and until recently was heavily subsidized by the Government. Currently there are 165 working mines, and the industry employs about 300,000 workers.

Figure I.2: GDP composition by sector, 1997, 2000 and 2003



Source: State Statistics Committee of Ukraine: Statistical Yearbook 2003. Kyiv 2004.

Table I.3: Selected economic indicators, 1995–2005

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GDP (1990=100)	..	..	41.7	40.9	40.8	43.2	47.2	49.7	54.4	61.0	63.0
GDP (% change over previous year)	-12.2	-10.0	-3.0	-1.9	-0.2	5.9	9.2	5.2	9.6	12.1	3.0
GDP in current prices (million Hrv)	54,516	81,519	93,365	102,593	130,442	170,070	204,190	225,810	267,344	345,113	472,741
GDP in current prices (million US$)	37,017	44,562	50,152	41,883	31,581	31,262	38,009	42,393	50,133	64,881	82,881
GDP per capita (US$)	722	876	989	833	633	632	781	879	1,049	1,376	1,760
GDP per capita (US$ PPP per capita)	3,794	3,506	3,486	3,484	3,557	3,880	4,394	4,762	5,360	6,179	..
Industrial output (1989=100)	52.4	49.7	49.6	49.1	51.1	57.8	66.0	70.6	81.8	92.0	94.9
Agricultural output (% change over previous year)	..	..	-1.8	-9.6	-6.9	9.8	10.2	1.2	-11.0	19.9	0.0
CPI (% change over the preceding year, annual average)	377.0	80.3	15.9	10.6	22.7	28.2	12.0	0.8	5.2	9.0	..
PPI (% change over the preceding year, annual average)	172.1	17.3	5.0	35.3	15.7	20.8	0.9	5.7	11.1	24.1	..
Registered unemployment (% of labour force, end of period)	0.6	1.5	2.3	3.6	4.2	4.1	3.6	3.7	3.5	3.5	3.1
Current account balance (million US$)	-1,152	-1,185	-1,335	-1,296	1,658	1,481	1,402	3,173	2,891	6,804	..
" " (as % of GDP)	-3.1	-2.7	-2.7	-3.1	5.3	4.7	3.7	7.5	5.8	10.5	..
Net FDI inflows (million US$)	257	526	581	747	489	594	769	698	1,411	1,711	..
Net FDI flows (as % of GDP)	0.7	1.2	1.2	1.8	1.5	1.9	2.0	1.6	2.8	2.6	..
Cumulative FDI (million US$)	776	1,302	1,883	2,630	3,119	3,713	4,482	5,180	6,591	8,302	..
Foreign exchange reserves (million US$)	1,051	1,960	2,341	761	1,046	1,353	2,955	4,241	6,731	9,302	..
" " " (as months of imports)	0.7	1.2	1.4	0.6	1.0	1.1	2.1	2.8	3.5	3.8	..
Net external debt (million US$)	6,949	7,240	7,959	11,639	12,472	10,519	9,194	8,467	17,080	..	..
Balance of trade in goods (million US$)	-2,702	-4,296	-2,896	-2,038	-265	617	490	980	47	3,669	-1,908
Exports of goods (million US$)	14,244	15,547	14,232	12,637	11,582	14,573	16,265	17,957	23,067	32,666	34,228
Imports of goods (million US$)	16,946	19,843	17,128	14,676	11,846	13,956	15,775	16,977	23,020	28,997	36,136
Ratio of net debt to exports (%)	48.8	46.6	55.9	92.1	107.7	72.2	56.5	47.1	74.0	..	..
Ratio of net debt to GDP (%)	18.8	16.2	15.9	27.8	39.5	33.6	24.2	20.0	34.1	0.0	..
Exchange rates: annual averages (Hrv / US$)	1.5	1.8	1.9	2.5	4.1	5.4	5.4	5.3	5.3	5.3	5.1
Population (million)	51.3	50.9	50.4	49.9	49.4	48.9	48.5	48.0	47.6	47.3	46.9

Sources: UNECE Common Statistical Database, 2005 and State Committee on Statistics, 2006.

The country has 1.3 billion tons of proven oil reserves. Total production of crude oil and gas condensate equaled 4.2 million tons in 2004. In 1999–2000, when some of Ukraine's refineries were privatized, Russian and Kazakh companies in particular invested heavily in the oil refining sector. In 2003, most of the 21.2 million tons of oil refined were exported.

Ukraine has 6.4 trillion cubic metres of proven natural gas reserves. Its annual 19 billion cubic metres of total domestic gas production was enough to meet about one quarter of domestic consumption needs in 2004.

Transport

The transport sector's share of GDP has remained relatively steady since 1997, and in 2003 it stood at 14.3 per cent. The sector seems to be experiencing a modal shift to the direction of the road transport, although railways dominate freight transport with an 85 per cent share. The vehicle fleet is changing dramatically. The current stock of passenger cars is a relatively low 110 cars per 1,000 inhabitants, but the fleet has been growing very fast. Since independence the number of passenger cars has grown by 75 per cent, while the stock of private trucks has increased more than 60 per cent since 1997. Currently, national and World Health Organization standards for local ambient air quality for specific pollutants are exceeded in almost all major Ukrainian cities.

Agriculture

Though agriculture's share of GDP has been falling since 1997, still in 2003 it accounted for 11.9 per cent of Ukraine's GDP. In 2006, agricultural land covered 71.3 per cent of the country's land area; out of this, 69.1 per cent was productive agricultural land and 53.8 per cent arable land. Ukraine's land resources are excellent for agriculture. The country has over 25 per cent of the world's chernozem within its territory.

The land ownership sector changed fundamentally after independence, and this has also affected the agricultural sector. The land privatization and reform started in 1991 had several phases and is still not yet finished (see Chapter 10 for more details). First, the large state and collective farms (sovkhozes and kolkhozes) were restructured and their land transferred to collective agricultural enterprises. Then, in 1994, the Government privatized land through the distribution of land share certificates and later allowed free trade of these certificates. As a result about 6.9 million people became land share owners. In the third stage of the privatization, the land share certificates were to be exchanged for actual parcels of land. The first and second stages were implemented easily, but the distribution of land has taken more than 10 years. As of January 2006 about 5.7 million Land State Acts had been issued, and the average size of a land plot was about 4 ha.

Ukraine's soil is prone to erosion, and over 30 million hectares (i.e. about half Ukraine's total territory) of land is strongly affected by erosion. Some agricultural practices, like planting too large a proportion of row crops (sugar beet, sunflower, etc.), exacerbate the problem. Undefined land ownership during the transition period may have led to a neglect of land protection and has increased the risk of erosion. Undefined ownership rights have also led to illegal cutting of tree belts that serve as wind breaks around farmland.

Before 1991, Ukrainian agriculture used mineral fertilizer intensively (141 kg/ha in 1991), which led to nutrient leaching. Due to the economic crisis the use of mineral fertilizers fell to low levels (22 kg/ha in 2003). A decrease in livestock production after 1991 led to a reduction in nutrient leachate from manure and urine, although this remained a problem. Both mineral and natural nutrient leaching are on the rise again, although from a very low level. The use of pesticides in agriculture has had two effects: leaching to the surface and groundwater, and the presence of pesticide residues in products. Pesticide use diminished in the 1990s but is expected to increase again. The storage of obsolete pesticides in inadequate conditions could be dangerous. About 19.3 thousand tons of obsolete pesticides are stored at 4,983 storage facilities of agricultural enterprises, and 33 per cent of the storage sites do not meet sanitary and environmental requirements.

I.6 Environment

Air

Air emissions from stationary sources have remained rather stable since 2001 in spite of the economic upswing. Stationary source emissions from industrial activities are still a major source of air pollutants. In 2004, 62 per cent of industrial air emissions came from manufacturing, 37 per cent from mining and quarrying and 1 per cent from construction materials. Total air emissions from mining increased almost 10 per cent from 2003 to 2004. During the same period, emissions from metallurgical enterprises, which generate 75 per cent of all emissions by manufacturing industries, rose 6 per cent.

The repair and replacement of old and outdated equipment for air pollution abatement (e.g. repair of electrostatic filters), mainly in large metallurgical plants, and the introduction of and investment in new, cleaner technological processes may explain the relative stability of emissions levels, although the country's incomplete data on industrial air emissions makes accurate analysis of the situation difficult.

In 2004 the energy sector produced 43 per cent (1.8 million tons out of 4.2 million tons) of the total air emissions from stationary sources in that year. In 1996, Ukraine adopted the National Energy Programme until 2010 to rehabilitate its thermal power stations. The programme specified technological improvements such as the use of renewable energy sources and the modernization of power plants to reduce emissions levels. Many of these reconstruction and modification projects have been delayed because of insufficient state budget financing, unfavourable legislation or insufficient private investment.

In 1990 Ukraine was the fifth largest emitter of greenhouse gases among the Annex I countries of the United Nations Framework Convention on Climate Change (UNFCCC). Ukraine has agreed to stabilize its emissions of greenhouse gases at 1990 levels by 2008–2012. The substantial reduction in industrial activities during the 1990s led to a decrease in emissions levels, and current emissions are more than 30 per cent below 1990 levels despite the recent increase in metal production. In 1998 about half of CO_2 emissions were generated by heat and power production, 20 per cent by manufacturing, 20 per cent by commercial and residential areas and 7 per cent by the transport sector. A reduction in CO_2 emissions could be achieved with relatively low investment and repair/rebuilding costs. The emissions rights conserved thereby could be sold under the Kyoto Protocol to foreign countries or enterprises to create financing for the modernization of the industrial infrastructure. However, Ukraine has been slow to create the necessary implementation mechanisms (see Chapter 4 for details).

Water

In 2001, internal renewable water resources per capita were 1,091 cubic metres in Ukraine, compared to an average of 9,089 cubic metres in Europe. Water resources are unevenly distributed in the country. In the north and northwest they are sufficient, while the south suffers water shortages and depends on water transfers, the Dnipro (Dnepr) River being the main source of water supply.

The quality of natural waters is a concern for Ukraine. In 2005, national data showed that 25–30 per cent of the water of natural water bodies did not meet sanitary standards. In 2004, 30 per cent of analysed samples of surface water for agricultural use showed contamination by nitrates, and more than 1 per cent by pesticides. Both figures are well above permissible norms. The nitrate content of well water is more than twice the permissible level. In many areas, surface and ground water are also contaminated by bacteria.

The quality of the Dnipro River's water is a major concern because the river is Ukraine's main body of water, making up 80 per cent of the country's total water resources and providing water for 32 million Ukrainians. In the 1990s, the water was made undrinkable in many areas by discharges of a variety of pollutants from various sources. While substantial progress has been made since then, much remains to be done. A separate State Targeted Programme (see Box 1.3 in Chapter 1) has been developed to clean up the Dnipro river basin and improve the quality of drinking water. To help Ukraine clean up the river basin and rehabilitate its natural environment, the United Nations Development Programme has launched the preparation of a Strategic Action Programme (SAP) for the Dnipro River Basin and Development of SAP Implementation Mechanisms in 2000. The ultimate objective is balanced and effective management of the river basin's resources.

Water abstraction and use have been decreasing since the 1990s. The total water abstraction of 14,694 million m^3 in 2004 was only 42 per cent of the average annual abstraction level for 1986–1990. During the period 1992–2004 the largest volume reduction occurred in agriculture, where water use dropped by 9.114 billion m^3. The biggest percentage drop occurred in municipal water use, which in the same period decreased by 68.4 per cent, while industrial water use decreased by 41.4 per cent.

The average water consumption of about 320 litres per capita per day is high compared to the average 100–200 litres per capita per day consumed in Western Europe. In some cities like Kyiv, Kharkiv, Odesa and Sevastopol, average water consumption reaches 400 litres/capita/day. In 1997, 70 per cent of the urban population of Ukraine was serviced through a centralized drinking water system, while for the rural population this figure barely reached 24 per cent. The rate of connection to a piped water system was relatively high (88%) in cities with over 300,000 inhabitants. The irregular water supply was a problem in smaller cities (with 50,000–100,000 inhabitants)

and caused water contamination. 33 per cent of the 113,000-kilometre total length of water supply pipes is in appalling condition. The leakage of drinking water from the water supply network is estimated to be 31 per cent. Moreover, in 260 settlements drinking water quality does not meet existing standards, and 40 per cent of the water purification capacity needs to be renovated.

Access to clean water is a priority issue in the Millennium Development Goals for Ukraine.

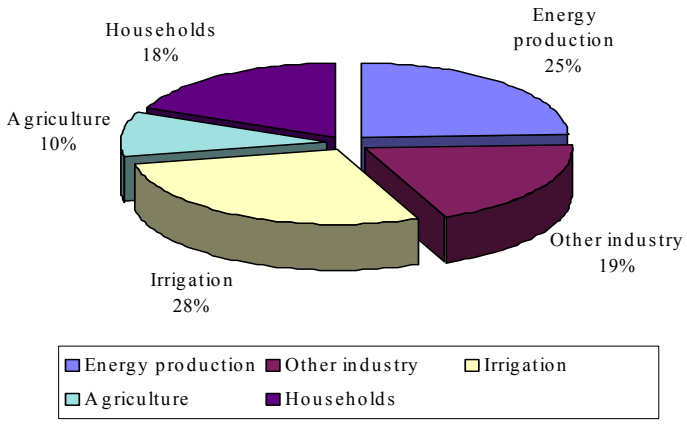
According to estimates made before the World Summit on Sustainable Development in 2002, 12.5 per cent of drinking water samples in Ukraine did not meet sanitary standards. Several national strategic programmes, such as Drinking Water of Ukraine (2005), the Comprehensive Programme on Top-priority Provisions for Centralized Water Supply in Rural Areas that Utilize Imported Water for 2001–2005 and forecast until 2010 and the State Programme on Water Management Development for 2002–2010 have been developed to improve the quality and availability of water. Lack of financing has all but stalled these programmes. During 2001–2004 only 10 per cent of the necessary funds were allocated, and none of the planned water supply systems for rural communities was built.

Although total combined industrial and household wastewater discharges decreased from 9.972 billion m^3 in 2000 to 7.734 billion m^3 in 2004, the inefficient treatment of industrial and municipal wastewater is causing eutrophication and bacterial and chemical pollution of the country's main rivers. The biggest recipients of pollutants are the Dnipro (26%) and Siverskyi Donets (16%) Rivers and the Sea of Azov (4%). The Odesa Oblast and the coast of Crimea are also especially affected because all the major rivers flow southward, discharging waterborne pollution into the Black Sea.

The sewer network extends for 46,000 km, of which 30,300 km are in cities and urban areas. In rural areas the lack of sewage networks leads to the disposal of wastewater without prior treatment. In urban areas the insufficient capacity and poor technical condition of treatment plants result in inefficient, inadequate treatment of wastewater.

Overall, industrial wastewater is not sufficiently treated before being discharged into surface waters. In 2004, metallurgy, the biggest wastewater producer, discharged 1,545 million m^3 of wastewater. It was followed by the coal industry with 581 million m^3 and the chemical and petrochemical industrial subsectors with 218 million m^3 of discharge. Almost all of the coal industry's discharges (89% of the total) are either untreated or insufficiently treated, while 70 per cent and 60 per cent of wastewater from the metallurgical and petrochemical industries respectively are untreated or insufficiently treated. Wastewater from these industrial processes is typically contaminated with heavy metals, phenols, oil products and other hazardous substances.

Figure I.3: Water abstraction by activity, 1997



Source: UNECE. Environmental Performance Reviews Ukraine, 2000.

Waste

Total waste intensity (including both industrial and household waste but excluding radioactive waste) tended to increase from 1998 to 2000 but has declined since then (Figure 8.3). Hazardous waste intensity has decreased sharply since the first EPR, indicating improvements in the management of such waste (Figure 8.3).

Industrial waste dominates Ukraine's total waste generation. The main sources of industrial waste are the mining, chemical and petrochemical, metallurgical, machine-building, wood, pulp and paper industries. Industrial waste production has increased 41 per cent since 1998, generating 564 million tons of waste in 2004. Meanwhile hazardous waste generation has diminished 33 per cent since 1999, and in 2004 totalled 63 million tons.

Industrial waste is typically disposed of in landfills, particularly on the grounds of enterprises. Landfills and industrial waste storage sites should be specially equipped to prevent pollution, but often waste disposal does not comply with the norms and represents a real danger to the environment, especially in the form of contamination of soil and groundwater by heavy metals at industrial sites. The national infrastructure for waste management and disposal is inadequate, and many regions of the country are having difficulties processing and disposing of hazardous waste. Because only a few companies have properly engineered disposal facilities, most companies are storing dangerous amounts of hazardous waste on their premises.

Biodiversity

Throughout the twentieth century, Ukraine's nature was strongly modified by anthropogenic factors, in particular intensive agricultural practices. Virgin lands were ploughed and mires, swamps and wetlands drained, and forests shrunk. Nevertheless, 29 per cent of the territory is still covered with natural or semi-natural vegetation. As of 1 January 2006, Ukraine had 7,243 specially protected sites covering a total protected area of approximately 2.8 million hectares, or 4.6 per cent of the total territory of the country. In 2006, Ukraine had 33 areas listed under Ramsar Convention, covering a total area of 676,251 ha.

Ukraine is rich in flora and fauna, with more than 25,000 species of plants and fungi and 45,000 species of animals. The 1994 Red Book categorized 41 mammal species, 67 bird species and 227 invertebrate species as endangered, rare or vulnerable. Two major migration routes for birds pass across Ukraine, and some nesting sites located there are of great international importance. For instance, 90 per cent of the global population of martins nests on the islands of the Black Sea Biosphere Reserve.

Soil quality has greatly deteriorated. Erosion affects 57.5 per cent of Ukraine's land area, soil pollution around 20 per cent, soil acidification 17.7 per cent, soil alkalization 3.7 per cent, and soil salinization 2.8 per cent. The steppe landscape is threatened by fragmentation of habitats, agricultural pressure and infrastructure development and is subject to the conflicting interests of environmental preservation and agricultural and forestry activities (see Chapter 10).

Forests cover about 16 per cent of Ukraine's land area (9.6 million hectares), predominantly in the Polissya area in the north and the Carpathian Mountains in the west. All forestland is state owned, and most of it is managed by the State Forestry Committee through its regional and local network of 300 Leskhozes. The economic use of forests is managed either by the Ministry of Industrial Policy or by recently privatized companies. According to official statistics, about 1 per cent of total timber production (84,000 m^3) is cut illegally. The illegal cutting occurs not only in forest areas but also in greenbelts of protective trees around agricultural lands.

Ukraine participates in a number of international conventions and initiatives to protect the biodiversity on its territory and in transboundary regions (the Carpathians). (See Chapter 4 for a discussion of these international undertakings.) In line with the Bern Convention, Ukraine has developed a section of the Emerald Network (a network of areas of special conservation interest). It has also established a network of ecological corridors as part of the European Ecological Corridor Network (EECONET) and has strengthened related legislation with the Law on Environmental Network (2004).

Chernobyl

Twenty years after the Chernobyl nuclear power plant accident, which released massive amounts of radiation into the environment, Ukraine continues to suffer heavy social, economic and environmental consequences. It continues to spend around 5 to 7 per cent of its state budget to alleviate disaster aftermaths. In the period 1991–2005, spending to

eliminate disaster aftermaths totalled almost US$ 7.4 billion. This financial burden is obviously going to continue, and to affect Ukraine's economy and state finances for the foreseeable future.

Incurred costs can be divided into three broad categories. First is the security and maintenance of the accident site itself, including the replacement of the concrete sarcophagus, which was built hastily around the nuclear reactor after the accident. A related problem is the storage of radioactive waste from the nuclear plants.

Secondly, radiation fall-out remains a concern in the affected areas. The contamination will persist for centuries, and Ukraine will need to continue food controls and restrictions for decades. Agro-technical and agro-chemical measures, such as changed crop rotation, liming and fertilizing to prevent radionuclide uptake by plants have been relatively successful in alleviating the immediate effects of radiation. Products from both large-scale and private farms undergo radiation level controls, but the extensive food production on household plots is usually not checked. An additional problem related to radiation from the accident is the possibility of forest fires in the fallout areas. Forest fires could discharge radioactive material into the atmosphere.

Finally, the full health impact of the disaster is hard to assess and may never be known. The number of thyroid cancer cases is rising, and recent scientific studies have reported increased incidences of solid cancers, including breast cancer, as well as cardiovascular and ophthalmic effects. The total costs of the accident are difficult to estimate because some illnesses may have a long latency period, sometimes more than 20 years, and are hard to trace with certainty to the accident. The general state of health is declining, and contaminated territories show low birth rates and relatively high rates of prenatal losses and infant mortality.

Map I.1: Map of Ukraine

The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

PART I: POLICYMAKING, PLANNING AND IMPLEMENTATION

Chapter 1

THE LEGAL AND POLICYMAKING FRAMEWORK AND SECTORAL INTEGRATION MECHANISMS

1.1 Overall context for environmental management

Since the completion of the first UNECE Environmental Performance Review (EPR) of Ukraine in 1999, the Government of Ukraine has taken a number of steps to reform the country's overall policy, regulatory and institutional framework. These changes aimed primarily at strengthening domestic demand, lowering inflation, building consumer and investor confidence and bringing more economic activities out of Ukraine's large shadow economy.

Changes were also introduced in the system for the protection of the environment and the management of natural resources. New laws have been promulgated and a number of executive regulations developed to facilitate the implementation of environmental policies and increase compliance with environmental requirements. However, the changes have not brought about the expected environmental improvements, as they have not been coherent or deep enough; they have also been affected by an unstable institutional framework for environmental management.

The need to protect the environment and use natural resources more efficiently has been declared a priority in a number of official documents. However, with economic growth becoming the Government's primary goal, environmental issues have in practice been considered an obstacle to achieving this goal. The emphasis on economic growth "at any cost" has resulted in the weakening of environmental policies and institutions, whether by stalling the development of effective and efficient policy and regulations, by relaxing enforcement of environmental requirements or by pursuing frequent and incomplete institutional changes. All these factors have contributed to significantly decreasing the effectiveness of the environmental regulatory framework.

After the new President and Government took office in early 2005, Government's attention continued to focus mainly on economic and social reform. Environmental issues have been mentioned in political declarations, but the commitment to reform and resources continues to be insufficient to create a critical mass for significant change in the design and implementation of environmental policy.

In the absence of an effective environmental management system, and in the context of slower-than-anticipated structural reform and modernization of technological processes, economic expansion is bringing back high pollution levels and maintaining the inefficient approaches of the past to the use of energy and natural resources.

1.2 Policies, strategies and legislation

Economic and sectoral strategies and the environment

Several strategic documents adopted by Ukraine's highest authorities acknowledge the broad range of serious environmental problems faced by the country. Documents such as the 2004–2015 Strategy for Economic and Social Development of Ukraine "On the Way to European Integration" (2004) and the Action Programme of the Cabinet of Ministers "Towards People" (2005) give individual ministries a basis for developing actions on environmental issues that they consider high-priority.[1] Like other government agencies, the Ministry of Environmental Protection selects every year key priorities for its operations (see Box 1.1 for priorities in 2006).

Environmental objectives and targets are also included in the government's programme of 2003 for implementing Ukraine's Millennium Development Goals (MDGs), which relate to the Millennium Declaration adopted by United Nations member States in 2002. In particular, Goal 3 on sustainable environmental development (corresponding to goal 7 of MDGs) contains targets and indicators related to (1) increasing the proportion of the population with access to clean drinking water, (2) reducing harmful

[1] After the review was completed, a new Government programme was in the process of being developed.

Box 1.1: The Government's main priorities in the field of environmental protection in 2006

- Creating the legislative base for implementation of the UNFCCC requirements and efficient implementation of the Kyoto Protocol mechanisms;
- Improving the environmental situation of the Black Sea and the Sea of Azov and preventing their pollution;
- Preserving biodiversity and landscape diversity;
- Improving waste management taking into account international standards and norms;
- Improving the management of nature reserves and protected territories based on a systemic accounting for environmental, economic, social and other interests of the society, and international commitments;
- Ensuring state ownership of natural resources.

Source: Resolution of the Board of the Ministry of Environmental Protection, April 2006.

emissions into the atmosphere from stationary sources and (3) increasing the area of natural reserves and parks (see Box 4.4 in Chapter 4). The implementation of the MDGs is coordinated and monitored by the Secretariat of the President and the Ministry of Economy. Annual reports on progress in achieving Ukraine's MDGs have been produced by the Ministry of Economy.

Other documents with environment-related priorities include those prepared to promote closer cooperation with the European Union and harmonize the regulatory framework with the EU *acquis communautaire*. These include the Partnership and Cooperation Agreement between Ukraine and the European Union and its Member States, which was ratified in 1994 and entered into force in 1998 for an initial period of 10 years. In 2004, as a consequence of the enlargement of the European Union by ten new countries, a European Neighbourhood Policy Action Plan with Ukraine was developed and endorsed by the EU-Ukraine Cooperation Council in 2005 (see Box 1.2). This document, along with a set of implementation measures adopted by the Cabinet of Ministers in 2005, has become the most important instrument in relations between the European Union and Ukraine.

Strategies and policies for environmental protection and management of natural resources

At the time of the first EPR of Ukraine, a document titled *Main Directions of the National Policy of Ukraine for Environmental Protection, Natural Resource Use and Environmental Safety* (1998; sometimes called the National Environmental Action Plan (NEAP), and referred to hereafter as *Main Directions*) set the overall basis for government actions to protect the environment and integrate environmental concerns into economic reform in Ukraine. The document was prepared by the Ministry of Environmental Protection and formally adopted by the Cabinet of Ministers and the Parliament in 1998.

Despite various attempts by environmental authorities, independent groups and individuals, no new strategic document has been developed as of early 2006, and *Main Directions* is still referred to as the currently applied official long-term strategy for environmental improvements, even though it does not contain explicit qualitative or quantitative environmental targets. The short- and medium-term implementation periods for policy measures were envisaged as 3 years and 10–15 years respectively; thus, as of early 2006, an update would likely be needed. Moreover, no explicit assessment of the

Box 1.2: The European Neighbourhood Policy's EU-Ukraine Action Plan

The European Neighbourhood Policy's EU-Ukraine Action Plan sets out a comprehensive set of priorities in areas within the scope of the EU-Ukraine Partnership and Cooperation Agreement. The Commission, in cooperation with the Council of the European Union, has prepared an Implementation Tool to support the implementation of the Action Plan. The tool is designed to provide benchmarks for assessing progress and help Ukraine achieve concrete, realistic and measurable results. The Action Plan includes several areas for enhanced cooperation, including transport, energy, the information society and the environment. While within sectoral activities, priorities for action that deserve particular attention are identified, they usually do not integrate any environmental components.

Source: European Neighbourhood Policy EU-Ukraine Action Plan, 2005.

implementation of *Main Directions* has ever been carried out.

Nevertheless, at the regional and local levels, a number of oblasts, cities and local communities have prepared strategic documents to guide their environmental protection activities. Examples are the Programme of Protection and Rehabilitation of the Environment of the city of Mariupol (1999; 2006 for the period 2006-2010) and the regional and local environmental action programmes for Donetsk (2001, for the period 2001-2005) and Sumy (2003, for the period until 2015) oblasts, Crimea (2003, several programmes), and other industrial centres. However, many of these plans have not been implemented due to insufficient funding or lax enforcement of environmental regulations.

Targeted state programmes

The first EPR of Ukraine referred to a number of state programmes as being part of a strategic approach to addressing various aspects of Ukraine's economic and social development priority issues. Currently, there are 300 targeted state programmes which are implemented by various government agencies and serve as tools for implementing national strategies. Some of them aim to achieve the goals established in the 1998 *Main Directions*. These programmes, which support the development of environmental policies and regulations, include:

- 12 environmental programmes administered directly by the Ministry of Environmental Protection (Box 1.3) and mainly aimed at improving air and water quality, developing national nature protection reserves, and introducing a sustainable development agenda; and
- 20 targeted "environment-related" programmes that are managed by other government bodies in cooperation with the Ministry of Environmental Protection.

The development and implementation of targeted programmes are closely coordinated with the Ministries of Economy and Finance, as these programmes contribute to achieving the strategic economic and social goals set by the Government and provide a basis for annual allocation of funds from the state budget.

For example, the National Programme for the Development of Ukraine's National Ecological Network for the Period 2000–2015 was developed in 2000. To implement this programme, the Law on Ecological Network (2004) was adopted and the Concept (Outline) of the State Programme on Biodiversity Conservation for 2005–2025 and the Concept (Outline) of the State Programme on Developing Nature Protected Areas were developed in 2004 and 2006 respectively. Similarly, in the context of the implementation of the programme to protect the environment of the Black Sea and Sea of Azov (2001), a draft of the Law on Sea Coastal Zones has been developed and an interdepartmental commission and a special unit at the Ministry of Environmental Protection was created to coordinate the programme's implementation. This draft law envisions integrated coastal zones management. Also, the Programme for Recycling and Reuse of Production and Consumption Waste until 2005 (1997) has led to the adoption of basic principles of the state system for treating waste as secondary raw materials.

In 2002, performance-oriented budgeting was introduced into the process of developing and managing the state programmes. Since then, their preparation and reporting have followed comprehensive appraisal and approval procedures which involve reporting on progress using a number of qualitative and quantitative indicators. Even though such procedures exist, the programmes suffer from under-funding, as limited funds are spread across several expenditure items. A lack of in-depth assessment of their efficiency and effectiveness leads to continued allocation of funds to all ongoing programmes rather than to those which are most necessary or cost-effective. Overall, the programmes do not provide strategic guidance for improving the state of the environment.

Environmental legislation

The regulatory framework for environmental protection is already very comprehensive in Ukraine. In 2005, the environmental legislation comprised over 200 laws and by-laws. A large number of laws, President's orders and Government acts were adopted in the period covered by the previous review (1996–2000). In the last five years, some basic environmental laws have been enacted, including, for example, the Law on Animals (2001), a new edition of the Law on Air Protection (2001) and laws on the Red Book of Ukraine (2002), Drinking Water and the Drinking Water Supply (2002), State Control of the Use and Protection of Land (2003), Land Protection (2003), Environmental Audits (2004) and Ecological Network (2004); and a number of laws have been amended (see Annex IV).

Box 1.3: Targeted state environmental improvement programmes under implementation in 2005 under the responsibility of the Minister of Environmental Protection

1. Programme for the long-term development of nature reserves in Ukraine ("Nature Reserves") (Parliament Resolution No. 177, 1994, Programme Code 011)

2. State programme for upgrading the equipment of the hydro-meteorological survey system and the ambient environmental pollution survey system ("Meteorology") (Cabinet of Ministers Resolution No. 579, 1996, programme code 029)

3. National programme for the environmental rehabilitation of the Dnipro River Basin and improvement of drinking water quality (Parliament Resolution No. 123, 1997, programme code 037)

4. National programme for the development of Ukraine's national ecological network for the period 2000–2015 (Law No. 1989-III, 2000, programme code 102)

5. National toxic waste management programme (Law No. 1947-III, 2000, programme code 103)

6. National programme for the protection and rehabilitation of the environment of the Black Sea and Sea of Azov (Law No. 2333-III, 2001, programme code 126)

7. Programme for the implementation of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction for the years 1999–2008 (Presidential Decree No. 50/99, 1999, programme code 216)

8. Comprehensive programme for national implementation of decisions approved at the World Summit on Sustainable Development (2002) for the years 2003–2015 (Cabinet of Ministers Resolution No. 634, 2003, programme code 271)

9. Programme for banning the production and use of ozone-depleting substances (Cabinet of Ministers Resolution No. 256, 2004, programme code 301)

10. State programme for flood prevention and management (Cabinet of Ministers Resolution No. 545, 2004, programme code 315)

11. State research and engineering programme for development of topography and geodesy and of the national cartography for the years 2003–2010 (Cabinet of Ministers Resolution No. 37, 2003)

12. Programme for recycling and reuse of production and consumption waste until 2005 (Cabinet of Ministers Resolution N° 668 - 1997)

At the same time, some important sectoral legal acts, such as the Land Code (2001) and the Forestry Code (2006), have been introduced which include a series of provisions affecting the environment or influencing policies for environmental protection and management of natural resources (See chapter 10).

The number of enacted new basic laws has been much lower than in the previous period. Instead, more emphasis has been placed on the development of lower-level regulations, government decisions, methodological and procedural documents which aim to provide further guidance for the interpretation, implementation and enforcement of existing laws. The reform and further development of air pollution regulations in 2001–2003 was particularly important. This development followed some recommendations (1.1 and 7.1) of the first EPR, which had suggested that harmonization between laws and their effective enforcement be treated as a priority, and had pointed out the need to develop implementation regulations relating to the Law on Air Protection.

Following the political decision to harmonize Ukraine's environmental legal framework with that of the European Union, all new drafts of regulations undergo verification by the Ministry of Environmental Protection of their compatibility with the EU *acquis communautaire*. This procedure is coordinated by the Ministry of Justice. Information about the EU requirements and their transposition into the national regulations is available (through the Ministry of Justice and informal channels), but no special resources, human or financial, have been allocated to the Ministry of Environmental Protection to ensure the quality of the harmonization.

The current regulatory framework has been developed over the last 10 years. Such an extensive period of law development has resulted in a system that is complicated to interpret, internally inconsistent and incompatible, and therefore difficult to follow and enforce. There are several examples of contradictions between existing laws and regulations – for example, between the Land Code and the Water and Forestry Codes regarding the status of protective zones along rivers and around forests, although the revision of the Forestry Code in 2006 has reconciled the provisions. For the same reasons, the laws on water and on nature-protected areas have also been revised in 2006 and submitted to the parliament. The recent accumulation of contradictions and the

complexity of environmental legislation have stimulated discussions about "codification" of environmental laws, particularly in light of the discussions about harmonization of Ukrainian laws and regulative by-laws with EU legislation. Various drafts of an Environmental Code have been developed in parallel by different informal groups, with no significant progress, as financing was insufficient and the groups were working in isolation from each other, with no exchange of information or consensus-building.

An additional obstacle to the codification of environmental laws is the lack of deeper analysis of the effectiveness and efficiency of existing regulations, their administrative and compliance costs and impacts, and possible regulatory gaps or inconsistencies. Although under the national legislation, any new legal act should be analyzed regarding its impacts on business (including economic and environmental), no in-depth analysis such as the Regulatory Impact Analysis (RIA), which is applied in a number of countries including EU countries, has been carried out in the field of environmental regulations. If introduced and implemented at least for the most important legal acts, such a procedure could help identify priorities for changing existing requirements and could provide direction for the codification work.

1.3 Institutional arrangements for environmental protection

National level

The Ministry of Environmental Protection has a key role in developing and coordinating the implementation of environmental policies in Ukraine. Other institutions are also involved in environmental protection, as Figure 1.1 indicates.

In performing environmental management, the Ministry of Environmental Protection and other agencies interact with the Parliament and in particular its Committee on Environmental Policy, Use of Natural Resources and Mitigation of the Consequences of the Chernobyl Accident. The Committee's principal task, among many others, is to oversee the development of environmental policy and the environmental regulatory framework, prepare draft laws and regulations for the Parliament's consideration, and assess their implementation, which includes public consultations and parliamentary hearings. Following a constitutional amendment of 2006, the Committee is also entrusted to oversee the work of the Ministry of Environmental Protection and to give its recommendations when a new minister of environment is to be appointed. The Committee also devotes significant attention to addressing impacts of the Chernobyl disaster and preventing and managing other environmental emergencies.

The structures and responsibilities within the institutional framework (Figure 1.2) have been undergoing significant and continuous changes over the last five years. These changes have particularly affected the key environmental authority, the Ministry of Environmental Protection. After the two reorganizations in 1998 and 1999 described in the previous EPR (when the Ministry changed its name from Ministry of Environmental Protection and Nuclear Safety to Ministry of Environmental Protection and Natural Resources), the Ministry experienced two further structural changes in 2003 and 2005. During the 2003 restructuring, the management of mineral resources was removed from the Ministry's responsibilities. In early 2005 the management of natural resources was brought back to the Ministry, together with the responsibility of coordinating the activities of three State Committees – on Land Resources, Forests and Water.

In recent years, the number of staff members in the Ministry has been stable, hovering between 230 and 250 in spite of the reorganizations and the increasing responsibility placed on the Ministry to coordinate sectoral policies. Attempts to strengthen the management of the Ministry resulted in the introduction in 2002 of the position of State Secretary responsible for ensuring the efficient operations of the Ministry. However, this position was removed in 2004 and the responsibilities were reallocated to Deputy Ministers. In late 2005, new plans were considered to restructure the Ministry internally, in particular to merge the departments responsible for relations with the Parliament and communication with the public and mass media, and to strengthen strategic planning and economic-environmental integration, as well as European integration and international cooperation. A new structure for the Ministry was approved in January 2006 (Figure 1.3). Figure 1.3 presents only the major organizational units – departments. There are also smaller units, divisions and sectors, some of them within the departments and some under the direct supervision of the Minister and Deputy Ministers.

The central apparatus of the Ministry performs its duties directly and through special authorized executive bodies. The Ministry supervises the

activities of five inspectorates (ecological and forest[1] at the national level, and three sea inspectorates reporting to the ecological inspectorate) with a total staff of approximately 4,000 people. The heads of these five inspectorates are nominated by the Cabinet of Ministers, which also defines the function of the inspectorates through regulations. The Ministry also oversees the work of three State Services (Geological, Natural Reserves, and Geodesy and Cartography), five research institutes and six state enterprises (Figure 1.2).

Subnational level

In addition to the units at the national level, environmental policy is implemented by the state departments for environmental protection in 24 oblasts and the cities of Kyiv and Sevastopol and the corresponding Republican Committee of the Autonomous Republic of Crimea**.** These departments are formally subordinated to the Ministry of Environmental Protection but are also coordinated with the regional administrations. Appointments of heads of regional environmental departments have to be agreed jointly with the head of the state administration of the oblast (the Governor). At the lowest level of the public administration, every *rayon* has at least one environmental inspector. Table 1.1 shows the responsibilities of the various elements of the administrative system.

The reform of the governance system in Ukraine in the late 1990s resulted in the creation of elected governments at the oblast and municipal level. This reform envisaged that some environmental responsibilities would be allocated to oblast and municipal councils. For the time being, however, the distribution of these responsibilities is not clearly determined in the relevant legal documents. Furthermore, self-governments have not been provided with the necessary resources to perform their new duties. This negatively influences relations between the two structures and prevents optimal environmental management.

1.4 General sectoral integration mechanisms

As Figure 1.1 indicates, the responsibilities for environmental protection and the management of natural resources are assigned to a number of government institutions. This should in principle facilitate the integration of environmental concerns into the design and implementation of economic and sectoral policies. It should also help to inject economic and social considerations into the development of environmental policies.

Strategies for sectoral and environmental integration

A number of documents and institutional arrangements exist to facilitate interagency communication on environmental matters and more integrated policy development. As was mentioned in section 1.2, a number of strategic documents include objectives and activities to address environmental problems and situate environmental policies in the context of Ukraine's economic and social development. The 2003 Law on Principles of the National Security of Ukraine makes environmental safety a priority and a precondition of sustainable development. The environmental provisions in this law are based on the provisions presented in the 1998 *Main Directions* document.

Further integration of environmental considerations into sectoral policies is achieved by the inclusion of environmental objectives in sectoral policies and programmes. For example, the 2001 programme "Ukrainian Coal" included provisions for increasing the efficiency of the coal industry and lowering its environmental impacts. For example, all newly constructed coal mines are now required to undergo environmental impact assessment procedures. The 2006 Ukraine's National Energy Programme includes measures to address waste issues, promote energy conservation and efficiency, and gives targets for the development of renewable energy, such as hydroenergy, biomass energy, and wind and solar energy.

The development of the National Environmental Health Action Programme (NEHAP) is another example of attempts at sectoral integration. Following the provisions of *Main Directions* and responding to the decisions of pan-European conferences of Ministers of Environment and Health, a programme to improve the state of public health in the context of negative effects of environmental pollution was developed and approved in 2000 after extensive consultation between 27 ministries and state committees. It was also the first time in Ukraine when the public and NGOs were extensively involved into the process of development of a major policy document. Several regional and national consultations were held, and numerous comments from NGOs were taken into account in the final

[1] In summer 2006 State Inspectorate for Supervision of the Protection, Utilization and Regeneration of Forests has been abolished.

version of the document. However, Ukrainian institutions have failed to implement the recommendation in the first EPR (Recommendation 14.8) to cooperate effectively on the implementation of the NEHAP. In particular, the Ministry of Environmental Protection has been passive in cooperating with the health authorities and coordinating this work with environmental programmes.

Figure 1.1: Government structures involved in environmental protection, 2005

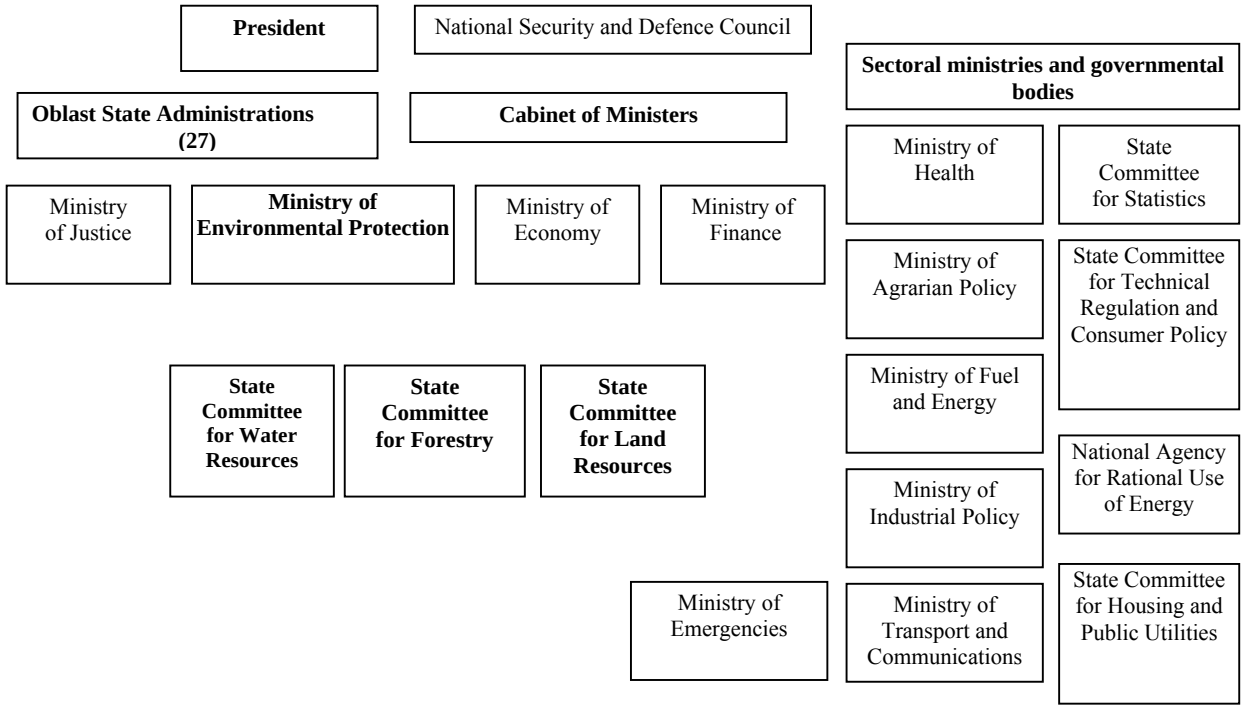


Figure 1.2: Structure of the subordinated agencies of the Ministry of Environmental Protection, 2005

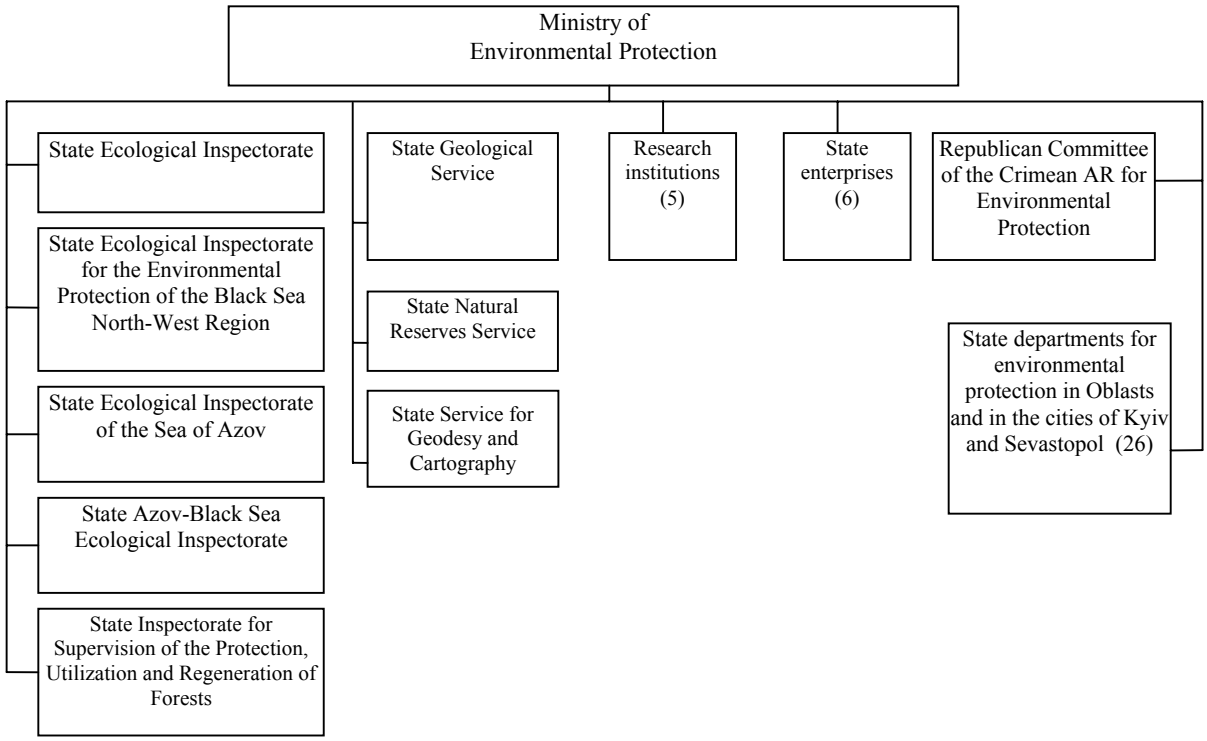
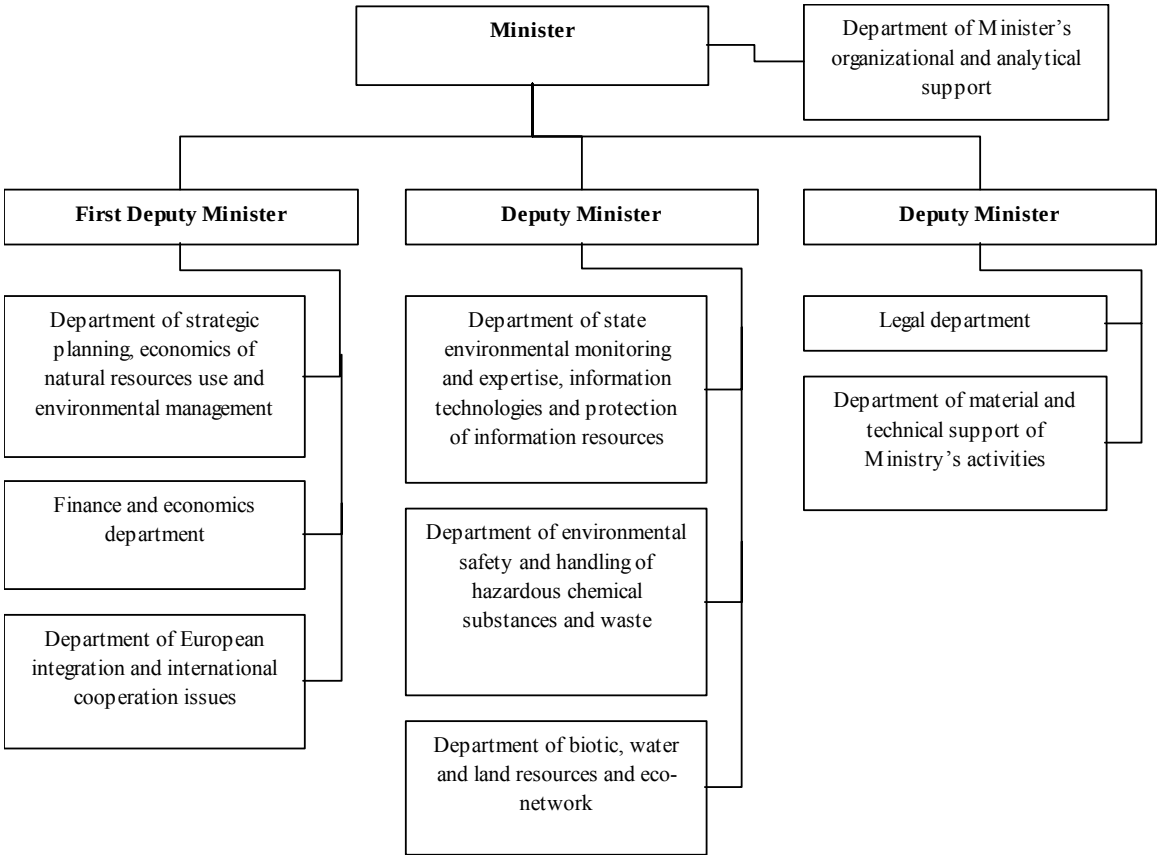


Figure 1.3: Structure of the central staff of the Ministry of Environmental Protection, May 2006



Source: Ministry of Environmental Protection, May 2006

Strategy for Sustainable Development

The Ukrainian authorities and in particular the Ministries of Environmental Protection and Economy have several times brought to the attention of the country's highest decision-makers the issue of sustainable development. The first EPR already referred to a draft "Concept of the Strategy on Sustainable Development", prepared in 1999, that had been the subject of interagency and public consultation. It was even transmitted to the Parliament for adoption. However, the document was never officially approved and was eventually shelved.

In 2003, the Ministry of Environmental Protection drafted a new Strategy for Sustainable Development. This draft, which was developed in 2003–2004, contained goals, principles and objectives of sustainable development policy to balance economic, social and environmental considerations in the country's development. The Strategy contained activities for three stages of implementation: short-term (2005–2006), medium-term (2006–2009) and long-term (beyond 2009). It also contained provisions for monitoring progress in implementation and included a set of sustainable development indicators (economic, social and environmental).

The new draft Strategy underwent more inter-ministerial consultation in 2004 and was presented to the Parliament. However, the change of government in early 2005 necessitated the withdrawal of the draft and the undertaking of a new consultative process. In addition to procedural obstacles, lack of consensus has been a problem, with several alternative proposals being considered. Finally, in 2006, the Ministry of Economy and the Ministry of Environmental Protection have been entrusted with the joint task to draft a framework strategy, which will be further submitted to the Cabinet of Ministers and the Parliament for approval.

Table 1.1: Division of main responsibilities between national and subnational environmental authorities, 2005

National level	**Ministry of Environmental Protection** (national executive authority)	• Formulates and implements state environmental policy • Develops national environmental programmes and implements uniform research and technology policy in the area • Coordinates the activities of central and local authorities • Organizes and carries out ecological expertise • Organizes environmental monitoring within its competency • Ensures the maintenance of state cadastres • Approves or coordinates environmental rules, requirements, standards, limits and quotas and controls compliance with them • Issues permits for transboundary movement of waste and transport of hazardous chemicals; issues licenses for treatment of hazardous waste and collection of waste for recycling and reuse • Develops user charges and pollution charges • Participates in international cooperation
	Three State Committees (on land resources, forestry and water)	• Involved in implementation of state environmental policy within the framework of their competencies • Activities of the committees coordinated by the Ministry of Environmental Protection •
	State Ecological Inspectorate	• Exercise state control over compliance with environmental legislation and management of natural resources (except mineral resources and forests) •
Sub-national level	**24 state departments for environmental protection in oblasts, two in the cities of Kyiv and Sevastopol and committee in ARC**	• Ensure implementation of state environmental policy; management and regulation of environmental protection; management of natural resources, environmental and radiation safety at the territorial level • Issues permits, limits and quotas for special use of natural resources (except forests), and pollutant emissions; ensures compliance with permit conditions • Issues permits for waste management; ensures compliance with permit conditions • Inform the public about the state of the environment through mass media
	Three special inspectorates (for the seas)	• Exercise state control over the use and protection of the marine environment and the natural resources of territorial seas, the continental shelf and Ukraine's marine economic zone • Enforce established natural resource use limits (except for mineral resources and forests) and pollutant emission limits • Exercise control over environmental compliance in the area of waste management

Institutional integration mechanisms

The need to integrate environmental concerns into sectoral policies has stimulated the creation of a number of institutional mechanisms for analysis, dialogue and consensus-building among government agencies. These mechanisms have been established to coordinate policies at the strategic, cross-sectoral level (e.g. in connection with sustainable development and regulatory reform) as well as in specific sectors (such as energy, health and industrial policy). Intersectoral dialogue has also been supported by specialized environmental units in sectoral ministries (e.g. in the Ministry of Economy and the State Committee on Statistics) and by specific bodies. The results of all these efforts have been uneven.

For instance, 1997 saw the creation of a National Commission on Sustainable Development chaired by a Deputy Prime Minister and involving a number of government agencies. However, this commission met only once and, shortly after 1999, become non-operational, as no resources had been allocated for its secretariat or for its functioning. In 2003, the National Council on Sustainable Development (NCSD) was established, but this body has never met as, again, no resources have been earmarked for preparing documentation and analysis or for management functions.

It is mandatory for the draft laws and strategies to undergo consultation process among all relevant ministries. However, approval by the MEP is not necessary for the sectoral targeted programmes to be adopted, and as a result the MEP sometimes is not aware of environmental component of these

programmes. In some cases, comments and feedback from the MEP are only a formality and are not taken into account, as was the case with the Energy Strategy adopted in 2006.

At the sectoral level, various short-term and ad hoc working groups and task forces have been created to address issues such as energy efficiency, climate change, environmental audits, cleaner production and environmental monitoring. Officials from relevant agencies and experts have taken part in such task forces. The process of developing the Law on Environmental Audit (2004) and the implementation of the programme on environmental monitoring are probably the best examples of intersectoral working groups.

In most cases, however, even though institutional arrangements for integration exist, their functioning is based on informal relations, and these contacts are not backed up by formal arrangements which could provide stability, resources and commitments regarding the adoption of the policies or regulations being developed. In some cases, in spite of explicit commitments, intersectoral mechanisms have not been created. An example is the lack of coordination of activities between the Ministry of Health and the Ministry of Environmental Protection to implement the NEHAP.

1.5 Conclusions and recommendations

Progress in developing environmental strategies and policies since the first EPR has been clearly insufficient. Now that the key strategic document *Main Directions of the National Policy of Ukraine for Environmental Protection, Natural Resource Use and Environmental Safety* is outdated, there is a need for an environmental policy that identifies priority environmental problems and related actions in the context of the country's short and longer-term socio-economic development. A new policy should focus on introducing incentives to improve environmental performance by enterprises and households. These incentives should be combined with effective instruments to deter violations of environmental requirements and respond swiftly and proportionally to non-compliance. The development of such a policy requires the participation of relevant stakeholders.

The current approach to environmental planning may benefit from a wider application of the "planning cycle" approach used in a number of OECD member countries, which includes:

- Setting explicit objectives and targets within a clearly specified time frame;
- Evaluating progress in achieving them;
- Providing feedback to policymakers; and
- Adjusting priorities on the basis of results achieved and lessons learned.

Analysis of the costs of achieving environmental goals, combined with a robust analysis of possible funding sources, could be a powerful instrument for environmental authorities in their discussions with other relevant government bodies about resources for environmental improvement. The current period of political change provides an opportunity to introduce modern approaches to environmental management and to influence sectoral policies.

Recommendation 1.1:
The Ministry of Environmental Protection, with the participation of relevant stakeholders, should:

(a) Develop a policy document on the environment, setting short-, medium- and long-term goals and targets and identifying key approaches to implementation; and

(b) Further adjust the directions and scope of targeted state programmes on the basis of the provisions of this new environmental policy and ensure that they are supported by sufficient financing.

Since independence, environmental legislation in Ukraine has undergone profound changes. Recently, emphasis has shifted from creating new laws to drafting lower-level regulations, including government decisions, and methodological and procedural documents which provide better guidance for interpreting, implementing and enforcing existing laws. Nevertheless, environmental laws and regulations need to be made more consistent and coherent. The Ukrainian authorities should continue a review of key environmental legal acts to eliminate major discrepancies and gaps between the principal laws and their executive regulations, using tools, such as regulatory impact analysis (RIA). The process of approximation of environmental requirements with those in the European Union should be used to prioritize and facilitate this review.

Recommendation 1.2:
The Ministry of Environmental Protection should strengthen its legal department and, in cooperation with the Ministry of Justice and the State Committee on Entrepreneurship, improve its legal expertise in order to accelerate the approximation to the EU legislation, possibly using modern assessment tools such as regulatory impact analysis (RIA).

Over the last five years, a number of steps have been taken to build and strengthen the institutional system for environmental management in Ukraine. However, these actions may not have achieved the expected results because of the too frequent reorganizations of environmental authorities. These frequent changes of the Ministry of Environmental Protection leadership have led to the dilution of the strategic vision and its coherence and have resulted in weakening the efficiency of staff's work, scattering of technical and human resources and inefficient use of financial resources.

Furthermore, fragmentation and an unclear division of responsibilities between agencies responsible for environmental protection and their subnational structures have led to overlaps in objectives, responsibilities, functions and operations. They have also contributed to inefficient use of financial, material and human resources. The decentralization of environmental management to elected government structures has not been accompanied by a clear division of responsibilities and has not resulted in the expected better use of resources.

Therefore, there is a need to strengthen the capacities of environmental administration in Ukraine and to review the institutional setting and the division of responsibilities. As a matter of priority, the Ministry of Environmental Protection should review its staff, assess its capabilities, and allocate responsibilities according to objectives so that priority issues are addressed more effectively. This may mean that the Ministry and the Oblast Administrations concentrate their efforts on "core" public functions and a smaller number of priority issues and focus on solvable problems. The changes would also require adjusting the salaries of staff according to their responsibilities and introducing incentive-based structures to enhance employees' performance. All these steps can help ensure a fair, effective and transparent framework of policy-making and enhance the institutional capacity for implementation.

Recommendation 1.3:
The Ministry of Environmental Protection should prepare proposals to the Cabinet of Ministers to clarify the distribution of responsibilities and accountability in the environment administration between the national, oblast and local levels, and should identify ways to make the system more integrated and to appropriately delegate powers.

Some progress has been achieved in introducing mechanisms for integrating environmental concerns into economic and sectoral policies, and in injecting economic and social considerations into the design and implementation of environmental policies. However, the two major attempts to establish intersectoral mechanisms for working on integration of economic and social policies – the sustainable development strategy and the implementation of the NEHAP – failed because of insufficient political and management support. Ukraine still needs a strategy for sustainable development that would integrate updated policy directions for environmental protection, as called for in recommendation 1.1.

To ensure that the strategy will be efficiently implemented, there is a need to strengthen formal but flexible mechanisms for analysis and consultations in the integration of environmental considerations into specific sectoral issues such as energy, taxation, agriculture, health, transport, insurance and liability. Working groups and task forces, including those existing already, should have specific tasks to be performed within a clearly defined time frame. Adequate resources should be allocated for their proper functioning.

Also to guarantee efficient implementation of the strategy, the Ministry of Economy and the Ministry of Environmental Protection, jointly entrusted with its development, should ensure that environmental considerations are reflected in socio-economic development policies, that overlaps and contradictions are reduced and that synergies between the functions of different bodies are maximized. Lessons learned from previous failures to set up such mechanisms should be taken into account in considering the available options.

Recommendation 1.4:

- *The Ministry of Economy and the Ministry of Environmental Protection should speed up the development of the draft framework strategy on sustainable development, with the involvement of all relevant stakeholders, including NGOs and the business community. The framework strategy should focus on sectoral policies in areas such as transport, agriculture, energy, industry and taxation.*
- *Where they do not exist, formal coordination and communication mechanisms should be established by the Cabinet of Ministers to ensure the integration of environmental considerations into these sectoral policies, especially in those sectors where discussions about the trade-offs between economic and environmental impacts may be the most difficult to conduct.*

Chapter 2

COMPLIANCE AND ENFORCEMENT MECHANISMS

2.1 Legal framework

The basic environmental legislative framework is still the same as when the first environmental performance review (EPR) of Ukraine was performed in 1999. However, some new or revised laws, decrees and regulations have been issued since then. Of major interest from a compliance and enforcement perspective are the following:

- The Law on Environmental Audits (2004)
- The Law on Air Protection (revised in 2001)
- The procedure for approving investment programmes and construction projects and performing complex state environmental impact assessments (2002; Cabinet of Ministers Resolution No. 483)
- The State Construction Norms DBN A.2.2-1-2003 "Structure and content of the documentation for environmental impact assessment (EIA) in designing and building industrial enterprises, buildings and structures. Main regulations for design" (2003)

The framework Law on Environmental Protection of 1991 was amended in 1999 to allow for increased local responsibility in implementation and enforcement of environmental legislation. The impact of those changes is discussed in more detail in the relevant sections of this chapter.

2.2 Environmental enforcement authority

Several major changes have been made in the structure of the Ministry of Environmental Protection (MEP) since 1999 (see Chapter 1). However, the State Ecological Inspectorate (SEI) of the MEP remains basically unchanged and in principle retains its role as described in the first EPR. The State Inspectorate for Supervision of the Protection, Utilization and Regeneration of Forests and three special inspectorates for environmental protection of the seas – State Ecological Inspectorate of the Azov Sea, State Azov–Black Sea Ecological Inspectorate and State Ecological Inspectorate for Environmental Protection of the North-West Region of the Black Sea – are also under the responsibility of the MEP (See Figure 1.2 in Chapter 1). Independent inspection institutions exist for fisheries, land resources and agriculture.

At oblast and rayon levels, regulatory functions and control functions are performed by inspectors that are under the triple supervision of the SEI, the MEP and the territorial administration. The total number of inspectors at SEI and at territorial levels is approximately 2,900, compared with 2,650 inspectors in 1999. The total number of SEI staff members is about 4,000, including administrative and other personnel. The average number of inspectors in the oblasts is about 55, and the SEI itself (national level) has 46 inspectors. The total number of inspectors should permit efficient enforcement of legislation. At territorial level, inspectors have to cover a broad range of issues, which would necessitate regular training and retraining. Although created for the purpose of performing training of the staff, the unit for upgrading skills within the State Ecological Institute is providing training and certification to environmental auditors on a purely commercial basis.

The Regulation on the State Ecological Inspectorate (Resolution of the Cabinet of Ministers No. 770, 2004), in line with the Law on Environmental Protection, outlines the tasks of the SEI and lists its specific responsibilities. Among those are organization and implementation of state control over: compliance with environmental legislation and rational use of natural resources; compliance with requirements of the State Ecological Expertise; compliance with environmentally related permits and licenses; and compliance with requirements for environmental safety. The SEI also develops and submits to the MEP propositions, *inter alia*: on developing and implementing environmental programmes; on ensuring environmental safety and on introducing and updating environmental standards and norms. Specific tasks for the SEI can include issues such as emergencies, epidemics and phasing out of products like pesticides and chlorofluorocarbons.

While the territorial inspectors support the SEI inspectors in their work, the bulk of their work is based on their own planning. A yearly plan is prepared and submitted to the oblast administration for approval. Although the oblast inspectors are not subordinated to the oblast administrations, it is beneficial for them to

operate with the approval of the oblast authorities, since the state departments of environmental protection in oblasts (territorial bodies of the MEP) cooperate in various areas with the oblast administration. The oblast inspectors normally inspect major pollution sources once or twice a year.

In addition to the SEI, Ukraine uses public inspectors on environmental protection. These inspectors work on a voluntary, unpaid basis together with the SEI inspectors or independently. As of June 2006 there are approximately 1,450 public inspectors, of whom about 50 work with the national inspectorate at the MEP. Public inspectors are appointed by national or oblast environmental authorities and receive a special certificate indicating their status. They can conduct inspections together with the authorities or independently and must report on their inspections. In case of proven violations, incompetence or inactivity of public inspectors, their rights to conduct inspections can be revoked by the SEI or oblast authorities.

Inspectors use special forms for reporting. It is compulsory to report the environmental problems noticed during the inspection and the level of sanction as a result of the inspection. The MEP's Planning Department receives quarterly, biannual and annual reports from the inspectorates. It merges this information and publishes it in statistical bulletins. It does not assess or use the information for any national planning of inspections or for any other type of planning or priority setting. The inspectorates themselves are responsible for inspection planning. From the statistics produced, it is not possible to extract information regarding to what extent the inspectorates have focused their activities on major pollution sources or priority environmental problems. At the territorial level the situation appears to be better. For instance, in Donetsk oblast the links between activities like permitting, inspections and investment promotion seem better coordinated than in the MEP.

The problems with fragmentation and overlapping of different inspectorates' inspection activities that were pointed out in the first EPR (see Annex 1, implementation status of Recommendation 1.4) have not been solved. As was mentioned above, joint inspections by different inspection services are one way to coordinate activities and avoid conflict.

Box 2.1: Activities regulated under the Law on Ecological Expertise (1995)

- Nuclear power engineering and the nuclear industry (from mining to waste)
- Biochemical, biotechnical and pharmaceutical production
- Collection, processing, storage, recovery, disposal and recycling of all kinds of industrial and domestic waste
- Oil extraction, the petrochemical and petroleum refining industry and filling stations
- Production and processing of natural gas; construction of gas containers
- Chemical industry (both organic and inorganic), textile manufacture (using dyeing or other chemical treatments)
- Ferrous and non-ferrous metallurgy
- Coal mining, mineral resource industries, extraction of peat and organic soil
- Manufacture, storage, recovery and destruction of all kinds of ammunition, explosives and rocket fuel
- Power and heat generation using organic fuel
- Manufacture of construction materials (cement, asphalt, asbestos production, glass making, etc.)
- Pulp and paper industry
- Woodworking industry (fibre board, resin-bonded chipboard, etc.)
- Mechanical engineering (machine-building) and metal-working industry (production of cast iron, steel and non-ferrous metals, including their chemical treatment)
- Construction of hydraulic structures, water power plants and reclamation systems, including tailing dams and slurry ponds
- Construction of airports, railway junctions and stations, bus terminals, river ports and maritime ports, railway systems, highways and subways
- Cattle breeding (livestock farms with a capacity of more than 5,000 head of cattle) and poultry factories
- Manufacture of foodstuff (meat-packing plants, dairy factories, sugar refineries and distilleries)
- Processing and reprocessing of livestock waste
- Construction of drainage systems and sewage treatment plants
- Construction of water supply structures, and hydraulic works on surface and ground waters for the construction of centralized water supply systems
- Other facilities, the construction of which may have a negative impact on the environment and which should be defined by the Ministry of Environmental Protection or its regional bodies

Source: Resolution of the Cabinet of Ministers No. 554, 27 July 1995.

2.3 Assessment tools

Environmental assessment

The Law on Ecological Expertise (LEE) of 1995 is still the basis for the state ecological expertise (SEE), a procedure that includes the environmental impact assessment (EIA) documentation used in many other countries. According to the law, ecological expertise applies to draft programmes and projects of sectoral and territorial development; project documentation for construction and renovation of enterprises and other facilities that may have negative environmental impact; drafts of methodological and normative acts and documents regulating economic activity with negative environmental impact; documents on developing new equipment, technologies, materials and substances; and materials, substances, products, economic decisions, systems and facilities, implementation or production of which could lead to violation of environmental safety standards and cause a negative environmental impact.

Twenty-two different types of activities have been identified as prone to causing higher environmental risks, for which an SEE is compulsory (see Box 2.1) – almost everything except agriculture. Except for cattle breeding, there is no size threshold under which an SEE is not needed. In this respect Ukraine's law differs markedly from the EU Directive on EIAs 97/11/EC (applicable to large installations as defined in its Annex I and on a case-by-case basis for those listed in its Annex II). As a result, the instrument is being used excessively and in a less-focused manner compared to EU requirements. Except for the activities listed as compulsory, the MEP decides on a case-by-case basis whether or not an SEE is needed for a specific project, based on an application containing a declaration of intention. About 6,000 ecological expertises are performed every year in Ukraine, a huge number compared to that in most EU countries. (For example, in Austria there are 10–20 a year, in Denmark 100, in Finland 25, in Ireland 180, in the Netherlands 70 and in the United Kingdom 500.)

The list of activities covered by the law was last changed in 2001, when filling stations were added to the list of activity categories and installations presenting an increased environmental hazard (CoM Resolution No. 544 of 1995, amended by Resolution No. 142 of 2001). The Ministry of Emergencies has its own list for SEEs in its areas of competence. The list is based on quantitative parameters such as the amount of oil used and stored in a factory.

CoM Resolution No. 483 (mentioned in section 2.1 above) and the 2003 State Construction Norms also have implications for SEEs. The legal framework for SEEs has been significantly improved and is now very comprehensive. The following elements can or should be addressed:

- Evaluation of three alternative locations before a decision is made
- Environmental and sanitary impacts
- Technical solutions for reducing impact, including use of cleaner production options, and related costs
- Design and costs of the infrastructure needed for an industrial site
- Transport of and availability of energy for the planned activity

A project for a production activity can be rejected if importing the finished product is a better alternative based on a balanced assessment of ecological, social and economic factors.

SEEs can be performed at the national, oblast and local levels, as was mentioned in the first EPR. Major projects – that is, projects with investments of more than Hrv. 30 million (approximately $6 million) – are executed by the MEP. For smaller projects, any SEE-related decision made at the local level does not need to be confirmed at a higher level.

An SEE should verify that an activity:

- Complies with environmental laws;
- Complies with the by-laws;
- Meets applicable MAC requirements;
- Uses resources rationally; and
- Minimizes environmental impacts.

These objectives apply at all levels. Since one objective is that maximum allowable concentration (MAC) requirements be met, one could expect to find a direct link between the SEE process and the permitting process, which, however, is not the case, according to the MEP.

Opportunities for the public to participate in the SEE process have improved since the first EPR. The public and ecological organizations have full access to SEE information and can express their views as specified by

the UNECE Aarhus and Espoo Conventions,[1] both of which Ukraine has ratified (see Chapter 4). For the activities listed in Box 2.1, SEE information (Announcement of intent and Announcement on environmental consequences of planned activity) must be published in the mass media. In 2004 the MEP created a national Aarhus website to which information on all new construction projects subject to the SEE process is submitted. Hearings are, when considered necessary, a part of the assessment process, mainly for large and hazardous activities.

In May 2003, Ukraine signed the Protocol on Strategic Environmental Assessment (SEA) to the Espoo Convention, but it has not yet ratified the Protocol (See section 4.2 for activities promoting the introduction of SEA and implementation of the Protocol).

Environmental auditing

The Law on Environmental Audits (LEA) was approved by the Parliament in June 2004. As a consequence, other laws had to be changed. This was done through the Law on Changes to Different Ukrainian Laws to Meet Ecological Requirements in the Privatization Process (2004). The LEA applies to both voluntary and mandatory audits.

- Mandatory audits are required in the following situations: bankruptcy, privatization of state-owned enterprises, long-term rent or lease of state enterprises, establishment of joint ventures between private and state-owned enterprises, situations where enterprises with increased hazard terminate a contract and insurance is mandatory, and other specific cases stipulated in the law. An audit should focus on the same five objectives as those targeted in a SEE. An audit can also be carried out in situations involving "past pollution" (existing environmental problems that were created in the past).
- Voluntary audits are used as a tool in the process for getting an ISO 14000 certificate.

Thus, the recommendation from the first EPR of Ukraine to introduce environmental auditing of industrial enterprises as a tool has been implemented to the extent that more industrial enterprises do voluntary audits. However, so far, the LEA has been introduced more as a tool to be used in the privatization of state-owned enterprises than as a tool for the gradual development of an integrated permitting system, as was proposed in the previous review. Nevertheless, the LEA includes a provision for using audits in certain other specific cases.

So far about 10 audits have been done in Ukraine. Measures proposed in a mandatory audit, which could be of a social, economic or environmental nature linked to the ecological situation, are binding for an enterprise. The auditor proposes the measures to be taken, and the Ministry cannot overrule the auditor's judgement. Proposals made in voluntary audits are just recommendations.

An auditor must be certified and meet certain requirements. The regulation On Approval and Regulation on Certification of Environmental Auditors (2005) is the basis for certification. Among the requirements for auditors are that they be of Ukrainian nationality, have four years of experience in environmental protection work and pass an examination. Auditors must also be independent; for example, a state official cannot become an auditor. The auditors are certified by the MEP Commission on Environmental Auditors Certification consisting of representatives of the MEP, the Ministry of Justice, NGOs and others. As of mid-June 2006, 68 auditors have been certified, and 25 companies, whose activities include environmental auditing, have been registered

Auditors have a very powerful position, since their recommendations are binding for enterprises undergoing a mandatory audit. There is a risk that such power could lead to corruption, threats and other criminal behaviour. In fact, no decision-making or supervisory role with regard to auditors' work has been given to the MEP or any other state bodies.

The Ukrainian environmental expertise and audit legislation has several features that are missing in the EU Directive on EIAs. For instance, the Law on Ecological Expertise and its by-laws explicitly request information about the costs of different alternatives for mitigating environmental impacts. In practice, no decisions can be taken without knowing the costs of the various options for reducing the environmental impact. Reasonable and balanced decisions should be based on three pillars: information about the environmental impact; technical options for eliminating, reducing or mitigating the impact; and the costs of the respective options. The Ukrainian law provides for these pillars.

[1] The Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (1999) and the Convention on Environmental Impact Assessment in a Transboundary Context (1991) respectively.

2.4 Environmental permitting

Ukraine still has a framework of environmental permitting which is single-media oriented. It includes permits on air (air emissions), water (water use and wastewater discharges), and waste (waste disposal), as well as permits for the use of certain natural resources (mineral resources, plants and animals). The environmental permitting framework has not changed since 1999, and is still based on the use of maximum allowable concentrations (MACs) of a large number of pollutants, with one important exception – the new Law on Air Protection that came into force in 2001. A new approach is now used for air pollution in existing and new installations. Conditions in air permits are no longer based on MACs in ambient air since 2003 when the MEP abolished this practice. In fact, the MAC system was causing problems when applied in areas with several pollution sources, since it calculated the allowed emissions from each source, based on the MACs and mathematical models. Contributions from other sources were difficult to consider in the models. Another problem with the MACs is that they are unrealistically stringent in many situations and there is no differentiation between large and small emission sources. After a regulatory vacuum of three years, a first step toward a shift to BAT-based emission standards is the MEP Order No. 309 of June 2006 on approval of air pollutants emission limits from stationary sources (See section 2.6). Nevertheless, MACs are still used for defining sanitary conditions around industrial facilities.

Since April 2006, a permit is valid for up to ten years, compared to three years before. This longer period will allow the state offices for environmental protection in oblasts to optimize the use of their resources to improve the situation at the major pollution sources and in industries where new investments are being made or planned.

The first EPR contained several recommendations for improving the permitting system (see Annex I, recommendations 1.4, 8.5 and 8.6 and their implementation). While these were partly implemented by the revised (2001) Law on Air Protection, an integrated permitting system has not yet been launched. At the end of 2005, a new "one-window permit" law was adopted which aims to centralize the procedures for getting a permit at a single location, thus facilitating matters for permit applicants. This law will take effect in October 2006, although it applies only to a limited number of activities (moreover, 70 activities are specifically excluded as requiring special licenses).

However, the first steps in that direction were taken in 2003 (with the help of a small grant from the World Bank) by preparing draft integrated permit applications for three industrial installations, and further efforts are under way. In 2004, a study "Approach to the introduction of Integrated Environmental Permitting in Ukraine" prepared by the Organisation for Economic Co-operation and Development (OECD), in cooperation with the MEP, proposed sectors and installation types to be covered by the integrated permitting system, outlined the legislative and institutional changes necessary to implement the new system, and suggested a timeline for the transition. An Institutional Development Fund (World Bank) grant of US$ 450,000 has been secured for preparing a legal framework for integrated permitting. The three-year project "Reform of legal framework and enhancing institutional capacity for environmental permitting in Ukraine" was launched in February 2006. Sweden supports with a complementary grant several pilot projects to result in first integrated permits. Many stakeholders such as state departments for environmental protection (SDEPs) in regions, the Ukrainian League of Industrialists and Entrepreneurs, individual industries, and members of the National Academy of Science support the idea of integrated permitting. A comprehensive training programme in integrated permitting for environmental officials in all oblasts is conducted in 2006-2007 by the Task Force Secretariat to facilitate the implementation of the integrated permitting system.

The Government's plan of actions for 2006 includes the preparation of a Concept for environmental permitting reform and a draft law on integrated pollution prevention and control. An interagency Working Group on Environmental Permitting was created in February 2006 to coordinate these efforts in conjunction with the World Bank/IDF project.

2.5 Self-monitoring and reporting of emissions and discharges

Emissions monitoring and reporting are mandatory for big polluting installations, which are required to monitor their air emissions and water discharges. A series of by-laws are in place to that end, but the specific requirements, such as monitoring frequency, are decided on a case-by-case basis. As part of the permitting process, emissions are to be regularly monitored by the industries themselves and sporadically checked by independent accredited laboratories. The industry labs that perform the regular monitoring need to be accredited too. The industries also have the option of using independent laboratories for regular monitoring. Monitoring performed by

industries is limited to a few parameters, and most often analysis is performed using classical methods that do not yield immediate results, even when they are ISO 14000 certified. More sophisticated analysis is done by external accredited laboratories. However, in fact, most pollution releases in Ukraine are still estimated, using process input and output data as well as technological parameters. Continuous online monitoring is not common, even at large power plants, whereas in the European Union it is compulsory.

Quarterly and annual reports are a normal mechanism for reporting of emissions to the authorities by enterprises. These reports are the basis for payment of emission charges within the established limits.

Smaller industries are normally not required to monitor their emissions. Their emissions reporting is based on the use of emission factors calculations.

In Ukraine, only a limited number of industries monitor environmental quality in their surroundings. Ambient environmental monitoring by industries is voluntary and is often linked to ISO 14000 certification.

2.6 Emissions and ambient standards

As was reported in the first review, maximum allowable concentrations (MACs) for 540 air pollutants and about 4,000 water pollutants have been one of the main bases for establishing permit conditions based on ambient standards in Ukraine. However, as was mentioned earlier, Ukraine has now introduced emission standards as a basis for air emissions (see Chapter 7 for air emissions standards in the energy production sector). These standards, officially called "Norms for pollutants emission limits from stationary sources" were approved by the MEP Order No. 309 of 27 June 2006 and came into force in August 2006. Emission limits are specified for particulate matter, solid toxic and carcinogenic pollutants, gaseous inorganic pollutants, and organic pollutants. The norms list emission limits for over a hundred air pollutants.

In Ukraine, air emissions standards are applied uniformly across all industries, independently of the size of the pollution source. In the European Union there are relatively few ambient air standards, and, according to the EU Directive on integrated pollution prevention and control (IPPC), emission thresholds are established case by case based on the use of best available techniques (BAT). EU legislation differentiates between large and small emissions sources and has more stringent requirements for large sources. For some sectors of enterprises, such as large combustion plants and waste incineration plants, the European Union has emissions standards that should not be exceeded. Those standards could be considered as minimum requirements when issuing an IPPC permit.

Ukraine has a number of standards and norms for water pollution that use MAC as their basis rather than discharge limits based on BAT. These include ambient standards (norms for environmental safety of water use and environmental norms of water quality in water bodies) and norms of maximum allowable discharges of pollutants. The latter lists polluting substances and includes 14 indicators, as well as bacteriological pollution, and toxicity and radioactivity levels. The norms limit concentration of pollutant rather than total amount. This is different from the practice of the European Union where a limited number of water quality standards are used, as well as some discharge standards. The key driving factors for emissions reduction are the BAT-based requirements in the IPPC Directive and provisions in the EU Water Framework Directive 2000/60/EC, like the requirement to eliminate priority hazardous substances and achieve concentrations in the marine environment close to background values for naturally occurring substances.

Direct comparison of EU and Ukrainian emissions standards is therefore neither possible nor appropriate for the time being. Introduction of the integrated permitting system will bring serious changes to the Ukrainian approach.

2.7 Compliance assistance and promotion and enforcement tools

Enforcement tools (binding tools) and compliance assistance and promotion tools (soft tools) need to be interrelated. The Ukrainian system is especially weak in the areas of compliance assistance and promotion (the softer tools). The MEP rarely uses proactive approaches like information campaigns, seminars and training activities to inform the regulated community on new laws or other developments. Rather, the latter are considered instruments that local authorities can use at their own convenience. Similarly, the charges for exceeding discharges limits (MACs) could be considered tools for promoting actions to reduce discharges. However, many stakeholders consider those charges too low to influence the behaviour of polluters (see Chapter 5).

Overall, enforcement in Ukraine is weak, although the inspectors have at their disposal various legislative

tools to enforce the regulations, such as sending a notice to a company or forcing it to limit or suspend its operations; they even may initiate the ceasing of the operations, pending a formal decision by the Cabinet of Ministers. For instance, in the Donetsk oblast, suspension of the activities is often required while corrective measures are being taken; suspension of enterprise managers is also implemented, a measure that has proven efficient in dealing with private and privatized companies but that is not often implemented.

However, the use of economic sanctions is generally preferred. Fines are determined in accordance with the Code of Administrative Violations and can be appealed by the company that has been fined. An inspector who sends a notice to a company violating the laws will, at the same time, charge for the excessive emissions as a sanction. When limits are exceeded, the charge is five times the rate for emissions within established limits (CoM Resolution No. 303 of 1999) (see Chapter 5). In addition, a fine compensating for the damage has to be paid to the city or municipality where the company is registered, which is not always the municipality affected. The damage compensation instrument is complicated to use since it is based on a large number of factors such as type of emission, type of area affected, size of the area, duration of the violation, period of violation (e.g. holidays or workdays) and so on. If a company pleads guilty and agrees to the sum calculated by the authorities, it simply pays; if not, a court issues a decision, which may be appealed. A specific person at a company can also be fined if he or she can be proved to be responsible for a violation at the company. Confiscation of assets should go through the court of justice.

2.8 Conclusions and recommendations

In Ukraine, the inspection duties are split among several inspection services. In 1999, after some changes in the Law on Environmental Protection, local authorities were given certain control functions, which is a new element in the institutional structure. However, the law is unclear and results in conflicting views on how the responsibilities should be shared. While delegation of some responsibility to the local level may have positive effects, the responsibilities of the respective levels need to be clarified. Similarly, efficiency could be greatly improved by reducing overlaps in responsibilities and activities of inspection bodies at the national level, namely between the MEP inspectors, including the special inspectorates for the Sea of Azov and the Black Sea, and the other independent inspection institutions for forestry, fisheries and others. Merging closely related entities is one option to consider; another is splitting and clarifying the responsibilities of the different entities.

Recommendation 2.1:

(a) The Ministry of Environmental Protection should review the organization of the inspection services and the related legal framework with the objective of increasing the effectiveness and efficiency of the inspection services and making sure responsibilities are clear and do not overlap. Based on the results of this analysis, the structure of the state inspection bodies for environmental protection should be streamlined.

(b) The Ministry of Environmental Protection should provide regular training on a non-commercial basis to ensure that inspection staff adjusts their skills in particular at territorial level.

The Law on Environmental Audits (LEA) of 2004 is a positive new element in Ukraine's environmental legislation. Currently it is used mainly as an instrument for introducing environmental considerations and decisions into business transactions. However, in the future it could also be used as a situation analysis instrument in an integrated permitting regime. Currently, measures proposed by the auditor are binding in cases where an audit is compulsory. However, if an audit were to be used in a permitting context, as was proposed in the first EPR, it would not be reasonable for the auditor to assume the authorities' role by setting permit conditions. The present strong power given to an auditor may also invite corruption, threats and other illegal activities. Finally, the LEA lacks the transparency and stakeholder involvement of the LEE.

The environmental permitting system is based on individual permits for different resource uses and single-media impact. There is no differentiation between large and small pollution sources. The result is a heavy administrative burden on permitting authorities and the regulated community, without any ranking of major pollution sources by priority. The present system, based on single-media standards, has a tendency to result in end-of-pipe solutions. Giving single-media permits makes it difficult to prioritize the most pressing environmental problems.

The MAC is also difficult to use as an instrument for regulating emissions when several sources contribute to the pollution. The introduction of an integrated

permitting system for major pollution sources, based on the use of cleaner production/BAT options (which would eliminate or reduce emissions during the production process) rather than end-of-pipe treatment could reduce or overcome some of the weaknesses in the present system. The EU IPPC Directive could be used as a benchmark for such an approach. However, even with a "one-stop shop" ("one window principle"), such a system could be administratively cumbersome. Therefore, for minor sources, a simplified system proportionate to the environmental impact should be considered.

Recommendation 2.2:

(a) The Ministry of Environmental Protection (MEP) should take the lead in introducing an integrated permitting regime based on the use of BAT and case-by-case considerations, similar to the EU IPPC-Directive for major pollution sources. For minor sources, simplified permits, based largely on general binding rules or technical standards, should be considered. Territorial MEP offices, local authorities, industry and NGOs should be involved, as well as relevant Ministries.

(b) After establishment of an integrated permitting and pollution prevention and control regime, environmental audits might become a voluntary instrument. The revision of the law on environmental audits should include a less powerful role of the auditors.

The quality of environmental self-monitoring by enterprises is low in Ukraine. Only a few companies monitor their emissions properly. Continuous online monitoring is more or less absent in industry.

To control and minimize emissions and avoid accidents, industries need an effective self-monitoring system. Ideally such a system should continuously track the performance of industrial processes and emissions of major pollutants to enable quick responses by operators to prevent excessive emissions. Often an ideal monitoring system cannot be established for reasons such as lack of financial resources or suitable instruments. But instruments for continuously tracking emissions of sulphur dioxide, nitrogen oxide, particulate, mercury, volatile organic compounds and other pollutants are now affordable and available and are widely used internationally. In any case, even when traditional laboratory analysis is used, it is vital to get quick feedback to operators so they can take preventive action. Monitoring by the authorities can only rarely provide data that are timely enough for this purpose, as such data are "post-event" by nature. Frequent benefits of improved self-monitoring in industries are better process performance and more effective production, which often pay off in economic terms. For all these reasons, self-monitoring in Ukrainian industries should be improved.

Recommendation 2.3:

The Ministry of Environmental Protection, in cooperation with concerned sectoral ministries and the State Committee on Statistics, and in dialogue with business and industry, should improve environmental monitoring and reporting by enterprises. In this process, current legal requirements should be improved aiming at (a) the creation of a legal base for the implementation of the PRTR Protocol to the Aarhus Convention, and (b) incentives to facilitate an effective self-monitoring system.

See also related Recommendation 3.3 in Chapter 3.

Environmental regulations can be effective only when the rules are known and understood and, preferably, also accepted by the regulated community and the public. The key to achieving this is to establish a good dialogue between the various stakeholders when preparing, introducing and implementing new legislation. The dialogue between the MEP and environmental NGOs has improved in the years since the implementation of the Aarhus Convention requirements. The dialogue of the MEP with the regulated community does not seem to have progressed to the same extent, and consequently the implementation of the legislation is below reasonable standards. Some reasons for this include a weak dialogue between industry and the authorities and a lack of actions by the authorities to promote compliance with permits and related obligations.

Recommendation 2.4:

The Ministry of Environmental Protection should take the lead in promoting better implementation of and compliance with the legal framework, rules and conditions. This should include actions such as:

- *involving stakeholders in the development of the legislation as suggested above;*
- *arranging regular meetings with stakeholders to exchange views on how to best solve environmental problems; and*
- *organizing seminars to inform stakeholders about the implementation of new laws and decrees.*

Chapter 3

INFORMATION, PUBLIC PARTICIPATION AND EDUCATION

3.1 Introduction

In response to the recommendations of its first environmental performance review (EPR), Ukraine has made efforts to better coordinate environmental observations by adopting regulations clarifying the responsibilities of numerous institutions involved in environmental data collection and establishing an interdepartmental mechanism to facilitate dialogue and information exchange. Specific databases have been established on issues such as air and water monitoring. Since 2003, coordinated monitoring systems have been developing at the oblast level. This development has a potential to lead to the consolidation of territorial systems into a coherent and comprehensive monitoring system at the national level that is based on harmonized data methodologies and procedures and yields environmental information used in policy planning and decision-making.

Ukraine has made considerable progress in improving public access to environmental information and involving the public in discussion of environmental matters. However, improved environmental education and public awareness have not yet led to increased pressure by civil society on authorities and polluting enterprises to strengthen environmental management and reduce pollution and waste in the country. Much depends on the availability of objective, timely and easy-to-understand assessments of the state of the environment. This area remains a great challenge for Ukraine.

3.2 Environmental monitoring

Air-quality monitoring

The State Hydrometeorological Service (Hydromet) monitors air quality in 53 Ukrainian cities at 162 fixed monitoring stations. To meet national monitoring regulations (one station per 50,000–100,000 city dwellers), nine more air quality-monitoring stations should be established. These are missing owing to lack of funds. The distribution of Hydromet stations for monitoring air quality is shown on Map 3.1. In addition, there are seven communal air-quality monitoring stations, six in Dniprodzerzhinsk and one in Komsomolsk. Thirty-three meteorological stations monitor pollution in atmospheric precipitation and 54 stations monitor pollution of the snow cover.

Ukraine's existing air observation network has not been reviewed or revised since its inception some 30 years ago or since the geopolitical changes of 1991. Within the Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe (EMEP programme), no new transboundary monitoring stations have been installed at Ukraine's northern and eastern borders to supplement the two existing stations (located in Rava Ruska and Svitebsk and not shown on Map 3.1) at the western borders.

The mandatory air-quality monitoring programme covers seven pollutants: total suspended matter, nitrogen dioxide (NO_2), sulphur dioxide (SO_2), carbon monoxide (CO), formaldehyde (H_2CO), lead and benzo(a)pyrene. For total suspended matter and carbon monoxide, samples are taken manually twice a day, while for the other five pollutants samples are taken four times a day. Some stations monitor the occurrence of additional pollutants, depending on regional and/or local emissions patterns and existing technical capacity.

Six stations located in Kyiv, Boryspil, Bohuslav, Odesa, Lviv and Crimea's Kara-Dagh Nature Reserve also monitor overall ozone concentrations and the state of the ozone layer. In total, 33 pollutants are monitored throughout the country. Air concentrations of volatile organic compounds (VOCs) (except benzo(a)pyrene), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), mercury (Hg) and persistent organic pollutants (POPs) are not measured. The presence of 11 pollutants in precipitation and the snow cover is analysed.

Hydromet is the agency responsible for the State Programme of scientific and technical renovation of system of hydrometeorological observations and environmental pollution monitoring network (1996). However, the goal of this programme to establish stations of continuous air pollution monitoring for NO_2,

SO_2 and CO have not been achieved due to lack of financing.

Hydromet processes monitoring data. However it does not transmit them to the Ministry of Environmental Protection (MEP) on a regular basis, except for detected exceedances, which are reported without delay not only to the MEP but also to the oblast and local authorities concerned.

Since 2000 the State Ecological Inspectorate (SEI) has slightly increased the number of monitored industrial pollution sources and enterprises. Today it takes sporadic air samples at 2,792 pollution sources at 927 enterprises. The total number of measured parameters is about 65.

The sanitary and epidemiological service of the Ministry of Health sporadically monitors air quality in residential and recreational areas, in particular near main roads, sanitary protection zones and apartment blocks; on the territory of schools, preschools and medical institutions in urban areas; and in workplaces. In addition, it measures air quality in residential areas in response to residents' complaints.

Overall, air-monitoring stations in Ukraine give a good indication of the population's exposure to air pollution without always capturing the full impact of pollution episodes. There is no interpretation of dose relationships between different data sets. The current air quality networks are generally unable to link air pollution levels with emission patterns and so identify activities that violate emission norms or air quality standards under normal operating conditions. Hydromet and the Ministry of Health do not harmonize or coordinate their monitoring programmes or methods.

Map 3.1: Hydromet's network of air-quality monitoring stations

The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Source: Hydromet, personal communication, 2005.

Inland water monitoring

Hydromet monitors hydrochemical water quality at 240 points at 374 gauges in 151 water bodies. Since 1999 this network has expanded by 25 observation points and 14 water bodies. However, during the same period the network of hydrobiological water-quality monitoring has decreased by ten observation points and eight water bodies. Today hydrobiological observations are conducted at 82 points at 159 gauges in 39 water bodies. Both networks provide data on a total of 46 parameters and help to assess chemical composition, biogenic parameters, and the presence of suspended and organic matter, main pollutants, heavy metals and pesticides. Samples are taken manually 4 to 12 times a year. Chronic water toxicity is monitored in 13 water bodies. Monitoring of oil products in surface waters in the Zaporizhzhia, Khmelnytskyi, Kherson, Volyn and Rivne Oblasts and in the Svitlovodsk area was discontinued in the 1990s and has not resumed since then. Hydromet continues to monitor transboundary water pollution at 15 points at 29 gauges, as it did in 1999.

Although the number of observation points conforms to the applicable water monitoring regulations, the monitoring network needs to be reviewed and updated. Today the observation points are located only on big rivers, large reservoirs and lakes near key urban areas. Diffuse pollution of surface waters is not monitored. There is no single background observation point on inland waters in Ukraine.

The SEI has increased the number of monitored gauges in water bodies by 99 since 2000. Today it takes sporadic water samples at 2,159 gauges. Over the same period the number of measured parameters has increased from 56 to 60.

There are other institutions involved in surface inland water monitoring. For instance, the State Committee for Water Management monitors water supply sources, transboundary watercourses and water abstraction by nuclear power plants. Since 1999 its network has increased by some 30 observation points (primarily at oblasts' borders and on transboundary stretches of the Dnister River), and today it includes 328 observation points in 116 rivers, 31 irrigation systems and 61 reservoirs. Hydrochemical and radiation parameters are measured everywhere; hydrobiological parameters are measured only in the Siverskyi Donets River. The Ministry of Health monitors sources of drinking water supply and recreational water sites along rivers and reservoirs.

The MEP developed and implemented recommendations on comparability of water monitoring data (2002). However there is no harmonized methodology for use by all institutions involved in surface water monitoring. Each governmental body uses its own software and databases. As a result, the monitoring data are distributed among various sources, disintegrated and not comparable.

Ukraine has expanded cooperation with its neighbors on monitoring of water quality in transboundary waters. With Romania it takes joint water samples from the Prut and Syrets rivers and exchanges bulletins concerning their water quality. Ukraine and Hungary take yearly joint water samples at 4 boundary gauges along the Tisa River. The two riparian States also exchange data on the results of another 20 samples that are taken individually.

The trend in groundwater monitoring has been towards a decrease in the number of observation sites – from 1,400 in 1996 to 1,148 in 2005. The network has been optimized since 2002 and today is operated by 17 field missions and 8 state (regional) enterprises, all subordinated to the State Geological Service, as well as by 25 oblast administrations and by enterprises pumping groundwater for specific uses. Groundwater monitoring sites are primarily intended to assess groundwater levels (availability) and natural geochemistry. Chemical parameters (22 in total) are measured manually once or twice a year, instead of quarterly as required by national monitoring regulations. There is generally no monitoring of anthropogenic impacts on groundwater. Occasional monitoring is done of levels of heavy metals and pesticides. The sanitary and epidemiological service of the Ministry of Health performs chemical analyses of groundwater intended for drinking water.

The significant gaps in the data on groundwater quality reflect the insufficient number of monitoring experts, the inadequate financing and policymakers' decreasing attention to this type of data.

Coastal water monitoring

Hydromet runs a coastal water monitoring network comprising 74 background monitoring stations, 9 dumping monitoring stations and 14 research stations, all located in the coastal areas of the Black Sea and the Sea of Azov. Although the total number of stations has increased by 13 since 1999, the current observation

network falls short of meeting the requirements of national monitoring regulations. At least 47 more background stations and 13 more dumping monitoring stations are needed. Today between 16 and 26 hydrochemical parameters and bottom sediments are measured at the existing stations. No hydrobiological parameters are monitored.

The State inspectorates for the protection of the Black Sea and the Sea of Azov operate their own monitoring systems. Their responsibilities include monthly sampling and analysis of pollution sources located along the coast; monitoring of discharges from ships and pollution from prospecting and operational activities for oil, gas and construction materials on the sea shelf; and oversight of the exploitation of marine living resources. The Scientific Centre for Marine Ecology in Odessa, which serves as a monitoring centre for the Black Sea Environmental Programme, also performs some monitoring activities in accordance with the Programme of State Environmental Monitoring of the Black Sea and the Sea of Azov (2004). The Ministry of Health monitors water quality at the beaches.

Soil monitoring

Hydromet monitors soil pollution of agricultural lands by pesticides at 35 plots in 18 oblasts and by heavy metals in 20 settlements. Samples are taken every five years, while samples for heavy metals in the cities of Konstantynivka and Mariupol are taken annually. The observation network has not undergone any changes since the first EPR.

The SEI takes soil samples sporadically at more than 600 industrial sites in the country. Since 2000 the total number of parameters measured has increased from 18 to 27. Both the SEI and the Ministry of Health institutions take sporadic soil samples on agricultural lands. The Ministry of Health also monitors soil quality in residential and recreational areas in cities.

Monitoring of biodiversity, including in forests

Owing to budgetary constraints, only species of high commercial value (trees, fish, game) are regularly monitored. Surveys and inventories of other flora and fauna species to be included in the national registry (cadastre) have suffered from funding limitations. Some studies, such as the preparation of the State inventory of marine mammals of the Black Sea and the Sea of Azov, have received particular attention because of international assistance or the public appeal of the species involved.

The Ukrainian Research Institute of Forestry and Forest Improvement in Kharkiv conducts forest-monitoring surveys in Ukraine. It operates a network of 1,200 monitoring plots in 16 oblasts under the UNECE's International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests) as well as 120 monitoring plots in 7 oblasts in cooperation with the United States' Forest Health Monitoring Programme. Data on growing stock are collected for all monitoring plots. Parameters for trees and vegetation are regularly assessed on all plots, while soil parameters are measured on some of them. Another ongoing project focuses on the collection of data on carbon sequestration in forests.

Radioactivity monitoring

Hydromet monitors radioactive contamination of the atmosphere through daily measurements of gamma-radiation exposure (GRE) doses at 179 stations, radioactive fallout from the atmosphere at 58 stations and radioactive aerosol content in the air in six cities. To meet the requirements of national monitoring regulations, one more GRE station and two more aerosol-monitoring stations need to be established or reactivated. Hydromet measures radioactive contamination of surface waters in eight bodies of water. In the vicinity of nuclear power plants, Hydromet measures radioactive contamination by caesium-137 of surface waters at 19 points (up from 11 points in 1999) and soil contamination at 29 points. Although monitoring of strontium-90 is required by national regulations, it is not being done.

The Ukrainian Research Institute of Environmental Problems operates a "GAMMA" system that monitors continuously background radioactivity in the city of Kharkiv and near the Zaporizhzhia and Rivne nuclear power stations. Monitoring of three other nuclear power stations is expected to begin in the near future.

Monitoring laboratories of the Ministry of Agrarian Policy perform spot checks of radioactivity concentrations in food products.

The Ministry of Emergencies monitors GRE doses at 10 automated points near nuclear power plants. It plans to install 10 more points in the near future. Within a 30-kilometre radius of the Chernobyl accident site (the Exclusion Zone), the Ministry of Emergencies monitors (a) radionuclide concentrations at 13 points and two production facilities, (b) radionuclides in

atmospheric precipitations at 29 points, and (c) air concentrations of "hot" particles at nine points. The International Radioecology Laboratory of the Chernobyl Centre for Nuclear Safety, Radioactive Waste and Radioecology in Slavutych monitors radiation impact on biota in the Exclusion Zone.

Analytical laboratories

Hydromet operates 45 analytical laboratories of various types in polluted areas of the country. In addition, two of its analytical entities analyse samples taken in marine waters. 90 per cent of these laboratories have been accredited. Although Hydromet has been provided with some new monitoring and analytical devices and equipment, overall its instrumental base still requires an overhaul. In early 2005, of its 1,799 devices and outfits, 1,231 were either not operational or outdated.

The SEI and its offices throughout the country operate 53 analytical laboratories. Since the adoption in the early 2000s of a plan to certify the sampling and evaluation methods used by these laboratories and to harmonize these with relevant ISO/EU standards, 42 methods have received formal certification. The updating of national monitoring standards is scheduled for completion by the end of 2007. Methodological documentation is not coordinated with that of other government agencies conducting similar monitoring activities.

The State Committee for Water Management has 40 analytical laboratories, all of which are certified. The State Geological Service operates four central (accredited) laboratories and eight "trimmed" state enterprise laboratories, only two of which are accredited.

The Ministry of Health has analytical laboratories in every oblast and most rayons. They conduct sanitary, chemical and bacteriological analysis of samples. Radiological analysis is conducted by laboratories in the Chernobyl, Polessk and Ivanovsk rayons of Kyiv Oblast – the areas that suffered most from the Chernobyl accident.

Overall, the number of laboratories run by the public authorities has never been questioned in Ukraine, although in western countries there has been a tendency to reduce the number of laboratories, with the remaining ones specializing, to the extent possible, in specific areas.

From 2000 to 2004 the number of enterprise laboratories in Ukraine conducting air monitoring decreased from 479 to 445, while the number of such laboratories monitoring water quality increased from 608 to 703 and those analysing soil and waste increased from 35 to 62. While 66 per cent of these laboratories were accredited in 2003, two years later some 92 per cent were accredited. The JSC Concern Stirol in Horlivka (Gorlovka) in Donetsk Oblast is an example of an enterprise that operates a modern self-monitoring system. It has five automated stations monitoring air quality at the enterprise and in its vicinity. It is ISO 14001 certified and has a modern environmental management system.

The SEI is checking compliance by enterprise laboratories with accreditation documentation. In 2004 a total of 207 laboratories throughout the country were checked. In 2002 the SEI together with the State Standardization Committee conducted interlaboratory comparisons of air and water samples from 19 enterprise laboratories. In 2003–2004 the Ukrainian Research Institute of Environmental Problems jointly with the State Standardization Committee conducted similar exercises.

Technical assistance

In 2001 Italy provided computer equipment to 35 analytical laboratories in Ukraine to support air-monitoring activities. The 1996–2000 Tacis programme to set up an accident and emergency warning system for the Ukrainian and Moldovan segments of the Danube Basin resulted in the creation of two international reporting centres, in Uzhhorod (western Ukraine) and Izmail (southern Ukraine). Water monitoring equipment was supplied to Hydromet in 2004 under the tripartite (Belarus, Russian Federation and Ukraine) UNDP/GEF–EU/Tacis project for a strategic action plan for the Dnieper Basin. The equipment is currently idle, as it does not meet national certification requirements. In 2003, with the assistance of Hungary, an automated water-quality monitoring station was established on the Ukrainian stretch of the Tisa River.

3.3 Information management and reporting

Information systems

Since 2002 the Ukrainian Research Institute of Environmental Problems has been developing databases on the atmosphere and hydrosphere and on instrumentation and methodologies used by MEP monitoring networks. These databases cover relevant monitoring stations and analytical laboratories of the

SEI, Hydromet and (partly) the State Geological Service. The data include locations of monitoring stations, measured parameters, measurement periodicity, equipment and measurement devices, and analytical methods. The databases list some air-monitoring devices in use that date back to 1946 and water-quality monitoring devices dating from 1961.

An ad hoc Information and Analytical Centre was established in 2004 to ensure information exchange between the Ministry, its local offices and environmental monitoring subjects. The Centre operated at the MEP during part of 2005 but stopped functioning owing to lack of financing. The MEP intends to renew functioning of this centre on a pilot basis by providing it with human and other resources and linking it online with major monitoring networks (for air, water, radiation and soil) to ensure the availability of up-to-date monitoring data for decision-making in case of environmental emergencies.

The State Geological Service has established a groundwater database as a subsystem of the State Water Cadastre. The database contains 18 types of data sets, including on groundwater reserves and use, the location of boreholes and the results of analyses of groundwater samples.

The Ukrainian Research Institute of Forestry and Forest Improvement is developing a database on the environmental status of forests in Ukraine based on data from the State Forestry Service, data collection under the UNECE ICP Forests programme and the Forest Health Monitoring Programme financed by the United States, and remote sensing data.

Environmental statistics

The State Committee of Statistics updated existing forms of statistical reporting and introduced new ones in 2003. It added new pollutants to the air emissions statistical form, drawing from the applicable international conventions on environment and transport. Methods for preparing pollution emissions inventories were prepared and harmonized with the CORINAIR/EMEP guidelines. Statistical data collection now includes separate data for air emissions from (respectively) private vehicles, transport enterprises, rail and air transport and agricultural vehicles. Collection of statistical data on hazardous waste is now based on a new hazardous waste classification (harmonized with international ones) and an updated list of wastes. The ISIC classification of economic activities is applied to most statistical data-gathering activities. Work is underway to harmonize the national environmental expenditures classification with that of Eurostat. However, the main annual environmental statistics publications of the State Committee of Statistics, *Environmental Protection in Ukraine* and *Protection of Atmospheric Air*, do not reflect the above-mentioned changes.

The State Committee for Water Management collects data on water abstraction, supply and losses and on wastewater discharges into water bodies, including pollutants in wastewater, on the basis of a relevant statistical form.

Environmental assessments and reporting

The Ministry of Environmental Protection initiated the development of integrated environmental assessment indicators to help in policy planning. The integrated indicators are based on a set of indicators characterizing conditions in the atmosphere and hydrosphere as well as natural resource use and climate. The integrated indicators make it possible to rate the environmental situation in an oblast on a scale of "satisfactory" to "very bad". Map 3.2 shows the results of such assessment by oblast. The materials are used in the preparation of the regional and national environmental atlases, which are taken into account in environmental policy planning.

Until 2002, national reports on the state of the environment (SoE) in Ukraine were published every year in Ukrainian and English pursuant to the Law on Environmental Protection. They were submitted to the Parliament and to the Presidential Administration, the Cabinet of Ministers, ministries, government departments, libraries, academic institutions and NGOs. For instance, 2,000 copies were published in 2001. Electronic versions of the reports were produced on CD-ROM (for principal report users) and posted on the MEP website.

The 2002 SoE report, published in 2003 in Ukrainian only, deviated from the structure of the previous reports. In fact, it was a compilation of the oblast SoE reports that are published yearly by oblast environmental authorities. The national report contained no assessment of the country's situation or the effectiveness of its environmental protection measures. That same year a comprehensive *National Report of Ukraine on Harmonization of Society's Activity in Natural Environment* was published in three languages (Ukrainian, English and Russian) on the occasion of the fifth Pan-European Ministerial Conference "Environment for Europe" held in May

2003 in Kyiv. This report actually repeated information presented earlier in the 2001 SoE report. No new comprehensive report has been published in Ukraine since 2003, owing to continuous reorganizations within the MEP and in particular its monitoring division. The publication of three annual SoE reports (2003, 2004 and 2005) was expected in 2006. A draft of the 2004 SoE report has been posted on the MEP website. The lack of a comprehensive overview of the country-level situation in the reports substantially decreases their usefulness for decision-making.

For future SoE reports, the MEP has decided to deviate from the past approach of having the report prepared through a designated focal point at the MEP. According to an order issued in 2005, the responsible institution will be selected annually through tendering. This new approach may jeopardize the consistency and continuity of the report's preparation. It would be contrary to the *Guidelines for the Preparation of Governmental Reports on the State and Protection of the Environment* endorsed by the Kiev Ministerial Conference "Environment for Europe" in 2003 that recommended the designation of "a permanent, specially authorized State environmental protection body to be responsible for the production and subsequent distribution of reports".

Reports from other bodies also contain environmental information. The Ministry of Emergencies publishes an annual report *Safety from Natural and Man-Made Disasters in Ukraine and Principal Efforts to Enhance It*. It also publishes the results of radiation monitoring in the *Bulletin of the Ecological State of the Exclusion Zone and Area of Mandatory Resettlement* issued twice a year and in the *Chernobyl Herald* newspaper. Hydromet irregularly publishes environmental pollution bulletins. The State Geological Service publishes yearbooks on groundwater budget, on forecasted groundwater tables and on groundwater conditions. These publications have limited distribution and are not easily accessible by the general public. The State Committee for Water Management runs the country's water cadastre but does not publish water data.

Overall, the results of environmental monitoring are not efficiently used to assess environmental conditions, the driving forces behind changes in the environment, the effectiveness of environmental protection measures, nor are they used effectively for making decisions, elaborating policy or enhancing public awareness of the issues in Ukraine. After recent accidents with serious environmental consequences (such as the explosions at a military ammunition warehouse in Zaporizhzhia Oblast in 2004) the authorities have started expressing concern regarding the lack of comprehensive and continuous data and information on the environment. There is a need to significantly improve coordination of activities of environmental monitoring subjects at the local and national levels.

3.4 Public participation

Civil society and awareness-raising

Today approximately 500 civil environmental organizations are active in Ukraine. The activities of many NGOs are aimed at enhancement of the local environment – for example, the afforestation of riverbanks; the cleansing and purification of water in rivers, ponds and springs; and the protection of nature reserves and cultural objects.

Environmental NGOs play a significant role in extracurricular environmental education. They issue bulletins and periodical publications such as *Native Nature* (published by the Society for Nature Conservation), *The Green World* (the Ukrainian environmental association Green World), *Oikumena* (the National Ecological Centre of Ukraine) and *Off Spring* (the Ukrainian charity Parostok). Specialized NGOs that advise the public on environmental legislation include EkoPravo-Kyiv, EkoPravo-Lviv and EkoPravo-Kharkiv.

The MEP provides environmental NGOs with financial support; the procedure was modified in 2005. NGOs' meetings and publications are financed through the State Environmental Fund via tenders.

Every year the MEP participates in the "Ecology" international exhibition and fair in Kiev. It maintains and updates a permanent exhibition in Ukraine's Expocentre. The MEP also organizes the nationwide competition "To Pure Sources", as well as various environmental events, such as Environment Day, Clean Air Day and Primroses. The magazine *Nature in Ukraine* is published with information resources and funding from the MEP.

Map 3.2: Results of integrated environmental assessments by oblasts in Ukraine

The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Source: Kharkiv Research Institute of Environmental Problems, personal communication, 2005.

Public participation and access to information

In 2003 Aarhus Information Centre opened as part of the Ukrainian-Danish project "Assistance to Ukraine on Implementation of the Aarhus Convention". In 2004 the MEP transformed the Centre into the Aarhus Information and Training Centre, which received computer equipment for its functioning via the EU project on environmental education, information and public awareness for the newly independent States.

Public councils were established at the MEP (in 2000) and thereafter at the state administrations for ecology and natural resources in the oblasts and in the cities of Kyiv and Sevastopol. The councils meet regularly to discuss topical environmental issues. The Public Council under the MEP includes 20 national environmental NGOs. It has organized round tables, workshops, the national contest "To Clean Wells" and national conferences such as "Environmental Policy: Public Outlook", held in 2000 to assess environmental policy in Ukraine. The Public Council has expressed concern to the MEP regarding the environmental impact of proposed big projects like the reconstruction of the Danube–Black Sea ship channel (the so-called Bystryi channel; see Chapter 4 for more details) and the pipeline construction through the Crimea, as well as the lack of a national sustainable development programme and the absence of integrated elements on environmental protection into the sectoral components of the European Neighborhood Policy's Ukraine-EU Action Plan (2005).

For three years since 2003 Ukraine had had no national Aarhus Convention coordinator. The new coordinator was appointed only in June 2006. This has weakened Ukraine's participation in the Meeting of the Parties to the Convention and the international implementation process.

The creation of Web portals for the Cabinet of Ministers and other government bodies has broadened opportunities for the public to receive information.

Since 2001 the MEP has maintained a robust website in Ukrainian and English (www.mepr.gov.ua). The MEP is now gathering and organizing environmental data already available on the Internet and loading its website with environmental reports, reports by MEP branches in the oblasts, and other useful information. Work is underway to convert the MEP website into a more sophisticated and user-friendly environmental portal.

There are examples of public participation in policymaking relating to the environment. For instance, NGOs participated in the preparation of draft laws on environmental audit, environmental insurance, the prohibition of tobacco smoking, and the draft of the Drinking Water Programme of Ukraine for 2006-2020. Representatives of NGOs sat on the MEP's decision-making board (collegium) and its tender commission. The inspectorates and territorial bodies of the MEP have established an institute of volunteer ("public") inspectors who participate in inspections by state inspectorates checking compliance with environmental legislation. (See also Chapter 2.)

The Law on Ecological Expertise (1995) and the Law on Land Use and Building (2000) provide for public participation in decision-making relating to the environment. For instance, the conclusions of a state ecological expertise (SEE) have to take public opinion into account, however, public participation in it is *de facto* exceptional. The legislation allows for NGOs so accredited to carry out separate public ecological expertise. There is some evidence of public ecological expertise organized by NGOs such as MAMA-86, Ecopravo-Lviv and Ecopravo-Kyiv. The conclusions of public ecological expertise are treated as recommendations, unlike SEE conclusions, which are binding.

The State Construction Norms "Structure and content of the documentation for environmental impact assessment (EIA) in designing and building industrial enterprises, buildings and structures" (2003), which were prepared with public participation, establish a procedure for public participation in decision-making. The developer is obliged to inform the public of the expected environmental impact of the proposed activity, organize public hearings and submit the results to the SEE. This procedure is not followed frequently. In practice, the SEE provides the environmental assessment documentation to the MEP's Aarhus Centre for uploading to the MEP website, with an invitation for comments only.

NGOs have expressed concern over the lack of transparency in dealings with local self-government bodies, which hinders public participation at the initial stage of the decision-making procedure for specific types of activities. This is particularly true of local commissions that deal with land issues and urban planning.

According to the current legislation, environmental health impacts are subject to sanitary and hygienic expertise (and not to environmental expertise) conducted by the bodies of the Ministry of Health. There is no public participation requirement for the sanitary and hygienic expertise. Discussions are underway in Ukraine regarding opportunities to merge all six existing state expertises (the ecological expertise being one of these) into a single one and to entrust this "one-stop shop" facility to a separate new government institution for streamlining procedures in order to facilitate business development in the country. Ukraine's environmental community needs to follow these discussions to ensure that public participation procedures are included in the operational modalities for the new institution, if it is established.

3.5 Environmental education

Preschool and school education

The MEP has developed a programme and a manual for preschool education that include environmental aspects.

The reform of primary and secondary schools that took place in 2001 was accompanied by the introduction of new environmental education programmes and standards. The approach was to integrate environmental issues into other subjects. As a result, environment is part of the "Me and Ukraine" subject taught in grades 1–4 and a number of subjects taught in grades 6–12, including biology, physics, geography, literature and some others. Natural history is taught in grades 5 and 6. Furthermore, environmental issues are included in the "Basics of Health" subject taught in all grades. "Fundamentals of Environmental Knowledge" has been introduced among optional courses in grades 10 and 11. The Institute of Education Problems of the Ukrainian Academy of Pedagogical Sciences oversees the preparation of textbooks and teaching manuals.

The Youth Academy of Sciences and the Ukrainian State Ecological and Nature Centre promote extracurricular environmental education among children and youth. There are about 200 Young Naturalist Centers throughout the country.

Professional and higher education

Ukraine has introduced state educational standards and mandatory curricula for environmental experts. A new mandatory course "Principles of Ecology" has been added to the curricula of vocational schools. Some vocational training institutions have begun training technicians in environmental protection and monitoring. Ecology has been introduced as a mandatory subject in all higher education institutions. Pedagogical universities teach a course on "Teaching Methods for Environmental Subjects", while Chernihiv and Uman universities train ecology teachers. A number of new environmental curricula have been initiated, such as "Environmental Audit", "Economics of Environmental Protection", "Ecology of Recreational Activities" and "Basics of Sustainable Development". The year 2001 saw the establishment of Odessa State Ecological University, a dedicated institute for training ecology specialists.

In Ukraine today, environmental experts are trained at 103 institutions of higher education, compared to around 30 in 1999. Some 2,000 environmental experts graduate annually; in fact, there is now concern about a possible overproduction of environmental experts in the country.

Training

The State Ecological Institute of the MEP is a leading institution providing retraining for environmental experts. Trainees are mainly from the State Environmental Inspectorate, customs and big polluting enterprises. In addition the Institute provides post-graduate education on Ecology for some 50 experts and on Environmental Protection management for 25 experts annually.

No public authority is made clearly responsible for promotion of the non-formal and informal adult education. Nevertheless, the MEP has been financing from the State Environmental Fund meetings and conferences on environmental awareness raising and the publication of environmental information products for the general public.

3.6 Policy and decision-making framework

Monitoring and information

Institutional setting and coordination

The Resolution of the Cabinet of Ministers No. 391 of 1998 "On approval of the regulation on the state environmental monitoring system", endorsed the Regulation of the State Environmental Monitoring System (SEMS). The Resolution of the Cabinet of Ministers No. 528 of 2001 "On introducing amendments into the Resolution of the Cabinet of Ministers No. 391 of 30 March 1998" introduced some amendments to the Regulation to enable better organization and closer coordination among the entities within SEMS. For this, an Interdepartmental Commission on Environmental Monitoring was set up, departmental standards were created for the procedure that the SEMS entities would use to monitor the environment, and indicators to be used in environmental monitoring were clarified.

Until 1999, a total of 10 environmental monitoring entities from different ministries, departments and services were part of the SEMS; since 2000, this number has been reduced to eight, partly owing to administrative reforms of the central executive authorities.

The Resolution of the Cabinet of Ministers No. 1551 of 2001 "On establishing the Interdepartmental Commission on Environmental Monitoring" approved the mandate of the Interdepartmental Commission on Environmental Monitoring, led by the Minister of Environmental Protection, and its membership. This membership includes senior representatives of all SEMS entities. The Commission set up sections dealing with air monitoring, water monitoring, land and waste monitoring and information support, as well as a board of experts. However, the effectiveness of the Commission is questionable, as it has not met since 2004. The Ministry of Agricultural Policy and the State Committee on Land Resources do not have units responsible for establishing the national system of environmental monitoring.

To facilitate data exchange among the SEMS entities, the MEP approved the Procedure for Information Exchange between the Ministry's Bodies and Other Environmental Monitoring Entities When Conducting Prescribed Observations of the Environment (Order No. 323 of 2002). There is no evidence that this regulation has borne fruit, as Ukraine has no interlinked or centralized environmental database. The fact that the national SoE report, which in the past was the outcome of inter-agency information exchange, has not been published since 2003 indicates that the regulation has not had the desired effect.

Policy and regulatory developments

Ukraine has been active in developing procedures, guidelines, manuals and programmes for making environmental monitoring comprehensive and well coordinated. All too often, guiding and methodological efforts have not been supported by prioritization efforts and increased budgeting. As a result, the situation in the field relating to the quantity of monitoring stations and equipment, the parameters measured, and data management and data delivery to decision-making bodies has not improved much since the first EPR of Ukraine.

Resolution of the Cabinet of Ministers No. 343 of 1999 approved the Procedure for Arranging and Conducting Air-Protection-Related Monitoring. The MEP is giving increased attention to producing guidance for the water-quality monitoring network. This can be seen from the adoption of the following:

- Standard Interdepartmental Guidelines for the Organization and Conducting of State Water Monitoring (Order No. 485 of 2001);
- Recommendations for Inter-comparison of Water Monitoring Data, and Guidelines and Requirements for the Equipment of Model Water Monitoring Sites (Order No. 325 of 2002);
- Organization and Conducting of Monitoring of Surface Water Pollution (Order No. 89-M of 2003).

In 2002, the MEP approved Guidelines for the Inventory of Analytical Laboratories (Order No. 325 of 2002), which led to the creation of three databases at the Ukrainian Research Institute for Environmental Problems (see section 3.3). The same year the MEP approved a Programme to Improve the Quality of Background Observation of the Pollution and Monitoring of the Natural Environment (Order No. 57 of 2002). The programme established requirements for the environmental monitoring activities of Hydromet and improved their coordination with the monitoring activities of other MEP bodies. Presidential Decree No. 681 of 2005 transferred Hydromet from the MEP to the Ministry of Emergencies. This may lead to a refocusing of Hydromet activities on monitoring natural disasters like floods, avalanches and storms. If no additional resources are allocated to this type of monitoring, routine environmental monitoring may suffer.

To promote a programmatic approach to further development of environmental monitoring in the country, the MEP approved Recommendations on Methods for the Preparation of Regional and State Environmental Monitoring Programmes (Order No. 487 of 2001), which are now being introduced at the regional level. Nine oblast monitoring systems were set up by mid-2005 on the basis of the methodology developed by the Ukrainian Research Institute of Environmental Problems. An example is the multipurpose environmental monitoring data analysis system for Zaporizhzhia Oblast presented in Box 3.1.

Environmental monitoring in Ukraine today is seriously underfinanced. For instance, since 1999 the environmental monitoring activities of Hydromet has received no more than 10 per cent of the funds it requires annually to pursue its monitoring activities. As of 2003, monitoring no longer receives supplementary financing (in addition to funds from the state budget) from the State Environmental Fund. Hydromet formerly received Hrv 300,000 a year for this purpose.

In 2004 the Cabinet of Ministers approved the Concept of a State Programme of Natural Environment Monitoring (Resolution No. 992-p of 2004); instructed the MEP to develop, in cooperation with other concerned government bodies, the Programme itself, covering the period 2006–2010; and pledged Hrv 200 million for its implementation once it had been approved by the Cabinet of Ministers. The MEP prepared a draft programme. The autumn 2005 version was a framework document with a very general breakdown of activities. It was understood that detailed actions along with expenditures and expected outputs would be submitted annually to the Cabinet of Ministers once the framework programme had been adopted. The list of activities in the draft programme looked comprehensive but lacked focus and priorities. Nevertheless, should it be approved, important activities would receive a push, such as the modernization of monitoring stations, the optimization of networks, the creation of background and additional transboundary monitoring stations, and the establishment of computerized databases for multiple users.

Amount of financing for 2006 for the purpose of establishing the state system of environmental monitoring is approximately US$ 3.5 million. These expenditures are funded from the State Environmental Fund and are higher than in any of the previous years.

Box 3.1: The oblast environmental monitoring programme in Zaporizhzhia

On 27 July 2001, the Zaporizhzhia Oblast Council adopted an environmental monitoring programme for the oblast for 2001–2010. Developed in collaboration with all oblast governmental bodies, major polluting enterprises and local NGOs and with support from the regional environmental fund, the programme is based on a format and procedure for data submission managed by Ecocentre. This company operates an Internet-based database to manage data inputs from all of the oblast's monitoring networks, including those of Hydromet, the Ministry of Health and the State Committee for Water Management and emissions data from polluting enterprises. Implementation is monitored by a regional interdepartmental commission led by a vice-head of the oblast administration. Some Hrv 16 million from various sources have been earmarked for the programme's implementation. It has served as a basis for developing other regional programmes, such as a programme to resolve environmental crises in Zaporizhzhia for 2001–2010 that has involved some 100 polluting enterprises; a programme on environmental protection, rational use of natural resources and environmental security for Zaporizhzhia Oblast for 2003–2010; a programme for rehabilitation of mining sites; and a programme for handling hazardous wastes.

Source: Zaporizhzhia Department of Ecology and Natural Resources, personal communication, 2005.

Public participation

In 1999 the Parliament ratified the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention). In order to harmonize existing Ukrainian legislation with the requirements of the Aarhus Convention, the Parliament approved Law No. 254-IV of 2002 amending and making additions to a number of legislative acts of Ukraine.

Parliament Resolution No. 2169-IV of 2004 on public awareness of environmental issues, and the related Prime Minister's instruction of 17 November 2004, are linked to the approval by the MEP (Order No. 169 of 2003) of the procedure for providing the public with environmental information and of regulations on public participation in decision-making in environmental matters (Order No. 168 of 2003).

Recently Ukraine has introduced regulations of a general nature that guarantee citizens' right to submit communications to public authorities. These include immediate measures to guarantee citizens' exercise of their right to submit communications (Presidential Decree No. 700 of 2002), immediate measures providing for the reception of citizens by government bodies (Presidential Decree No. 434 of 2004), conditions for ensuring greater public participation in the formulation and implementation of state policy (Presidential Decree No. 854 of 2004) and conditions for ensuring public participation in the formulation and implementation of state policy (Cabinet of Ministers Resolution No. 1378 of 2004). Public consultations have begun via public hearings and public opinion surveys using sociological methods.

The Presidential Decree No. 1276 of September 2005 introduced, among other things, an obligation for government bodies to be periodically scrutinized by the public (through hearings, opinion polls and public expertise). The Communication Department for communication between the authorities and the public under the Cabinet of Ministers has been entrusted with the task of overseeing the coordination and implementation of this Decree. However, as no detailed guidance for implementation was provided, each government body is developing its own modalities and procedures.

Despite these important steps, much remains to be done to promote the Aarhus Convention's implementation in Ukraine. According to an evaluation made under the recently completed Ukrainian-Danish project on "Assistance to Ukraine on Implementation of the Aarhus Convention", the lack of mechanisms with direct effect in most regulatory acts hampers the successful implementation of the requirements of this Convention. Furthermore, the country has to harmonize its legislation with the Convention's requirements regarding access to justice and develop effective mechanisms that enable citizens to appeal to the courts when their own environmental rights and the rights of their associations are violated.

Ukraine has signed the Protocol on Pollutant Release and Transfer Registers (PRTRs) to the Aarhus Convention, which was adopted in Kyiv in 2003 and aims at enhancing public access to information through the establishment of coherent nationwide PRTRs. There is no evidence, however, that the country has launched any discussions involving key monitoring institutions, compliance authorities, sectoral ministries, business and industry, and NGOs on the legal, institutional and technical frameworks required to establish a national PRTR.

Environmental education

The Law on General Secondary Education (1999) introduced environmental education in schools as a priority. The Law on Preschool Education (2001) contains an article on environmental education. The Board (collegium) of the Ministry of Education in 2001 adopted the Concept of Environmental Education in Ukraine (No. 13/6-19 of 2001). The Ministry adopted an action plan for implementing the Concept for 2002-2005 (Order No. 200 of 2002). This document provided the basis for the development and implementation of new environmental education programmes for preschool and school-age children and for students of colleges, technical schools, institutes and universities, as well as for managers of institutions and enterprises and for technical experts.

The Ministry of Education discussed environmental education at preschool institutions and schools at meetings of its Board in 2002 and 2005 but does not cooperate with the Ministry of Environmental Protection on these issues. However, the two Ministries cooperate closely in promoting environmental education in vocational schools, universities and other higher education institutions. The Environment Commission of the Scientific and Methodological Council of the Ministry of Education includes representatives of both Ministries as well as university instructors and other academics.

In 2003, the Cabinet of Ministers launched the implementation of actions to improve the environmental education of the population, promoting awareness of water saving (Resolution No. 537-p of 2003). There is no evidence that these actions have borne fruit.

Ukraine is participating in the international process on education for sustainable development, a UNECE regional initiative which resulted in the development and adoption of a Strategy for Education for Sustainable Development in 2005. Ukraine has not yet taken steps to implement the Strategy at the national level.

3.7 Conclusions and recommendations

Since the first EPR in 1999, Ukraine has made some progress in observing its environment. It has enhanced its surface water quality observation network and has installed more transboundary water-monitoring stations. Nevertheless, the current monitoring networks are insufficient to meet the requirements of the country's national legislation and international obligations. The existing observation networks have not been reviewed or revised since their inception. There is no background monitoring in the country, and a number of important pollution parameters are not measured.

Various monitoring institutions reporting to different governmental bodies often measure the same pollutants but use different equipment, methods and procedures. There is no harmonized methodology for use by all institutions involved in monitoring the same environmental media. As a result, the monitoring data are distributed among various sources, disintegrated, and not comparable. Sporadic observations by environmental and sanitary inspectorates frequently duplicate each other.

To better coordinate environmental data collection in the country, the Cabinet of Ministers established the Interdepartmental Commission on Environmental Monitoring in 2001. The Commission has not met since 2004. The Ministry of Environmental Protection prepared a draft State Programme of Natural Environment Monitoring covering the period from 2006 to 2010. Its speedy approval by the Council of Ministers would give impetus to much-needed activities such as the modernization of monitoring stations, the optimization of networks, the creation of background and additional transboundary monitoring stations, and the establishment of computerized databases for multiple users.

Recommendation 3.1:
The Cabinet of Ministers should accelerate the adoption of the State Programme of Natural Environment Monitoring. The Ministry of Environmental Protection should reinvigorate the Interdepartmental Commission on Environmental Monitoring to serve as a driving force in:

(a) Monitoring the implementation of the State Programme of Natural Environment Monitoring;

(b) Ensuring the harmonization of monitoring formats, measurement and analytical methods, and data quality control and storage procedures used by different government bodies; and

(c) Coordinating existing monitoring networks and their extension, particularly those for background, transboundary (air and water) and marine environment monitoring.

The State Committee of Statistics has updated existing forms of environmental statistics data collection and introduced new forms. Some institutions in Ukraine have expanded their environmental databases and

improved environmental information management and reporting. However, each monitoring institution continues to use its own software and databases. There is poor exchange of environmental data. Some oblast environmental authorities have recently established online databases linking all monitoring institutions and polluting enterprises in their regions, and this experience needs to be replicated elsewhere.

The Ukrainian Research Institute of Environmental Problems has developed integrated environmental assessment indicators to help compare the environmental situation in oblasts around the country and develop environmental policy. However, there is no evidence that integrated indicators and resulting maps have actually been used in Ukraine.

National reports on the state of the environment in Ukraine were published annually in Ukrainian and English through 2002; since then none has been published. According to a 2005 order of the MEP, the generation of future reports will follow a new approach, with the institution responsible for the report selected annually through tendering. This approach, which may jeopardize the consistency and continuity of the reports, should be discouraged in favour of the designation, pursuant to the *Guidelines for the Preparation of Governmental Reports on the State and Protection of the Environment* endorsed by the Kiev Ministerial Conference "Environment for Europe" in 2003, of a permanent, specially authorized State environmental body to be responsible for the production and subsequent distribution of reports.

Recommendation 3.2:
The Cabinet of Ministers should designate or establish a lead environmental monitoring and information institution (e.g. an environmental agency) to assist the Ministry of Environmental Protection in:

(a) Developing a national electronic database of data communicated by operators of leading environmental monitoring and observation networks according to agreed indicator sets;

(b) Maintaining national registers of state monitoring stations and analytical laboratories;

(c) Developing environmental assessments using geographic information systems (GIS) and other modern techniques;

(d) Publishing the national state of the environment report and other assessment reports, based on modern indicators, for use in policy- and decision-making and public information;

(e) Training experts in monitoring and information management.

Many big polluting enterprises in Ukraine monitor their emissions, discharges and wastes. For instance, 703 enterprise laboratories monitor water quality. The number of accredited laboratories has increased substantially since the first EPR. Much remains to be done, however, as few enterprises operate modern self-monitoring systems (see also Chapter 2).

Both the State Ecological Inspectorate and the sanitary and epidemiological inspectorates of the Ministry of Health are checking the compliance of enterprise laboratories with accreditation documentation. Nevertheless, inter-laboratory comparisons of enterprise laboratories are still insufficient, as is training of laboratory staff.

While Ukraine signed the PRTR Protocol to the Aarhus Convention that was adopted in Kiev in 2003, there is no evidence that the country has launched any discussions involving key monitoring institutions, compliance authorities, sectoral ministries, business and industry, and NGOs in creating the legal, institutional and technical frameworks needed in order to establish a national PRTR.

Recommendation 3.3:
The Ministry of Environmental Protection, in cooperation with concerned sectoral Ministries and the State Statistical Committee, and in dialogue with business and industry, should improve environmental monitoring and reporting by enterprises by:

(a) Reviewing current legal requirements for enterprises' routine data collection on their emissions, discharges and wastes and their reporting to environmental authorities, and preparing proposals for strengthening these requirements and making them as specific as necessary;

(b) Establishing pilot PRTRs in a few oblasts (such as Zaporizhzhia, where the prerequisites for such a register have already been met with the launch of a regional environmental database covering major polluters), which would eventually lead to the creation of a national PRTR;

(c) Considering incentives to facilitate the collection and transmission of environmental data by enterprises, as well as corporate voluntary environmental reporting; and

(d) Helping enterprises train their staff members responsible for environmental data collection, analysis and management, and preparing and disseminating to enterprises guidance material using relevant international guidelines and manuals.

Ukraine has considerably broadened citizens' rights with regard to accessing environmental information and participating in environmental decision-making. Public councils have been established at the MEP and at oblast environmental authorities. There are examples of public participation in policy-making relating to the environment, such as the preparation of draft laws on environmental audit and environmental insurance. The creation of a Web portal for the Cabinet of Ministers and websites for government bodies has also broadened opportunities for the public to receive information.

Ukraine has to further develop its legal and regulatory framework so as to more effectively implement the requirements of the Aarhus Convention. There are no procedures in place for organizing public participation in state ecological expertises. There is no public participation requirement for the sanitary and hygienic expertises that evaluate the environmental health impact of proposed activities. There is discussion in Ukraine of merging all state expertises into a single one and entrusting the process to a new government institution in order to facilitate business development in the country. There is a risk that public participation may be overlooked in new legislation.

Recommendation 3.4:
The Ministry of Environmental Protection and Ministry of Health should review the existing legislation on ecological expertise and on sanitary and epidemiological expertise to clarify or establish detailed procedures for public participation consistent with the requirements of the Aarhus Convention. If the Cabinet of Ministers proceeds with the planned development of new legislation on merging all existing expertises, it should ensure that there are detailed procedures for public participation in assessments of the environmental and health impacts of proposed activities.

Ukraine actively promotes environmental education. The reform of primary and secondary schools was accompanied by the introduction of new environmental education programmes and standards. Ecology has been introduced as a mandatory subject in all higher education institutes, and a number of new environmental curricula have been initiated. State educational standards and mandatory curricula for environmental experts have been approved.

The Ministries of Education and of Environmental Protection cooperate closely in promoting environmental education in vocational schools, universities and other higher education institutions. The Environment Commission of the Scientific and Methodological Council of the Ministry of Education includes representatives of both Ministries as well as university instructors and other academics. It does not deal with preschool or grade school education, "continuing education" for adults, or broader issues of education for sustainable development. Ukraine has not started discussions involving all stakeholders regarding the implementation of the UNECE Strategy for Education for Sustainable Development.

Recommendation 3.5:
The Ministry of Education, in consultation with the Ministry of Environmental Protection and other relevant Ministries responsible for certain areas of professional education (such as the Ministry of Health), should consider broadening both the mandate and the membership of the Environment Commission of the Ministry of Education. This body could be supplemented by experts in preschool, grade school and vocational education and non-formal and informal education, and by representatives of other stakeholders, including NGOs and the mass media, to help promote and facilitate the implementation, at the national level, of the UNECE Strategy for Education for Sustainable Development.

Chapter 4

IMPLEMENTATION OF INTERNATIONAL AGREEMENTS AND COMMITMENTS

4.1 General framework for international cooperation

Enlargement of the European Union in May 2004 brought a historical shift for Ukraine in political, geographic and historical terms. It also found an adequate reflection in the international cooperation for environmental protection and sustainable development.

Back in 1998 it was announced that the main priority of Ukraine's foreign policy in the medium term was the attainment of the status of associate member of the European Union. The approximation of Ukraine's economic, social and environmental legislation to the standards required from countries applying for EU membership was also envisaged. Having expressed its wish for stronger European integration, Ukraine has taken several steps to develop an adequate policy framework and adjust national legislation to the EU Directives. At the moment all newly developed and amended legal and strategic documents have to be reviewed by the Ministry of Justice for consistency with provisions of the EU Directives and approaches.

The general framework for international cooperation is laid out in the 1998 *Main Directions of the National Policy of Ukraine for Environmental Protection, Natural Resource Use and Environmental Safety*. This document covers implementation of some 70 bilateral and multilateral environmental treaties, cooperation with the main UN bodies and programmes (such as UNEP, UNECE, IAEA, FAO, CSD and GEF); bilateral cooperation with neighbouring countries and donor countries, regional cooperation on protecting the Black Sea and the Sea of Azov, the Dnipro and Danube rivers and the Carpathians mountains; and participation in the international programmes to eliminate the consequences of the Chernobyl disaster.

The *Main Directions* document, which has not been revised since then, continues to serve as a basis for state environmental policy and directions for international cooperation. It has not proven to be a practical tool for either, mainly due to the absence of clear targets and priority setting as well as a failure to allocate financial resources for its implementation. Having announced its orientation towards European integration, Ukraine expected to receive substantial financial and technical support from abroad. However, in the absence of a comprehensive strategy for cooperation at the national level, there has been no significant increase in donors' activities in the environmental field. On the contrary, several donors, such as USAID, have closed their environmental programmes in Ukraine, and some others have reduced the amount of projects they support. The continual restructuring of the Government has also contributed to reducing international environmental cooperation (see Chapter 1).

4.2 Priorities and approaches

Priority areas for cooperation

Analysis of various policy documents, including laws, strategies and action plans, shows that bilateral and multilateral environmental cooperation in Ukraine are focused on the following areas:

- protection of biodiversity
- protection of transboundary waters
- air protection and protection of the ozone layer
- mitigation of climate change
- transboundary environmental impact assessment
- waste management
- land degradation

Bilateral cooperation is especially strong with the countries that share a land border with Ukraine: Belarus, Hungary, Poland, the Republic of Moldova, Romania, the Russian Federation and the Slovak Republic. Major areas for cooperation include information exchange; conservation of biological and landscape diversity; reduction of transboundary air, land and water pollution; and the establishment of the Pan-European Ecological Network. Special actions to protect the Black Sea are undertaken in cooperation with other Black Sea littoral states. Cooperation with other countries is facilitated through international technical assistance. Ukraine benefits from

cooperation with international organizations and institutions, including the World Bank, the European Union, OSCE and UNDP, and with donor countries such as Canada, Denmark, Sweden and Switzerland.

Approaches to international cooperation

To tackle national priority areas and achieve optimal results, Ukraine is implementing such actions as signing and ratifying multilateral environmental agreements (MEAs), concluding bilateral and multilateral agreements with other countries, and obtaining technical assistance from international donors.

Ukraine is a party to 20 major environmental conventions and a signatory to two more (See Annex II). It has acceded to nine and signed six protocols to environmental conventions. Compliance with and enforcement of international agreements are weak, mainly due to the lack of financial means clearly dedicated to implementing their provisions. For several years, concerns have been raised about Ukraine not paying its annual contributions to various conventions. Until the end of 2004, the problem was complicated by a prohibition against using the financial resources of the National Environmental Fund (NEF) for this purpose. However, in 2005 this prohibition was lifted and Ukraine paid off the debt and is currently up-to-date on its annual contributions.

The 12-person Department of European Integration and International Cooperation in the Ministry of Environmental Protection (MEP) is supposed to be the main department responsible for maintaining and developing relations with international organizations, secretariats of MEAs that Ukraine is a party to, and relevant bodies in other countries, as well as for identifying key issues to be addressed with support from international technical assistance. In practice, departments dealing with specific subjects, such as biodiversity, water management and climate change, independently identify and decide what actions should be taken to fulfill obligations under a particular convention and how the international technical assistance projects should be implemented. Despite a general policy implying that all information related to international cooperation should be aggregated in Department of European Integration and International Cooperation, most of the data are dispersed between different departments according to their area of competence. This makes it difficult to obtain a comprehensive picture of international cooperation, including international technical assistance in the environmental sector.

International technical assistance

Following the recommendations in the first EPR, Ukraine has tried to improve coordination of international technical assistance. About 30 international technical assistance donors are active in the country. In 2005 the total amount of international technical assistance provided to Ukraine in all areas was around US$ 400 million.[1]

In 2002 the Cabinet of Ministers (CoM) adopted Resolution No. 153 on establishing a unified system for attracting, using and monitoring international technical assistance. According to this Resolution, the Ministry of Economy is the body responsible for collecting proposals from all interested national authorities and organizations on the main regional and sectoral priorities for cooperation. These proposals are also used during negotiations with donors, which leads to the creation of annual cooperation programmes.

Resolution No. 153 also sets out a procedure for registration of international technical assistance projects by the Ministry of Economy based on a written request from the relevant national authority (the MEP in case of environmental projects). Taxes are waived for registered projects. This procedure takes up to 20 days, and the Ministry of Economy cannot refuse a registration. Information about all registered projects goes into a special Internet-based database. Every six months the relevant national authority (i.e. the MEP) completes a reporting form that is also posted on the Web and shows the results achieved for each project.

This registration is not mandatory if the organization chooses to pay all the taxes. In this case the competent authority is not required to submit any request or inform the Ministry of Economy about the international technical assistance project. However, recently most donors have requested such registration, not only for the sake of tax exemption but also to ensure more transparency in making available project-related information. Financial irregularities have been found in implementation of programmes at the national level. For example, in 2003, the Accounting Chamber spotted a series of budget violations by the MEP representing about US$ 500,000. This happened during implementation

[1] International technical assistance for all sectors of the economy for the period 1992–2005 was about US$ 5 billion. According to the Ministry of Economy, specifying the amount directed towards environmental problems is not possible.

of the National Programme on Protection and Restoration of the Environment of the Black Sea and the Sea of Azov. The Chamber also noted a lack of coordination at the state level, which had led to the misappropriation of funds.

In 2005 the Cabinet of Ministers approved a strategy for attracting international technical assistance for 2005–2007 (Resolution No. 829). This strategy aims to consolidate efforts by donors and attract international technical assistance for implementing the provisions of the Government Programme "Towards People" (2005) and the EU-Ukraine Action Plan for 2005–2007 (see Chapter 1). At the same time, the Strategy outlines the intention of the Government of Ukraine to create conditions where Ukraine becomes a donor and can itself provide technical assistance to the least developed countries.

Environment is included in the Strategy as one of the eight main areas for which international technical assistance should be used. Environmental problems expected to be resolved under the Strategy include, among others, the creation of conditions conducive to effective implementation of the Kyoto Protocol mechanisms; the improvement of economic instruments for use of natural resources; implementation of the river basin principle in transboundary water resources management; the development and application of good practices and international standards in waste management; and the creation and maintenance of ecological corridors and transboundary specially protected areas.

4.3 International cooperation on environmental issues of national importance

Biodiversity conservation

Ukraine's rich biota comprises more than 25,000 species of plants and fungi and 45,000 species of animals, some of which are endemic. Under particular pressure is the steppe landscape, which is threatened in particular by fragmentation of habitats, agricultural pressure, infrastructure development and the conflicting interests of environmental preservation on the one hand and agricultural and forestry activities on the other (see Chapter 10). Two main migration routes for birds pass across Ukraine, and some nesting sites are of great international importance. For instance, 90 per cent of the global population of martins nests on the islands of the Black Sea Biosphere Reserve. As of 1 January 2003, Ukraine had 7,040 specially protected sites covering a total area of 2,715,400 hectares, or 4.5 per cent of the total territory of the country.[2]

Ratification of the United Nations Convention on Biological Diversity (CBD) in 1995 brought numerous opportunities for Ukraine to cooperate with international organizations and foundations. Since then, around US$ 10 million of international technical assistance has been directed to biodiversity conservation and related issues. The biggest donor is the Global Environment Facility, which in 2003 provided a grant of US$ 6.9 million for implementation of the GEF/World Bank Azov–Black Sea Corridor Biodiversity Conservation project. The project's main goals were to implement management measures at key marine and terrestrial protected areas in the corridor; develop a corridor conservation strategy; build awareness and support for wetlands conservation through an environmental education programme; and implement a competitive small grants programme. However, because of slow implementation, the project's development objectives could not be achieved within the planned time frame. As a result, so that the grant was cancelled by GEF in August 2005; by that time less than 20 per cent of the funds have been spent.

With the support of GEF, in 2001–2003 Ukraine implemented the Biodiversity Phase II Enabling Activities project. Twelve draft laws and around 300 amendments to various legal documents related to biodiversity conservation issues have been developed. A clearing-house mechanism for the CBD has been created that provides a platform for information exchange between Government officials and the public.

Two State programmes – the National Programme for the Development of the National Ecological Network of Ukraine for 2000–2015 (Law No. 1989-III of 2000) and the National Programme for the Protection and Restoration of the Environment of the Black Sea and the Sea of Azov for 2001–2010 (Law No. 2333-III of 2001) – contributed significantly to the integration of biodiversity issues into the environmental legislative framework. Although the second national report *Preservation of Ukraine's biodiversity* (2003) recognized the increase in awareness and understanding of the importance of biodiversity issues, it noted distressing and dangerous trends of destruction of the natural environment and loss of biodiversity and called for greater efforts and more resources to be allocated to this field.

[2] The second national report *Preservation of Ukraine's Biodiversity* (Kyiv, 2003).

The MEP is preparing a new important strategic document, the Programme for Biodiversity Conservation for 2006–2025, which will define further steps to be taken to protect biodiversity. It takes into account provisions of the CBD as well as other global and regional conventions such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and the Convention on the Protection and Sustainable Development of the Carpathians (Carpathian Convention).

The 2005 Carpathian Convention has great importance for Ukraine, which was one of its main initiators. The Carpathian Mountains form so-called buffer zones and corridors that ensure the continuity of ecosystems throughout the European continent, including the transboundary dispersal of plants, the migration of birds and animals and the conservation of genetic diversity. Forest ecosystems of the Carpathians play a special role in biodiversity conservation, help protect nature and regulate water resources, and provide resources for the region's timber industry. Currently, a PDF[3] A stage of the project Conserving Globally Significant Biodiversity and Mitigating/Reducing Environmental Risk in Ukraine's Carpathians is being carried out with support from GEF and UNDP. Its aim is to enhance biodiversity conservation in the Carpathians by reinforcing institutional capacity, improving forest management systems and implementing principles of sustainable development and rational use of natural resources.

Another major concern is the regulation of the use of genetically modified organisms (GMOs) and the implementation of the Cartagena Protocol on Biological Safety to CBD. There is no special law or other legal document in Ukraine that governs the use of biotechnological products. Nor is there any certified procedure for testing biotechnological products, particularly GMOs, and defining their possible adverse effects on human health and the environment. The existing biological safety system does not regulate imports, exports and transit of GMOs. Likewise, there is no national legal framework for applying the precautionary principle for the use of GMOs. Despite the fact that the Ukrainian biological environmental safety system was launched in 1999 solely to meet the requirements for genetically modified agricultural crops, no criteria have been developed for assessing whether particular uses of genetically modified animals, micro-organisms and non-agricultural plants are ecologically sound, nor have methodologies and regulations been designed for related tests. A UNEP/GEF project on Development of National Biosafety Frameworks started in 2004 but was suspended in 2005 due to project management problems.

Regarding other activities on biodiversity issues, Ukraine participates in the Emerald Network and is considering joining the EU Nature 2000 programme. In 2004, Ramsar status was granted to 11 Ukrainian sites, bringing the total number to 33 (676,251 hectares). Since 1999, Ukraine has been developing and strengthening its legislative framework for better implementation of the CITES provisions; improving customs controls, in particular by creating a customs environmental inspector post; and reinforcing rules on CITES specimen control through a licensing system.

Water resources protection

Access to clean water is included as a priority issue in the Millennium Development Goals for Ukraine. According to estimates made before the World Summit on Sustainable Development (2002), 12.5 per cent of drinking water samples in Ukraine failed to meet sanitary standards. While 70 per cent of Ukraine's urban population was supplied through a centralized drinking water system, for the rural population this figure barely reached 24 per cent. According to 2005 national data, 25–30 per cent of the water of Ukraine's natural water bodies does not meet sanitary standards.

Several major international conventions, along with the EU Water Framework Directive and the EU Water Initiative, contribute to defining the framework for effective regulation of water resources management in Ukraine. A series of national strategic programmes, such as the State programme "Drinking Water of Ukraine" (2005), the Comprehensive Programme on top-priority provisions for centralized water supply in rural areas that utilize imported water for 2001–2005 and forecast until 2010, and the State programme on water management development for

[3] PDF (Project development facility) is a definition used by the GEF for three project preparation categories. For more information see: http://thegef.org/Operational_Policies/Eligibility_Criteria/Funding_Options/funding_options.html

2002–2010 are other key elements of this framework. However, lack of financing is a major problem. The programmes collectively received only 10 per cent of the necessary funds in 2001–2004, and the situation was nearly the same in 2005. None of the planned centralized water supply systems for rural communities materialized during 2001–2004.

Major activities to protect the Danube River in Ukraine are carried out in the framework of the EU DABLAS Task Force, created to improve cooperation in the Danube–Black Sea region. Ukraine has been a Contracting Party of the International Commission for the Protection of the Danube River (ICPDR) since 2003. Ukraine has benefited from the ICPDR by being included in the special warning system and by receiving monitoring equipment to control and exchange data under this warning system.

Pollution of the Black Sea is caused by various factors (human and industrial activities, wastewater discharges and accidents) and harms not only water quality but also the ecosystems of surrounding areas. Ukraine ratified the Convention on the Protection of the Black Sea against Pollution (the Bucharest Convention) in 1994. To implement the Convention, a specific law (No. 2333-III of 2001) approved the National Programme for the Protection and Restoration of the Environment of the Black Sea and the Sea of Azov for 2001–2010. The programme aimed at the step-by-step improvement of the state of the two seas, for which it included activities and related financial needs. However, as the budget for the Programme was developed in 2001 and has not been adjusted to reflect inflation, it now suffers from under-financing. Results of the process of the programme implementation are assessed annually and reported to the Cabinet of Ministers. According to these assessments, the low effectiveness of its implementation is caused by the fact that most of the activities are performed at the local level and financed from local budgets, with local staff who lack the necessary planning skills. Article 23 of the Action Plan calls for reducing regional imbalances and improving local development capacities by introducing strategic planning at the national and regional (oblast) levels in Ukraine; developing a draft national strategy of regional development up to 2015; and establishing a legislative basis for promotion of regional development, including in depressed territories.

A separate State Targeted Programme (see Box 1.3 in Chapter 1) has been developed to clean up the Dnipro (Dnepr) River basin and improve the quality of drinking water. The Dnipro River basin is the main source of water for 32 million Ukrainians and holds up to 80 per cent of the country's total water resources. To assist Ukraine in cleaning up the basin and rehabilitating its natural environment, UNDP in 2000 launched the preparation of a *Strategic Action Programme (SAP) for the Dnipro River Basin and Development of SAP Implementation Mechanisms*. The project was designed to strengthen cooperation among Ukraine, Russia and Belarus, the three countries through which the Dnipro River flows, and to help prioritize urgent rehabilitation measures. A major outcome of the project was the Transboundary Diagnostic Analysis, which provided a basis for the formulation of the Strategic Action Plan (SAP) and related harmonized National Action Plans (NAPs). A comprehensive set of recommendations as well as precise follow-up actions were issued in 2004**.** If implemented, they will lead to balanced and effective management of the Dnipro River basin resources**.**

Air and ozone layer protection

Ukraine has declared *air pollution* a priority area for international cooperation. Since the early 1990s, the long-term trend in air pollution in Ukraine has been positive. During 1995–2002, air emissions from stationary sources decreased by a factor of 1.4.

Ukraine is a party to the Convention on Long-Range Transboundary Air Pollution (CLRTAP) and three of its eight protocols – the EMEP[4] Protocol, the Protocol Concerning the Control of Emissions of Nitrogen Oxides and Their Transboundary Fluxes, and the Protocol on the Reduction of Sulphur Emissions or Their Transboundary Fluxes by at Least 30 per cent. Since the biggest inputs of NO_x and SO_x are related to the operation of power plants, the Cabinet of Ministers in 2001 passed Resolution No. 1780 on setting emissions limit values for polluting substances from stationary sources (including power plants). This Resolution requires that emissions limit values for all new installations be set based on the most recent and modern technologies for air emissions reduction. Because of the frequent restructuring of the MEP, only in 2006 were these limits values submitted for adoption to the Ministry of Justice.

Even though Ukraine has not signed the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, in 2003 it approved a Concept on implementation of state policy regarding the decreasing of polluting substances emission leading

[4] Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe.

to acidification, eutrophication and creation of ground-level ozone until 2015. The concept aims to create a regulatory framework for reducing air pollution, harmonizing Ukraine's environmental legislation with that of the European Union, and producing modern air-purifying equipment and technologies. To implement this concept, in 2005 the MEP developed a related action plan until 2015 and started to prepare the necessary legal acts for the future regulatory framework. The first document developed under this action plan was a law banning imports into Ukraine of cars that do not comply with the EURO-2 standard approved on 1 January 2006 (see Chapter 9).

In 2000–2004, Ukraine consistently failed to deliver reporting data on emissions and strategies and policies under the first two protocols on time; the data were neither complete nor reported in the correct format. Although the CLRTAP Implementation Committee has noticed improvement in the reporting, it is also expected that Ukraine will make every effort to submit all necessary data on time.

In 1988, with an annual consumption of ozone-depleting substances (ODS) of over 0.3 kg per capita, Ukraine was considered a leading consumer of ODS in Eastern Europe. In 1997 Ukraine adopted the first National Programme on Phasing Out of ODS Use, which outlined steps to be taken in the next five years. In 1998–2004, with support from GEF (which provided a $23.2 million grant to phase out ODS), the Government of Ukraine, working with national companies, successfully implemented this programme. Modern ozone-free technologies were introduced for refrigeration and the production of aerosols, solvents and halons. A regulatory framework for ODS control was set up, including the introduction in 1998 of licensing of ODS use and control of imports and exports of ODS. In the current procedure, licenses for ODS-containing goods are issued as a paid service by the Ministry of Economy, not by the MEP, although the prior agreement of the MEP must be formally requested by companies on the basis of a technical file. However, the MEP does not keep track of the licenses given and therefore cannot ensure that the legal framework is enforced.

The country also extended its obligations with regard to the Montreal Protocol on Substances That Deplete the Ozone Layer by ratifying the Copenhagen Amendment in 2000, but it has not yet proceeded with ratification of more recent amendments. So far, the overall phase-out has effectively eliminated primary ODS consumption in the country, leaving only a modest and declining residual demand, primarily in the refrigeration-servicing sector. A new national programme for phasing out ODS use, approved by the Cabinet of Ministers in 2004 (Resolution No. 256), establishes a framework for further actions until 2030.

Ukraine was supposed to phase out production of methyl bromides starting on 1 January 2005 in order to fulfill its obligations under Article 2 of the Montreal Protocol. To assist Ukraine in this matter, the World Bank is preparing a project to phase out the production of methyl bromide.

Climate change

Ukraine is one of the least energy-efficient countries in the world and has the sixth highest level of CO_2 emissions per capita, a figure that significantly exceeds the levels in most European countries. This situation is due to inefficient technologies in key economic sectors, such as energy and heavy industry, and extremely high losses (estimated to exceed 25%) in the heating sector.

Ukraine ratified the UN Framework Convention on Climate Change (UNFCCC) in 1996 and its Kyoto Protocol in 2004. As a country with an economy in transition, Ukraine became an Annex I party and committed itself to stabilizing its GHG emissions to 1990 levels during the period 2008–2012.

Ukraine in 1999 created a high-level government body to oversee climate change issues – the Interministerial Commission for the Implementation of the UNFCCC – that was established by an Executive Order of the Cabinet of Ministers. Ukraine has also developed a number of legal acts adjusting national legislation to the provisions and obligations under the UNFCCC and the Kyoto Protocol. It has requested technical assistance from international organizations and donor countries for setting up a national joint implementation (JI) policy.

In 2005, the Cabinet of Ministers approved the National Plan on approaches for the implementation of the provisions of the Kyoto Protocol (Resolution No. 346) The plan foresees a range of measures with the following priority steps: setting up the National Inventory System to evaluate anthropogenic GHG emissions and GHG absorption by sinks; making an annual inventory of anthropogenic GHG emissions; setting up infrastructure to implement JI projects aimed at reducing GHG emissions; and developing a national system of emissions trading. The MEP was appointed as coordinator of activities to ensure implementation of Ukraine's commitments on

UNFCCC and its Kyoto Protocol by Presidential Decree (No. 1239, 2005).

In fact, the MEP not only issues letters of endorsement and approval of JI projects, but also serves as a Joint Implementation Secretariat, although has not been officially designated as such by the Government. Within the MEP the recently created Division for coordination of activities under Kyoto Protocol and regulation of ozone-depleting substances is in charge of these functions. The Centre for Climate Change was established under the auspices of the MEP in 2005 for facilitating JI projects preparation and implementation. It has been involved in conducting yearly inventories of GHGs, developing legal documents and forecasting GHG emissions and absorption levels.

In February 2006 the Cabinet of Ministers approved Regulation on evaluation, approval and implementation of projects intended to decrease amount of anthropogenic emissions or increase absorption of greenhouse gases according to the Kyoto Protocol to the UN Framework Convention on Climate Change (Resolution No. 206). The regulation specifies the procedures for evaluation, approval and implementation of JI projects and issuance of endorsement and approval letters for them, as well as related organizational measures. In April 2006 the Cabinet of Ministers approved Regulation on functioning of national system of evaluation of anthropogenic emissions and absorption of greenhouse gases that are not regulated under Montreal Protocol on Ozone-Depleting Substances. The regulation identifies measures to coordinate activities of various governmental bodies to deal, *inter alia*, with GHG emissions inventories. However the body that would serve as a national inventory centre has not yet been identified.

International organizations are bringing assistance to Ukraine to implement the Kyoto mechanisms. In 2005, UNDP supported a project for establishing the JI Secretariat to coordinate JI projects. Under this project an operation manual and organigram mapping the project development and approval process for JI projects were developed, capacity-building and training activities were conducted, and a database of JI projects was created. A total of 120 letters of interest in participating in JI projects were received from Ukrainian enterprises. With EU-Tacis assistance, Ukraine has prepared a draft JI procedure at the national level.

At the moment, according to the MEP, 26 JI projects representing potentially about 1.96 million tons of CO_2 have been identified in Ukraine. Eighteen projects have received letters of endorsement, of which two – letters of approval (see Box 4.1). In 2005-2006 Ukraine has signed memoranda of understanding on climate change issues and JI projects with Canada and the Netherlands and is planning to sign other memoranda with Austria, France and Italy. There is a close cooperation on these issues with Japan, including technical assistance provided to Ukraine to meet eligibility requirements to participate in international emissions trading. In May 2006 Ukraine signed a first emission purchase agreement with the Netherlands for a Joint Implementation project of a total of 396,000 tons of CO_2 emission reduction in the period 2007-2012. Ukraine is aiming to meet the JI Track 1 (fast-track) criteria by September 2006.

In addition to JI, Ukraine could potentially trade the surplus of Assigned Amount Units (AAUs) (an estimated 1.7 billion tons of CO_2). However, several Parties to Kyoto Protocol, including Austria, Germany, and the Netherlands, announced that they would not be buying AAUs unless they are linked to environmental benefits. Therefore meeting the JI Track 1 criteria and establishing a legal basis for Green Investment Schemes (GIS) are essential for Ukraine. The World Bank has commissioned a study to evaluate GIS potential and what institutional and political obstacles need to be removed. The study is expected to be completed by September 2006, and the MEP intends to initiate its first GIS deal after it is finalized.

In the framework of the 2004 EU-Ukraine Action Plan, a Joint Working Group on Climate Change, comprising national and EU experts, has been created under the EU-Ukraine Partnership and Cooperation Agreement Sub-Committee on Environment. Its principal function is to identify opportunities for EU-Ukraine cooperation on climate change by exchanging information and experience on good practices regarding policies and measures for reducing GHG emissions, and by facilitating the development of cooperation under Kyoto mechanisms.

Chemicals and waste management

Waste management is an increasing concern in Ukraine. That is why Ukraine is currently striving to improve and further develop related legislative framework, join the major conventions regulating this field, and attract international technical assistance.

Box 4.1 Types and numbers of possible Ukrainian Joint Implementation Projects (CO_2 emissions reduction units (ERU) per year) under the Kyoto Protocol

- Utilization of coal mine methane – 3 (2,098,000 tons)
- Methane capture at solid waste landfill – 5 (454,400 tons)
- Biomass utilization – 1 (51,600 tons)
- Energy cogeneration – 1 (45,300 tons)
- Liquid waste utilization – 1 (50,000 tons)
- Alternative sources of energy – 1 (70,000 tons)
- District heating supply system modernization – 4 (323,700 tons)
- Technology process modernization – 1 (87,750 tons)
- Hydropower station modernization – 1 (260,000 tons)

Source: Ministry of Environmental Protection, 2005

The Law on Waste, the country's first legal act on waste, was approved in 1998. It incorporated provisions of the EU Framework Waste Directive (75/442/EC). When Ukraine became a party to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal in 2000, the Law on Waste was amended accordingly. In the period 1998–2004, some 50 related legal acts were adopted, including 14 laws and 30 CoM resolutions. The most important of these is CoM Resolution No. 1120 of 2000, which approved the so-called yellow and green lists of dangerous chemical substances and regulates control of the movement, utilization and elimination of hazardous waste.

To control flows throughout the country, the MEP is issuing special permits for the transit of hazardous waste and the import and export of harmful chemical substances on the yellow list. Ukraine is also considering a ban on imports of all types of waste. A special commission on illegal imports of dangerous substances and waste has been created. Ukraine is also considering joining the Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and Their Disposal (1999).

In 2001, Ukraine signed the Stockholm Convention on Persistent Organic Pollutants (POPs) and benefited from the GEF funding for enabling activities under the Convention. An inventory in 2002–2003 of the POPs stored on Ukrainian territory revealed that 19,341 tons of obsolete pesticides were stored at 4,983 storage sites owned by the Ministry of Agrarian Policy. Of these sites, only 499 are well maintained, 2,871 have satisfactory storage conditions, and the rest are not maintained properly. Another outcome of the project is the development of a national plan for implementing the Stockholm Convention (as of July 2006 the draft has been prepared and submitted to the relevant ministries and governmental agencies for consultations). National priorities in this field have been established (Box 4.2), and, to facilitate their implementation, Ukraine plans to ratify the Stockholm Convention so as to obtain more financial resources.

In 2004, following the ratification of the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, Ukraine amended its 1995 Law on Pesticides and Agrochemicals. Ukraine is developing an action plan for implementing the Convention and is taking steps to create a joint information exchange centre with the Ministry of

Box 4.2: National priorities to eliminate persistent organic pollutants

Following are key related goals:

- inventorying and eliminating PCBs
- performing a second inventory of obsolete pesticides
- obtaining the necessary analytical equipment
- researching technologies for the treatment of POPs
- setting up an appropriate legislative framework
- monitoring POPs regulated by the Stockholm Convention
- controlling dioxins and furan emissions.

Health. Ukraine is also a party to the Rotterdam Convention's Commission on Chemicals and participates in discussions on new substances (e.g. asbestos) to be regulated under the Convention.

The chemicals management problem in Ukraine has one more dimension. After the break-up of the Soviet Union, Ukraine inherited large stocks of a certain fuel, sometimes called "melange", that was used for rockets and guided missiles. The components of this very complex chemical mixture are extremely reactive and volatile and highly toxic. More than 16,000 tons of this fuel are stored at eight sites in Ukraine. With the support of the OSCE and NATO, a scoping study was conducted in 2005 to identify appropriate further actions. An international technical team made an inventory of the volumes and types of melange stored and the storage conditions. It concluded that the storage conditions were not satisfactory and that the melange urgently required neutralization. The next stage would be to obtain the necessary funding to arrange industrial conversion of the melange into nitric acid.

Transboundary environmental impact assessment

Ukraine shares terrestrial or maritime borders with 10 other countries and therefore treats transboundary cooperation as a key priority.

Economic activities undertaken by Ukraine that may present a high environmental risk and/or affect the environmental conditions of neighbouring countries should undergo environmental impact assessment according to the procedures stipulated in the Espoo Convention on Environmental Impact Assessment in a Transboundary Context (to which Ukraine has been a party since 1999) and in the national normative documents (*State Construction Norms*, 2003). In 2001, the previous list of high-risk activities and installations was amended to include a provision on installations that may have transboundary impact and are subject to international conventions and directives. This list is included in *State Construction Norms*.

Since 2003, despite clear and well-defined norms providing opportunity for public participation and taking into account the transboundary context, Ukraine has been experiencing problems related to transboundary impact assessment (see Box 4.3).

Ukraine has also signed the Strategic Environmental Assessment (SEA) Protocol to the Espoo Convention. Much work has been undertaken on SEA, and some pilot projects are planned in 2006. In 2004 and 2005, UNDP and REC for Central and Eastern Europe supported the project "Startegic Environmental Assessment-Facilitation and Capacity building", which resulted in a publication with guidelines on developing SEA potential in Ukraine and a need analysis for the implementation of the Protocol. UNECE, REC and UNDP subsequently assisted Ukraine in the drafting of a national strategy for the introduction of SEA and the implementation of the Protocol.

Finally, cooperation regarding transboundary environmental impacts is also regulated by the provisions of the Convention on the Transboundary Effects of Industrial Accidents. Ukraine has signed but not ratified this convention, due to a lack of financial resources for complying with its provisions and the absence of a clear division of responsibilities between state authorities with regard to monitoring and handling the consequences of industrial accidents.

Although the Law on High-risk Objects and several related by-laws were adopted in 2000, the enforcement aspect of the legal framework in this field remains inadequate. Ukraine has created an information exchange (warning) system to be included in the international warning network, but the system is not operational because of employees' deficient language skills, a lack of necessary equipment and frequent changes in the MEP structure.

Land degradation

Land degradation is considered one of Ukraine's major environmental problems, as 57.5 per cent of the country's territory is now eroded and the percentage is increasing by about 80,000 hectares per year (see Chapter 10). Because of this Ukraine joined the UN Convention to Combat Desertification (UNCCD) in 2002. The Convention's annex on Regional Implementation for Central and Eastern Europe cites Ukraine as an example of serious land degradation. After Ukraine joined the Convention, the Cabinet of Ministers approved priority measures for its implementation. These measures include the development of a number of national programmes targeting land degradation problems and amendment of laws and by-laws in line with the provisions of the Convention.

Box 4.3: Reconstruction of the Danube–Black Sea shipping channel

In 2003, by Decree of the President of Ukraine, the reconstruction of the Danube–Black Sea shipping channel (the so-called Bystroe Canal) in the Danube delta was begun. The environmental impact assessment (EIA) of the project was conducted according to the national rules, and the report in the national language (Ukrainian) was made available on the MEP website. Since Ukraine did not expect this project to cause a "significant" adverse transboundary impact, it did not send a notification about its plans to the neighbouring countries parties to the Espoo Convention.

In 2004, the Government of Romania initiated a procedure of inquiry per article 3, paragraph 7 of the Espoo Convention on the grounds that reconstruction of the channel would have a significant adverse transboundary impact on environmental conditions in Romania, and that it had not been officially notified of Ukraine's plans. In 2004 an ad hoc inquiry commission was created consisting of representatives of Ukraine and Romania, and an independent chair as head of the commission. The commission's main aim was to scientifically evaluate the transboundary impact of the activity undertaken by Ukraine.

The Ukrainian NGO Ecopravo-Lviv brought this case to the attention of the Compliance Committee of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters. Separately, the Government of Romania made a submission on the canal project to the Committee. Based on the Committee's findings, the second Meeting of the Parties to the Aarhus Convention in Almaty in 2005 found the Government of Ukraine was not in compliance with provisions of the Convention . It was argued that the public had not received adequate access to the information at the decision-making stage, had not participated in the EIA and therefore could not influence its final results. According to the Aarhus Centre, the canal's rebuilding will have a significant adverse effect on the protected areas of Ukraine that are located near the proposed reconstruction site. It was also argued that the reconstruction plans had not been discussed or agreed with the management authority of the protected area (the Danube Biosphere Preserve) or with the National Academy of Sciences, which supervises the protected area.

In July 2006, the Inquiry Commission established under the Espoo Convention concluded that Danube–Black Sea Canal is likely have "significant adverse transboundary effects" on the environment and thus the provisions of the Espoo Convention apply. This means that Ukraine is expected to send a notification about the canal to Romania and that the procedure imposed by the Convention should start. There should be consultation between the Parties, Romania should be given an opportunity to comment on the project, and public participation in the two countries should be ensured. It also means that the final decision about the project should be submitted to Romania.

Source: UNECE, 2006

By the end of 2005, the Cabinet of Ministers had issued nine Resolutions regulating various aspects of land use and protection. Amendments are incorporated into the laws on land protection (2003), land management (2003) and state control of the use and protection of land (2003). A draft law on the state programme for use and protection of land has been prepared. This programme, once approved, will lay a foundation for the National Action Programme (NAP) required by the UNCCD and will allow for state budget resources to be directed at the land protection activities.

Relevant actions include a project proposal for GEF on capacity-building to combat land degradation and desertification in Ukraine (PDF A). This project's main tasks would be the development of a national action plan according to the requirements of the UNCCD and creation of local coordination units to guarantee the implementation of the state programme and action plan at the local level.

4.4 Integration with the European Union

The most recent enlargement of the European Union has placed Ukraine in a new regional context and has become a key factor determining major policy developments in the country's international cooperation. Sharing a border with the European Union gives Ukraine the opportunity to develop an increasingly close relationship with this entity, moving towards gradual economic integration and deeper political cooperation.

Environment issues are a focus of the EU-Ukraine Partnership and Cooperation Agreement (PCA) that entered into force in 1998. The European Neighbourhood Policy (2004) offered a broad range of new opportunities that would facilitate Ukraine's access to the EU market and its participation in EU programmes. Early 2005 saw the adoption of the EU-Ukraine Action Plan for 2005–2007, which should not only help Ukraine to implement the provisions of the PCA but also support Ukraine's objective of further integration into EU economic and social structures. The Action Plan gives directions for environmental protection and sustainable development.

In 2005, the Cabinet of Ministers approved a set of measures for implementing the EU-Ukraine Action Plan. Implementation has started, and, as of 2007, there will be a new EU financial instrument specific for the financing of the Action Plan activities.

Over the years, responsibility for the issue of European integration has been assigned in turn to various dedicated bodies. In 1997, the National Agency for Development and European Integration was set up for this purpose. In 2000 it was closed and its functions were given to the Department of European Integration under the Ministry of Economy. According to national experts, this decision slowed down the integration process, especially because of the insufficient number of staff members working on the issue. In 2005 European integration was once again confirmed as a strategic priority for Ukraine.

4.5 The World Summit on Sustainable Development and the Millennium Development Goals

World Summit on Sustainable Development

In 2002, on the eve of the World Summit on Sustainable Development (Johannesburg), Ukraine produced a national report revealing some promising trends. The Government has initiated an economic reform and a poverty reduction programme. It has adopted a new Land Code that envisages a systemic approach to planning and rational use of land resources. Other initiatives provide for reducing industrial air pollution and deforestation and promoting water management. In 2003 Ukraine established a National Council on Sustainable Development (NCSD) under the Cabinet of Ministers (although the body has yet to meet), and the Parliament has ratified a number of international environmental treaties.

Chapter 8 of Agenda 21 calls on countries to adopt national sustainable development strategies (NSDS). In 2003 Ukraine, with the support of international organizations, started preparing its NSDS, which is still in draft form. (See details in Chapter 1.)

In 2003, the Cabinet of Ministers approved a comprehensive programme for implementation the decisions taken at WSSD for 2003–2005. It includes provisions for preparing proposals for NCSD activity, developing a programme for scientific research on sustainable development, and cooperating with international organizations on this issue. According to the Programme, every ministry should conduct its activities in line with the tasks listed in the Programme and report on progress. However, the Programme does not include any provisions related to the development or implementation of NSDS.

Millennium Development Goals

The environmental situation in Ukraine has gradually worsened over the years because the basic laws for safely developing natural resources use and environmental protection have largely been ignored. In the 2003 and 2005 reports on progress towards the Millennium Development Goals (MDGs), the Ministry of Economy recognized that the national economy had never discouraged the activities of environmentally damaging sectors, especially mineral resources extraction. During the last decade, these factors and the absence of investments to upgrade technologies and introduce environmentally friendly measures have resulted in a deteriorated environment.

The 2003 and 2005 reports state that adaptation of the MDGs to Ukrainian conditions is an important and urgent task for Ukraine. In order to develop a long-term strategy for economic and social development, a national sustainable development strategy and other strategic documents, Ukraine must bring its strategic priorities into line with the MDGs, according to the reports.

An analysis by the Ministry of Economy in cooperation with other ministries and government bodies, and with the support of the UNDP project on economic and social development, led to the development of six key MDG-related goals for Ukraine, among them poverty reduction and environmental sustainability. A Strategy on Poverty was adopted in 2001 and is revised every year to reflect implementation. Indicators show that poverty is generally decreasing in Ukraine. The environmental sustainability goal aims at tackling three key environmental issues: access to clean water, biodiversity conservation and air quality (see Box 4.4).

The MDGs are supposed to be met through implementation of state programmes in related fields – for example, the Comprehensive Programme on top-priority provisions for centralised water supply to rural areas that utilize imported water for 2001–2005 and forecast until 2010 and the National Programme for the Protection and Restoration of the Environment of the Black Sea and the Sea of Azov for 2001–2010. Allocation of financial means to implement such programmes is crucial for reaching the MDGs. However, as was noted earlier (see section 4.3), the lack of financing has prevented this particular programme from being implemented.

Box 4.4: Targets of MDG Goal 7 for Ukraine	
Target 1	**Increase the proportion of people with access to clean drinking water by 12% from 2001 to 2005**
Indicator 1.1	Percentage of population with access to drinking water that meets national standards for urban areas
Indicator 1.2	Percentage of population with access to drinking water that meets national standards for rural areas
Target 2	**Stabilize air pollution from stationary and mobile sources by 2015**
Indicator 2.1	Volume of harmful emissions into atmosphere from stationary sources of pollution (tons per year)
Target 3	**Expand the network of natural and biospheric reserves and national parks to 10.4 % of the overall territory of Ukraine**
Indicator 3.1	Total area of natural and biosphere reserves and national parks as % of overall territory of Ukraine

Source: Ministry of Economy. Report on progress towards the Millennium Development Goals (MDGs), 2005

Ukraine has developed an impressive number of state programmes related to the implementation of international commitments which require financing from national sources. The lack of financing makes the effective implementation of these programmes difficult and thus further hinders compliance with international commitments.

4.6 Conclusions and recommendations

Since the first EPR, Ukraine has devoted considerable efforts to developing cooperation with a number of international organizations. A number of international technical assistance projects have been implemented to improve water management and biodiversity conservation, develop strategic policy documents, and ensure adequate public access to environmental information and public participation in environmental decision-making. In the last few years, Ukraine has generally improved its compliance with international reporting obligations, although more needs to be done.

In particular, a number of programmes developed to make good on international commitments are insufficiently budgeted. To ensure implementation of the Convention on the Protection of the Black Sea against Pollution (the Bucharest Convention), the State Programme on Protection of Environment of the Black Sea and the Sea of Azov for 2001–2010 was approved, but financing for it has been insufficient. Similarly, the Comprehensive Programme on Top-priority Provisions for Centralized Water Supply in Rural Areas that Utilize Imported Water for 2001–2005 and forecast until 2010, which is critical for reaching interim targets under the Millennium Development Goals, has not been fully implemented due to a lack of financing.

This situation results partly from the common practice of financing environmental programmes with money left from other programmes and partly from the excessive number of state programmes related to implementation of international commitments that require financing from national sources. Given that effective implementation of these programmes may remain difficult, Ukraine should better prioritize the targets included under these programmes and secure their financing.

Recommendation 4.1:
The Government of Ukraine should devote more attention to fulfilling its international obligations in the field of environmental protection and make sure that the necessary financial resources are earmarked for the proper implementation of any national strategic documents. When such documents are approved, the Government should prioritize their targets and take all necessary steps to secure the financial resources. The option of decreasing the number of national strategic documents so as to ensure their financial viability, and thereby their implementation, should be considered.

Chapter 8 of Agenda 21 calls on countries to adopt national strategies for sustainable development. A 2003 Resolution by the Cabinet of Ministers approved a comprehensive programme for implementing the decisions taken at the World Summit on Sustainable Development for 2003–2005 that included the preparation of proposals for the National Commission on Sustainable Development, cooperation with international organizations on this matter, and development of a draft comprehensive programme for scientific research for sustainable development. It did not, however, include any provisions related to development or implementation of a national sustainable development strategy. In 2004, with the support of international organizations, the Ministry of Environmental Protection (MEP) prepared a draft national strategy for sustainable development that has gone through several rounds of

discussion by relevant government bodies but has not yet been approved. Such a strategy could significantly contribute to enhancing cross-sectoral cooperation and the integration of environmental issues into other sectoral policies. Therefore, its development should be pursued and its subsequent adoption swift.

See Recommendation 1.4.

In 2000–2004, Ukraine consistently failed to deliver reporting data under the Protocols on nitrogen oxides and sulphur emissions of the Convention on Long-Range Transboundary Air Pollution, nor has Ukraine reported on its implementation of the Espoo Convention in the two reporting cycles to date. During the past two years Ukraine has also had problems with transboundary impact assessments and public participation, in particular relating to the reconstruction of the Danube–Black Sea shipping canal. In spite of these problems, Ukraine is considering joining other multilateral environmental agreements, among them the Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and Their Disposal, the Protocol on Civil Liability to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes and the Convention on the Transboundary Effects of Industrial Accidents. Before making new commitments, Ukraine should consider actions to better fulfil the provisions of those international agreements to which it is already a party.

Recommendation 4.2:
The Ministry of Environmental Protection, in order to respect Ukraine's commitments under relevant multilateral environmental agreements, should:

- *Establish effective legal and institutional mechanisms, where they do not exist, for implementation of multilateral environmental agreements;*
- *Make every effort to collect and submit to the secretariats of international conventions and protocols the due related reporting as fully as possible and in due time;*
- *Notify Romania on the Danube-Black Sea shipping channel in accordance with the Espoo Convention and implement the recommendations of the inquiry commission established under the Espoo Convention as appropriate;*
- *Strengthen sub-regional cooperation and multilateral and bilateral agreements with the neighbouring countries with the objective of conducting environmental impact assessments in transboundary context, taking into account the lessons learned from the case of the Danube-Black Sea shipping channel;*
- *Whenever possible, prioritize actions aimed at fulfilling provisions of those international agreements that Ukraine is a party to; and*
- *Take actions for implementation of a strategy for the introduction of Strategic Environmental Assessment and the implementation of the SEA Protocol.*

With EU assistance, Ukraine has prepared a procedure for certification of the joint implementation (JI) projects under the Kyoto Protocol that was approved in 2006 by the Cabinet of Ministers. The Ministry of Environmental Protection serves in practice as Joint Implementation secretariat even though the unit within the MEP is not designated as such officially. The Centre for Climate Change was established under the auspices of the MEP for facilitating JI projects preparation and implementation. In 2005, the Cabinet of Ministers approved the National Plan on approaches for the implementation of the provisions of the Kyoto Protocol. The Cabinet of Ministers also approved the regulation specifying the procedures for evaluation, approval and implementation of JI projects and issuance of endorsement and approval letters for them, as well as the regulation aimed at coordination of activities on the national system of evaluation and GHG emissions and absorption. A body dealing with GHG emissions inventories has not yet been identified, although creation of the National Inventory Centre is foreseen. Ukraine succeeded in submitting annual National Inventory Reports (NIR) to the UNFCCC secretariat since 2004. However, the lack of procedures for implementation of JI projects until recently has been an obstacle for cooperation with the countries that showed their intention to participate in such projects with Ukraine.

Recommendation 4.3:
The Cabinet of Ministers and the Ministry of Environmental Protection should ensure implementation of the National Plan on approaches for the implementation of the provisions of the Kyoto Protocol to the UN Framework Convention on Climate Change by:

- *Clarifying the functions of the different bodies involved in implementing the Kyoto Protocol and improving their coordination;*
- *Ensuring that there is an officially designated national body responsible for reviewing, adopting and tracking joint implementation projects to reduce the country's greenhouse gas emissions and serving as a Joint Implementation Secretariat;*

- *Setting up a clear, simple and transparent framework for the development, approval, endorsement, registering and monitoring of joint implementation projects, including national criteria for the evaluation of such projects;*
- *Establishing a framework for advising national enterprises on the preparation of joint implementation projects and helping them obtain endorsement and approval letters; and*
- *Setting up a procedure or strategy for targeting potential donors or investors interested in joint implementation projects in Ukraine, and for maintaining a related database.*

Several projects, among them the GEF/World Bank Azov–Black Sea Corridor Biodiversity Conservation project and the UNEP/GEF project on Development of National Biosafety Frameworks have experienced problems during the implementation phase that have caused their temporary suspension or even complete closure, with the work left unfinished. These problems could have been avoided with better compliance with the rules and procedures of the partner international organizations. More transparent hiring and tendering procedures on both sides (recipients and donors) would make it easier to tackle technical problems as soon as they occur and thereby facilitate successful implementation of projects.

Recommendation 4.4

The Ministry of Environmental Protection should cooperate closely with international organizations when developing and implementing international assistance projects. The Ministry should ensure compliance with the rules and procedures of the international organizations, when carrying out these projects. The Ministry should enhance coordination with other national agencies implementing international assistance projects and improve monitoring of the implementation process.

PART II: MOBILIZING FINANCIAL RESOURCES FOR ENVIRONMENTAL PROTECTION

Chapter 5

ECONOMIC INSTRUMENTS AND ENVIRONMENTAL FUNDS

5.1 Use of economic instruments for environmental objectives

The first Environmental Performance Review (EPR) of Ukraine described the system of economic instruments available for environmental purposes. This included taxes on the extraction and special use of natural resources, user charges for a number of services, emissions charges (for air emissions, discharges into water and waste disposal) and sanctions for environmental pollution, and excises and customs duties on environmentally harmful products such as fuels and cars. This overall framework has remained basically unchanged in the period under review.

An important institutional innovation was that, in 1999, the State Tax Administration (STA – formerly the State Tax Inspectorate) was entrusted with the control over the timely collection of pollution charges payments, which improved collection performance. These charges are the main source of revenue for environmental funds. The STA is also responsible for the collection of revenue from other environment-related economic instruments, with the exception of excises on imported goods and customs duties, which fall within the competency of the customs administration.

No new instruments have been introduced during the period under review. Rates for pollution charges were revised to reflect the impact of past inflation in 2003, 2005, and 2006. Although the adjustment of prices to cost recovery levels in sectors with a significant environmental impact is not yet complete and cross-subsidization is pervasive, a large decrease in non-payment has increased effective costs for users. The National Electricity Regulation Commission sets electricity and gas prices, while local authorities decide tariffs for water services and municipal waste collection.

Detailed information on the overall legal, institutional and policy framework for environment-related economic instruments is given in Chapter 6.

Environment-related taxes [1]

Taxes are levied on the special use of natural resources, including land, water, mineral resources, forests and fauna (Table 5.1). Natural resource taxes are the main source of environmental revenues, representing an average 3.3 per cent of the total revenues and grants of the consolidated general government budget and 1.1 per cent of GDP for the period 1998–2004. The land tax makes the largest contribution, accounting for almost three quarters of natural resource taxes. The observed decline in revenues, in relative terms, over the period considered has been driven by the land tax. This tax has been subject to large exemptions, which (according to the World Bank) were equivalent to around 0.5 per cent of GDP annually in 2000–2003. Geological fees, which make the second largest contribution to revenues from the special use of natural resources, were erratic in the first half of the period under review, but have remained stable since then. Water usage receipts, which were broadly unchanged during most of the period, fell markedly in 2003–2004.[2]

The main role of these taxes is to raise revenue. Another official objective is to encourage rational use of natural resources, however in practice their influence on resource management is limited. There is some differentiation in the rates applied. For taxes on the use of subsoil mineral deposits, rates depend on mining conditions and types of resources. There is an automatic indexation according to past inflation for taxes on the use of water and mineral resources since 2004.

[1] An environmental tax is defined as a tax on an environmentally harmful tax base. Included are taxes on transport fuels, motor vehicle taxes, taxes on discharges to water and air, landfill taxes, taxes on pesticides, etc. according to Eurostat Environmental Taxes, catalogue N° KS-39-01-077-EN-N.

[2] In addition to these taxes for the special use of natural resources, gas and oil production generated royalties amounting to almost 1 per cent of total government revenues in 2001–2004.

Table 5.1: Selected environmental revenues as percentage of total government revenues, 1998–2004

	1998	1999	2000	2001	2002	2003	2004
Natural resource use	4.08	3.50	3.48	3.32	3.14	2.87	2.79
of which:							
Forestry	0.12	0.11	0.07	0.07	0.07	0.06	0.06
Water usage	0.37	0.32	0.33	0.44	0.33	0.27	0.26
Subsoil mineral resources	0.11	0.10	0.10	0.08	0.09	0.08	0.23
Geological fee	0.42	0.35	0.55	0.36	0.31	0.36	0.35
Land tax	3.05	2.62	2.42	2.37	2.24	2.10	1.89
Other natural resources	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicle tax	0.53	0.71	0.94	0.81	0.73	0.62	0.54
Pollution charges	0.12	0.14	0.22	0.26	0.23	0.28	0.26
Memo							
GDP, Hrv million	102,593	130,442	170,070	204,190	225,810	267,344	345,943
Government revenues, Hrv million	36,497	41,555	56,774	68,435	80,759	96,809	121,285
Exchange rate, average, Hrv/US$	2.450	4.130	5.440	5.372	5.327	5.333	5.319
Exchange rate, average, Hrv/EUR	..	4.393	5.029	4.814	5.030	6.024	6.609

Sources: Direct communications with Ministry of Finance and IMF; National Bank of Ukraine, 2005.
Note: Data about product excises and customs duties are not shown in this table as they were not available or incomplete.

The water tax has a potentially larger impact on preventing wasteful use of a precious resource. It applies to the commercial use of water, including by enterprises generating hydroelectric power and by transport activities via waterways. Rates depend on river basins and on the regions where aquifers are located and, for transport by water, on fleet type. Hydropower and transport by waterway are not subject to the system of limits that applies to other commercial uses, according to which use above a set threshold is charged at a higher rate. In 2005, while rates for general users doubled, special rates were introduced for municipal utilities, fish farmers and beverage producers. As a result of these measures, rates for enterprises providing housing and communal services are only 15 per cent of general rates.

There are excises on a number of products with adverse environmental impact, including gasoline, diesel fuel and transport vehicles. Excises on fuel products represented an average 2.1 per cent of total revenues in 2003–2004 – above levels prevalent in Russia, but less than half the average share in the European Union. Excises on cars accounted for an additional 0.4 per cent. Customs duties on fuel products, transport vehicles and tyres contributed a further 0.1 per cent.

The fuel taxation regime was overhauled in May 2005 to alleviate a crisis caused by the introduction of price caps in the market. Before that change, excise taxes had been levied on ordinary gasoline at a rate of 20 per cent of value (excluding VAT), or no less than EUR 60/ton. However, the more polluting diesel fuel received privileged treatment, being charged at half those rates. Although the favourable tax treatment of diesel is common in many countries, this practice harms the environment.

The reform transformed fuel excises into a pure ad quantum tax (i.e. per unit of product taxed), as is common international practice, levied at EUR 60/ton on gasoline and EUR 30/ton on diesel. Excises on light distillates (EUR 12/ton) and aviation and jet fuel (EUR 20/ton), which is exempt from taxation in most Western countries, were unchanged. Customs duties for high-octane gasoline and diesel fuel, which added a further EUR 40/ton and EUR 15/ton to the cost, respectively, were eliminated. An additional fee for customs clearance of oil products, which was earmarked as a contribution to the pension fund, was also discontinued. Overall, fuel taxation is rather light by European standards, resulting in pump prices for both diesel fuel and "supergasoline", that have been closer to those observed in the United States during the period under review (see below). In addition to the differential taxation in favour of diesel fuel, the agricultural sector benefits from the delivery of fixed amounts of diesel fuel at preferential prices.

Cars are subject to excises differentiated according to engine capacity and age, with used cars charged at a higher rate. The import of cars older than eight years was prohibited in 2005, but current tariff rates do not favour newer cars. Excises rates were reduced in 2005 by a factor of 10, but this was shortly followed by an increase in customs duties to 25 per cent of the customs value, from an earlier 5 per cent. The vehicle tax, which varies by engine power and type of

vehicle, contributed an average of 0.7 per cent to government revenues and grants in the period under review[3]. Revenues from vehicle taxation are usually considered a part of environmental revenues.

Environment-related tax revenue, including natural resource taxes and fuel and car duties and excises, averaged 2.2 per cent of GDP in 2003–2004. This figure is small by EU standards, reflecting the comparatively low energy-related taxation on fuel and the declining trend of taxes on natural resources in recent years.

Environmental pollution charges and other payments

Revenues from emissions charges are rather limited in comparison with other sources of environmental revenues; they averaged only 0.22 per cent of the revenue and grants of the consolidated general government budget in 1998–2004. However, this ratio more than doubled in this period, reaching 0.26 per cent of revenues in 2004, largely reflecting improved collection rates. Pollution charges are collected for air emissions by stationary and mobile sources, discharges of pollutants into water bodies and waste landfilling.

The 1999 EPR noted a simplification of the system of charges for environmental pollution (Resolution of the Cabinet of Ministers No. 303, 1 March 1999) and the responsibility for control over timely collection was granted to the State Tax Administration. The base for calculating the charges is the amount of pollutant, which is usually estimated on the basis of technical norms. Rates depend on a variety of factors, including the type of medium and pollutant and the location of the polluter. This differentiation of rates aims to reflect the diversity of environmental and economic damage, taking into account the characteristics of the area. Basic rates are defined for 25 major air and nine major water pollutants. For pollutants not explicitly listed, rates are specified according to their class of hazard. Charges on waste are differentiated according to toxicity, which is grouped into four categories.

A key characteristic of the system of pollution charges is the definition of a threshold (Maximum Allowable Concentration, MAC) above which rates increase by up to a multiple of five. Charges are thus closely linked with the system of permits, which establishes allowed concentration limits on water and waste for each industrial facility. When concentrations exceed these limits, the corresponding payments are not considered production costs (as is the case when they are "within limits" but deducted from the profits of enterprises). Since 2003, air emissions have not been following the MAC system anymore; a new system based on emission limits was introduced in June 2006 (see Chapter 2).

Pollution charges serve two purposes. They raise revenue, which is allocated fully to the system of environmental funds to finance environmental expenditures. Charges on air pollution contribute the bulk of the revenues (58 per cent of the total in 2004), but waste charges also increased rapidly in the period under consideration (32 per cent in 2004). Pollution charges are also designed to create incentives for reducing environmentally damaging activities by increasing the costs of the polluting behaviour, in line with the "polluter pays" principle.

The first EPR noted that pollution charges had not kept up with inflation following the last adjustment in 1995. The first revision, in 2003, applied a coefficient of 1.5 to the original rates (staged over two years). These new rates were increased by a factor of 1.082 in 2005, and of 2.373 in 2006. The cumulative effect of these revisions will roughly compensate for the inflation observed since 1995. While the revision of rates is a positive development, the new rates are probably not high enough to significantly influence polluting behaviour. In 2006, charges for NO_X and SO_2 emissions to air are, at around US$ 38/ton, relatively high compared to those of other EECCA countries but well below charges observed in Central and Western Europe. Pollution charges for water effluents and waste remain low even after the doubling of rates in 2006. The number of pollutants to monitor still appears to be too large, and therefore too costly, and there has been no attempt to refocus the system of pollution charges to achieve a reasonable number of achievable environmental targets. This would require further simplification and the reconsideration of the appropriate level of charges so that they exceed marginal abatement costs.

Charges on emissions from road transport apply only to enterprise fleets, not to private cars, which are a major source of air pollution. Rates depend on the means of transport and the type of fuel and are lower for diesel fuel, despite its more negative environmental impact. This instrument is discriminatory, as the exclusion of private cars is not justified. A product charge, levied directly on the sale of motor fuel to all users, would be easier and

[3] A privileged rate of 50 per cent of normal levels applies to cars produced and registered in Ukraine before 1990. As this rate favours old cars, it would increase pollution.

cheaper to administer, as it could be collected together with excise taxes.

Charges for industrial waste disposal depend on volume and hazard class, with adjusting coefficients depending on the location of the disposal and the type of facilities. There are also charges for the disposal of specific types of waste, such as fluorescent lamps. In most cases, waste quantity is calculated on the basis of norms rather than measured directly. Regulatory measures, based on a strictly enforced system of permits and accompanying liability provisions, would be a more appropriate way to deal with extremely toxic substances, which are bound to produce extensive damage even when released in small quantities. Overall, charges do not adequately reflect the actual costs of waste disposal. The current regime restricts the development of waste disposal services by fee-charging companies. Such fees should reflect the cost of waste management and encourage the development of other options for dealing with waste, including recycling. Limits for waste generation are based on existing technologies (as is common for pollution charges) and therefore provide no incentives to reduce waste in the absence of cost-reflective disposal charges.

In addition, product charges are levied on local and imported containers and packaging. These charges are managed by the state enterprise Ukrecocomresources and are used primarily to finance projects for collection and recycling of primary packaging waste.

Payment compliance, which is a crucial element for the effectiveness of economic instruments, improved significantly in the period under review. The ratio of charges paid to charges due rose from 22.7 per cent in 1998 to 87 per cent in 2004. Charges for air pollution performed best in the period under review, and enforcement of waste pollution charges also improved dramatically, whereas charges for water pollution showed the lowest compliance. The share of emissions above limits for water discharges increased, representing 45 per cent of those within limits in 2004. This uneven compliance suggests some problems with setting and enforcement of standards. In general, compliance is lower for charges above limits and tends to be weaker in areas that account for the bulk of pollution charges (i.e. the most industrialized centres of the eastern part of the country). Actual payments for fines and damages have been rather low in relation to amounts due, with a reversal of some past improvement, reaching around 27 per cent in 2003–2004, up from 13.1 per cent in 1999 but down from 36.3 per cent in 2002. In 2004, damages due and fines represented 2.7 per cent of pollution charges due, but only 0.8 per cent of actual payments. Thus, compliance appears to deteriorate in the cases when it matters most, namely in connection with the most significant polluters and the payment of fines and damages.

Other financial sources

In addition to taxes and charges, other resources can be mobilized to address environmental problems. Voluntary contributions seem to have played no role in Ukraine. The country needs economic reforms in order to attract donor and private financing. The EU neighbourhood programme for 2007–2013 represents an increase in potential funding. The current EBRD strategy for Ukraine identifies among its priorities the municipal and environmental infrastructure and increasing energy efficiency, including through purchases of carbon credits. Moreover, Ukraine is in a good position to benefit from the funding arrangements envisaged in the Kyoto Protocol coming into effect between 2008 and 2012 (see Chapters 4, 7 and 8).

5.2 Environmental impact of prices and subsidies

Prices that reflect the total costs of production, including the use of environmental resources, are a basic requirement for the avoidance of excessive uses of the environment and the creation of incentives for environmental investments.

Transport

Transport is a sector with a significant environmental impact (see Chapter 9). Modal shifts and intensity of use reflect growing incomes but also the influence of prices. While road transport has been liberalized, Ukrainian railways have not yet been corporatized. There is no independent regulator, and tariff setting remains non-transparent. Cross-subsidization is extensive, to the detriment of the cargo transportation sector. While the financial position of Ukrzaliznytsia (Ukrainian State Railways Company) is strong, the current institutional set-up may provide further impetus to a modal shift in favour of the more polluting road transport. Growing incomes have fostered private car ownership, which is already relatively high for the current level of per capita incomes. Vehicles accounted for an increasing share of emissions of air pollutants during the period under review, representing one third of the total by 2004.

The use of leaded petrol was discontinued in 2001, and the import of vehicles older than eight years was prohibited in 2005. The import tariff does not discriminate in favour of new cars. A number of taxes and duties capture part of the externalities associated with the transport sector (emissions charges from mobile sources, excises and customs duties, and various charges on vehicles). The importance of transport-related taxes is relatively modest in comparison with the situation in the more advanced EU countries. Fuel prices have risen sharply. In the first quarter of 2005, high-octane gasoline prices were only US$ 0.60 per litre, but by October of that year they averaged US$ 0.80 per litre, with the more environmentally harmful diesel fetching around US$ 0.76, partly reflecting a more favourable tax treatment. In the European context, Ukraine's motor fuel is relatively cheap; in October 2004, the unweighted average price in the enlarged European Union (excluding Malta and Cyprus) was US$ 1.48 per litre for unleaded fuel and US$ 1.33 for diesel. A pent-up demand for car ownership may be more sensitive to income changes than to fuel price variations. However, taxes, if set at the appropriate level, can still influence usage and choices between various types of transport.

Energy

Until recently, the energy sector was plagued by non-payment, in addition to which, regulated tariffs below full cost recovery resulted in large subsidies to energy users. The situation has improved markedly since 2000, and payment collections are currently close to 100 per cent for electricity and gas.

Cross-subsidization of consumption is important in the energy sector. Household tariffs for electricity are on average around 50 per cent below industrial tariffs. Since September 2005 there has been a gradual shift towards the equalization of tariffs for all types of consumers (excluding households), with only two tariff classes (according to voltage). However, this creates a situation of cross-subsidization at the regional level, as uniform tariffs do not reflect differences in cost across regions.

Gas prices for households remained unchanged from 1999 to 2006 and are much lower than industrial tariffs. As of November 2005, the price of gas was US$ 37 per thousand cubic metres for households, US$ 46.2 for budget financed (public sector) organizations, US$ 42 for heating utilities and US$ 72 for industrial users. The agreement between Ukraine and Russia on conditions for future deliveries concluded in January 2006 brought a sharp increase in prices. Since the almost 30 per cent increase in industrial tariffs approved in February 2006, cross-subsidization increased. Household tariffs were raised in May and July 2006, with more increases planned for 2007. These increases will reduce the amount of cross-subsidization. Until 2006, the traditionally low gas prices have discouraged energy efficiency and promoted specialization in energy-intensive industries, which have a significant negative environmental impact, a situation which may change with the drastic price increase. Access to imported energy remains precarious, and the price system should continue to be used to encourage energy savings.

The coal sector has received significant but declining subsidies and decreased from around 3 per cent of GDP in 1998 to 1 per cent in 2003, according to the World Bank (see Chapter 8). While some restructuring has reduced overall costs, coal production subsidies and low coal prices have not been conducive to greater energy efficiency or to environment improvements. (See Chapters 7 and 8 for a discussion of the adverse impact of coal mining and the burning of low-quality coal.)

Municipal utilities

Municipal enterprises levy user charges for handling waste and treating and supplying water. Tariffs are set locally and therefore differ across locations. Residential users pay around one third of industrial tariffs for water and wastewater and less than two thirds of industrial tariffs for heating. Households' effective tariffs represent only a fraction of the costs, with significant regional differences in coverage[4]. Even considering the impact of cross-subsidization by industrial users, overall tariffs do not cover costs. The poor financial situation of municipal utilities has constrained their investment capacity, resulting in a deterioration of services and contributing to the pollution of surface waters.

Some improvement has occurred, particularly in payment discipline, so that in 2004 actual payments were almost 100 per cent of amounts due. The tariff-setting framework has also been improved. The Law on Housing and Communal Services (2004) stated that user charges must fully cover operating costs, with the regulator being required to compensate water utilities if these are forced to charge lower tariffs. According to this law, the Cabinet of

[4] In 2004 the unweighted averages of the cost recovery ratios in the oblast centres were 67 per cent for water, 61 per cent for wastewater and 80 per cent for heating.

Ministers is responsible for the tariff-setting procedure, which local government authorities use to take the actual decisions on local prices.

Current revenues do not even cover the maintenance of the current inadequate infrastructure of water utilities resulting in a significant financing gap[5]. Raising user charges is therefore essential. Higher tariffs must be accompanied by a stable regulatory framework insulated from political influence, which would facilitate the raising of additional revenues and foster private-sector participation. Ukraine intends to promote the development of local credit markets to support the financing of municipal infrastructure. In addition, the state has provided direct budgetary support for investment in local water utilities.

Costs for water supply services are very high, largely due to significant water leakage and excessive electricity consumption. The gradual shift towards more cost-reflective tariffs must be accompanied by the introduction of incentives to reduce costs and improve efficiency. This may require changes in the way tariffs are set, taking into account the quality of services provided. Installation of flow meters would encourage savings by users and reduce delivery losses for providers. Also, performance-based contracts could be used to monitor the work of water utilities. This would require that these utilities be considered autonomous entities, not just an extension of the administration.

Cost recovery in domestic waste management performed by municipal services is also insufficient. The 2004 National Solid Waste Management Strategy envisages the separation of user charges from housing rent and the gradual increase of tariffs. This would lay the foundation for increased participation by the private sector and for attracting the necessary investment.

The financial impact of higher tariffs for municipal services on the population depends on the duration of the period required to achieve full cost recovery. In any case, some households may face difficulties and require targeted assistance.[6] Currently, service providers receive compensation for discounts granted to households whose utility bills exceed 20 per cent of income. Direct monetary transfers in the form of social compensations to the poorest, covered by the state and local budgets, are a more efficient alternative leading to higher savings. Such support could also apply to the supply of other utilities such as electricity and gas.

5.3 Environmental funds

Overview

Earmarked funding is a defining feature of the public system of environmental protection in Ukraine, resulting in the automatic allocation of some revenue streams to finance environmental expenditures according to pre-established rules.

Established in 1992, environmental protection funds form a three-tier system (national, regional and local). Since 1998, earmarked funds, which were previously off-budget, have been consolidated into the State budget and budgets of the respective territorial levels. They are not separate legal entities. In addition to one National Environmental Fund (NEF) in the State budget, there are 27 regional funds and thousands of local funds, with the total number of funds 10,084. The regional funds include 24 oblast funds, two city funds (Kyiv and Sevastopol) and the Environmental Fund of the Autonomous Republic of Crimea.

Most of the revenues to the funds accrue from charges for environmental pollution. Fines for non-compliance with environmental laws accruing to environmental funds are shared according to criteria determined by the regional legislative bodies. Damage cost restoration is another (albeit minor) source of revenues for the regional and local funds.

Of the funds' revenues, 30 per cent go to the national level, 50 per cent to the regional level and the remaining 20 per cent to the local level.[7] The cities of Kyiv and Sevastopol keep 70 per cent of revenues. Charges are paid at the tax office where a company is registered, which may differ from the location of the plant where pollution is generated. Thus the share received by local funds may not fully reflect the actual location of polluters. Local budgets can waive pollution charges by enterprises (up to the amount due to these budgets) on the condition that they are

[5] This gap is estimated at around EUR 27 per connected inhabitant per year, one of the highest in the region, according to estimates by the OECD EAP Task Force.

[6] A recent EBRD study shows that the share of utility payments in households' total expenditures is relatively low, even for the poorest 10 per cent of households. The combined weight represents 3.6 per cent of expenditures. This reflects not only prices below cost-recovery levels but also non-payment. Full cost recovery by 2007 would raise this ratio to 15.5 per cent.

[7] Before the amendment of the Law on Environmental Protection in 1998, the shares were 10, 20 and 70 per cent for the national, regional and local levels, respectively

invested in improving the companies' environmental performance.

A number of normative rules have affected the distribution of charges and the allocation of funds. For instance, enterprises that participated in the economic experiment in the mining-metallurgical complex between July 1999 and December 2001 could retain 70 per cent of the charges on the condition that they invested the funds in environmental protection activities. Similar conditions were also granted in 2002. The value of the benefits received by these companies in 1999–2002 represented almost 20 per cent of the revenues of the environmental fund system during this period. According to a specific programme under the Ministry of Fuel and Energy, State electricity companies also benefited from special treatment in 2000–2005, as the NEF was transferring back at least 70 per cent of their paid environmental charges to finance their environmental projects. Another type of economic experiment was conducted in a number of cities (Kryvyi Rih, Dnipropetrovsk, Mariupol and Zaporizhzhia), which were entitled to receive financing for projects for a value equivalent to the pollution charges paid by the companies located in these cities. All these experiments and special conditions were stopped in the beginning of 2006. (See the detailed information on special economic zones in Chapter 6, Box 6.1.)

The MEP manages the NEF. It identifies the projects to be funded at the national level, within the framework of the existing budgetary programmes and according to the priorities derived from the existing legislation. It also provides a budget programme "passport" that is communicated to the Ministry of Finance, which after approval transmits it to the treasury for payment. Grants are the usual form of support, but the annual law on the budget may stipulate other forms of financial support, such as interest rate subsidies on bank loans.

Revenues and expenditures

The revenues of the environmental funds grew quickly during the review period, increasing 4.3 times in 1999–2004 in dollar terms. Revenues also rose significantly in relative terms, in total and as a percentage of GDP. The transfer of responsibility for the collection of the charges to the State Tax Administration appears to be the most significant factor driving the increase in revenues.

The distribution of revenues of the environmental funds among the various territorial levels of administration has changed significantly as a result of the new sharing rules introduced in 1998 (see Table 5.2). The share of local funds, which accounted for most of the revenue at the time of the first EPR, fell to less than 20 per cent in 2004, down from 61 per cent in 1998. The 2006 budget law increased the share of the national fund to 65 per cent of pollution charges, while decreasing respectively the shares received by regional and local funds. This redistribution of the revenues between the national and local levels was accompanied by granting to the other ministries and government agencies direct access to the money from the National Environmental Fund by the Cabinet of Ministers. To get the money, a ministry or a state committee must consult with the MEP regarding the list of proposed environmentally related projects before requesting the funds from the treasury. As rates of pollution charges more than doubled in 2006 (2.373 times the 2005 rates), the relative decrease will not affect the amounts received by the lower levels of government in absolute terms or the amount that could be used by the MEP for its projects.

The NEF performs a significant redistributive role, which results in large differences between revenues raised in a region (oblast) and funds redistributed to the same region for environmental expenditures. Also, revenues and expenditures are poorly correlated by type of medium. Thus, the bulk of the revenues originates from pollution charges on air pollution, while most expenditures are allocated to address water pollution problems, which are a main priority for the country (see Chapter 1).

Unspent revenues from the previous fiscal year are carried over to finance environmental expenditures in the current year. At the beginning of the period, current expenditures were higher than capital expenditures, but the increase in revenues starting in2000 was used to finance capital expenditures, which accounted for more than 80 per cent of total expenditures in 2001–2004. Except in 2000–2002, expenditures in areas other than those explicitly identified as NEF priorities (water and air pollution, waste and protection of natural reserves) accounted for a very large part of the total (about one third in 2003 and 2004, see Table 5.3).

Environmental funds finance only a part of public environmental expenditure, and fund revenues represented an average 29.1 per cent of total expenditures in the period 2001–2004 (11 per cent from the NEF). Both environmental fund revenues and total environmental expenditures rose sharply during these years, but the former increased more

Table 5.2: Revenues of environmental funds, 1998–2004

	1998	1999	2000	2001	2002	2003	2004
National, US$ million	2.82	2.64	6.87	10.54	12.37	15.19	18.03
Regional, US$ million	4.78	5.30	8.55	16.77	16.82	25.56	30.49
Local, US$ million	11.88	6.05	7.32	7.54	6.25	9.75	11.52
Total, US$ million	19.47	13.99	22.74	34.85	35.44	50.50	60.05
Total, Hrv million	47.70	57.80	123.70	187.20	188.80	269.30	319.40
As percentage of GDP	0.05	0.04	0.07	0.09	0.08	0.10	0.09
As percentage of government revenues	0.13	0.14	0.22	0.27	0.23	0.28	0.26

Source: Ministry of Environmental Protection, 2005.

Table 5.3: National Environmental Fund expenditures, 1998–2004 (US$ million)

	1998	1999	2000	2001	2002	2003	2004
Revenues	2.8	2.6	6.9	10.5	12.4	15.2	18.0
Expenditures	1.1	2.7	4.4	12.0	9.6	17.9	22.2
Capital as percentage of total, %	..	35.4	73.5	83.4	91.0	79.5	83.7
Current as percentage of total, %	..	64.6	26.5	16.6	9.0	20.5	16.3
Expenditures/revenues, %	39.8	103.5	63.4	113.7	77.5	117.7	123.1
Total expenditures	1.1	2.7	4.4	12.0	9.6	17.9	22.2
Air protection	0.0	0.1	0.3	0.2	0.2	1.9	4.4
Water protection	0.1	0.6	2.3	8.1	6.3	6.4	6.6
Waste management	0.1	0.2	0.3	1.8	1.6	3.7	4.2
Land use and underground resources	0.0	0.0	0.2	0.3	0.6	0.1	0.1
Protected areas	0.3	0.7	0.6	0.3	0.4	0.2	0.6
Other	0.6	1.1	0.7	1.3	0.4	5.5	6.3

Source: Ministry of Environmental Protection, 2005.

slowly, thus financing a declining share of expenditures over this period.

Environmental funds can only be spent on the types of activities listed in the Resolution of the Cabinet of ministers No. 1147 (1996, see also Chapter 6, section 6.4). Specific programmes chosen for financing are identified in the annual state budget as part of the overall budgetary process. The NEF finances environmental projects of national and interregional significance, including relevant research. Priority is given to activities linked to the prevention, reduction and elimination of pollution, with particular emphasis on water pollution and waste disposal. The NEF generally provides only partial financing for local and regional projects, with the rest covered by project applicants at their territory's level.

As a result of the increase in revenues, the average size of the projects financed by the NEF increased almost fivefold between 1998 and 2003, more than twice as fast as the Consumer Price Index (CPI). However, priorities appear too vague to provide strict guidance for the projects to be financed. More narrowly defined priorities would reduce the flow of unsuitable demands, thus facilitating the appraisal process. At the oblast level, a review conducted by DANCEE in 2001 found most of the funds in violation of the Saint Petersburg Guidelines on Environmental Funds in the Transition to a Market Economy. Expenditures were not targeted precisely enough to meet environmental objectives, and there were no clear procedures for project selection or management.

The annual draft state budget includes economic and social projections and estimates of revenues, expenditures and financing for the next three years. However, this framework does not yet effectively constrain future budgets and therefore does not provide effective guidance for future planning. There is little attempt to reconcile the conflicting demands posed by medium-term environmental plans into a multi-year financing strategy. The absence of an effective medium-term budget framework is a key obstacle. While the foundation for results-oriented budgeting has been laid, reporting focuses mainly on financial compliance. Environmental funds, for which pollution charges are the main source of revenue, face a basic dilemma, as success in abating pollution involves a long-term erosion of their

Box 5.1: Intended reform of the environmental funds, 2005

In 2005, the MEP inventoried 10,056 local environmental funds. For example, there were 638 funds in Kyiv Oblast alone. The funds are not separate legal entities, and they lack dedicated employees, office facilities and management boards. Consequently the efficiency of the management of these numerous local funds is questionable.

In 2005, a Law on National Environmental Fund was drafted to improve the funds' system of management. The law would:

- Create a two-level system (1 national and 27 regional funds, including the Autonomous Republic of Crimea, 24 oblasts and the cities of Kyiv and Sevastopol) to increase the efficiency of expenditures;
- Favour medium- and long-term projects and improve their management;
- Extend the scope of fund revenues (e.g. by encouraging voluntary contributions and participation by enterprises);
- Give the funds an independent legal status; and
- Use the funds to help enterprises by reducing the cost of commercial credits for environmental investments.

In 2006, the draft law was rejected by the Parliament.

revenue bases. Moreover, a system based only on pollution charges does not guarantee that sufficient revenues to meet environmental needs will be generated.

The intended reform of the system of environmental funds addresses some of these shortcomings (Box 5.1). The proposed framework involves a two-tier system, composed of the NEF and regional funds, which would be in line with the recommendation of the first EPR. While a general principle for environmental policy is that actions should be taken at the level where environmental problems occur, most emissions problems transcend the local level.

The reform would also give funds the status of separate legal entities. This could provide a better foundation for reconciling the general guidance provided by the MEP and the Parliament on environmental priorities with the operational independence necessary for a cost-effective allocation of resources. The Saint Petersburg Guidelines on Environmental Funds suggest that the final decision-making authority for selecting projects should be allocated to a collective body representing the main stakeholders. This collective body could also participate in defining the strategy for achieving environmental priorities.

The reform project envisages moving away from pure grant financing to increasingly include the concession of soft loans. This would help to further leverage resources and to promote the involvement of private-sector finance in environmental activities. However, the development of capacity would be required to adequately assess the repayment ability of applicants and to manage cash flows.

5.4 Conclusions and recommendations

The system of pollution charges has remained basically unchanged, although rates have been raised to reflect past inflation. Institutional changes have boosted compliance with regard to payment of charges. However, in spite of some attempt to reconsider the system of pollution charges, going beyond their revenue-raising role and focusing on alleviating environmental pressures, results are still insufficient. This would require, in line with the recommendations of the first EPR, further simplification and increases in rates for specific pollutants that can be adequately measured to levels that represent a real incentive for pollution reduction, in view of abatement costs and economic feasibility. The effectiveness of economic instruments depends on the existence of a strong enforcement environment.

Recommendation 5.1:
The Ministry of Environmental Protection, in cooperation with the Ministry of Finance and State Tax Administration, should review the system of pollution charges, aiming at its simplification and possible introduction of automatic indexation mechanisms for rates. In particular, they should assess the appropriate level of rates for selected pollutants to achieve specific environmental objectives and enhance the incentive role of charges.

The review of the system of pollution charges needs to consider the use of alternative instruments, including product charges. In particular, charges for air pollution from mobile sources that apply only to enterprises could be replaced by a product tax on fuel products that does not differentiate between users but takes into account the different environmental impacts of the various types of motor fuels. This tax could be collected together with excise taxes to minimize administration costs, with revenues earmarked for environmental expenditure, as in the current system of pollution charges. For instance, charges on SO_2 emissions could be replaced by the

differential taxation of fuel according to its sulphur content.

Recommendation 5.2:
The Ministry of Environmental Protection, in cooperation with the Ministry of Finance, should extend the base for the emissions charges for air pollution from mobile sources to all users. This should be done by inclusion of these charges in the price of all motor fuels.

Utilities tariffs now more accurately reflect costs, and the non-payment situation has improved. However, cross-subsidization is extensive and charges do no yet fully reflect the "user pays" and "polluter pays" principles. This situation discourages the use of savings measures and makes it difficult for companies providing utilities to attract the necessary investment. Municipal utilities need substantial financing in order to maintain their decaying infrastructure. Higher user charges and a well-defined tariff-setting framework are required to raise the necessary funds. Provision costs are high and should be reduced through the introduction of incentives to improve efficiency.

Recommendation 5.3:
The Ministry of Construction, Architecture and Housing and Communal Services, in cooperation with the Ministry of Labour and Social Policy, should create conditions fostering increased investment in the improvement of services provided by municipal utilities. Also, reinforcement of payment discipline and a gradual increase in tariffs to reflect costs are important and should be implemented. It should promote the reduction of these costs through benchmarking (defining a point of reference for comparisons between providers) and performance-based contracts, which establish a link between the revenue accruing to the utilities and efficiency gains.

Revenue accruing to the system of environmental funds has increased significantly, chiefly as a consequence of improved compliance resulting from the transfer (in 1999) of collection responsibility to the State Tax Administration and (since 2003) rate increases. In addition, the end of the ecological-economic experiment brought more revenues back to the environmental funds. Increased emissions in the most recent period have also contributed to higher revenues.

There has been less progress in expenditure management. The existing fragmentation, with thousands of local funds, leads to inefficient spending as a result of lack of consistency in overall environmental priorities. Local funds have reportedly allocated environmental funds to general-purpose expenditures of local governments. Project cycle procedures and criteria for appraising and ranking project proposals are better defined at the NEF, while serious shortcomings appear at lower territorial levels.

However, even at the national level the situation is far from satisfactory. The dispersion of functions within the Ministry of Environmental Protection and the absence of a unified management structure for dealing with these issues have prevented the adoption of clear guidelines and control procedures. The fragmentation of the system also leads to high costs and hampers alignment with environmental priorities. There is a need to develop a more solid foundation for identification of projects and prioritization of spending on the basis of formally rigorous effectiveness criteria. Transparency, financial planning and project-cycle management need to be improved, especially in view of the increases in revenues. Reform plans under consideration are steps in the right direction, but the opportunity provided by the planned change in the legal framework should be used to align the system fully with international best practices, as described in the so-called St. Petersburg Guidelines. The reform envisages giving funds an independent legal status, which is a positive step that should be accompanied by the creation of clear and transparent management and independent supervision mechanisms.

Recommendation 5.4:
The Ministry of Environmental Protection, in collaboration with the Ministry of Finance, should rationalize the system of environmental funds, drastically reducing their number and establishing a list of priority environmental actions for medium-term financing, including drafting of the necessary changes in the legal framework. These modifications should include the consideration of the few remaining funds as separate legal entities while applying good and transparent management rules.

Chapter 6

EXPENDITURES FOR ENVIRONMENTAL PROTECTION

6.1 Introduction

In 1997, Ukraine had environmental expenditures[1] of about US$ 950 million from public and private sources. In 2001, the Ministry of Finance introduced a new classification system for budget expenditures which was based on international practices and enabled more precise assessment. According to the Ministry of Finance, the comparison of figures from the two periods is therefore not possible. During the more recent period, there was a noticeable increase in expenditures related to the environment, which doubled from US$ 650 million in 2002 to US$ 1.1 billion in 2004. Nevertheless, the period is too short to confirm any solid trend.

At the local level, the profusion of local environmental funds, which number 10,056 (see Chapter 5), and the lack of environmental reporting make it impossible to determine whether expenditures are really dedicated to environmental protection. Also, at the national level, while government bodies other than the Ministry of Environmental Protection (MEP) spend money on the environment (see Table 6.3), in particular through the environment-related components of the respective State targeted programmes, some of these environmental expenditures cannot be disaggregated from the bulk of expenditures reported by the Ministry of Finance. All these features make a detailed analysis of the efficiency of the use of expenditures difficult.

Data used in this chapter were provided by the MEP, the Ministry of Finance and the State Committee of Statistics.

6.2 Domestic financial resources

Public financing

In the period 2001–2004, expenditures of consolidated national budget showed a steady variation at around 0.25 per cent of the GDP (Table 6.1). The amount of expenditures made through environmental funds fluctuates around 30 per cent, of which 7–8 per cent is spent through the National Environmental Fund (NEF). The lack of monitoring of environmental expenditures within government bodies makes it rather difficult to analyse these expenditures (Table 6.3), and rough comparisons with other countries are not very meaningful. For example, the environmental public expenditure of France was 0.3 per cent of GDP in 2002, a percentage comparable to that of Ukraine. But for the same year, France spent EUR 67 (US$ 78) per capita compared to US$ 2.8 in Ukraine; the latter figure is closer to that of Romania (about US$ 4 in 2004).

Public environmental expenditures have increased steadily over the past five years. They doubled from US$ 99 million in 2002 to US$ 200 million in 2005 (Table 6.2). Main targets of state environmental financing are waste management and implementation of projects to combat or prevent soil erosion.

For the first half of 2005, Table 6.3 shows that the main government bodies spending budget funds on environmental expenditures are the Ministry of Fuel and Energy (31 per cent), the MEP (26 per cent) and the Ministry of Emergencies (14 per cent).

The state only finances measures for the rehabilitation and maintenance of facilities, not measures for the elimination of pollution sources. According to the MEP, the Government's environmental priorities are not based on realistic or long-term projects. Their cost efficiency is not assessed, and possible options are not considered.

Expenditures from the environmental funds

The sources of revenues for the environmental funds are described in Chapter 5. Both expenditures and revenues have increased significantly since 1998 (see Table 5.3). Cabinet of Ministers Resolution No. 181 of 2002 specifies that 10 per cent of the NEF can be reserved for extraordinary expenses. NEF expenditures are managed by the MEP, while those for the oblast and local environmental funds are managed by oblast and local authorities.

[1] Do not include expenditures related to the Chernobyl accident, which are categorized as social.

Table 6.1: Environmental protection expenditures from the Government's consolidated budget, 2001–2005

million US$

	2001	2002	2003	2004	2005 [3]
Consolidated budget	103.04	124.20	172.37	222.06	263.13
State budget	103.04	98.95	136.19	168.41	200.82
including NEF [1]	11.79	8.85	14.06	17.68	19.54
LEF [2]	..	25.25	36.18	53.65	62.31

Source: Ministry of Finance, 2005.

Notes:

[1] NEF: National Environmental Fund

[2] LEF: Oblast and local environmental funds

[3] Planned

Table 6.2: Environmental expenditures from the state budget, 2001–2005

million US$

	2001	2002	2003	2004	2005 [1]
GDP	38,009	42,392	50,145	65,037	..
Environmental expenditures as percentage of GDP	0.27	0.23	0.27	0.26	..
Budget item					
Total environmental protection	**103.04**	**98.95**	**136.19**	**168.41**	**200.82**
Prevention and elimination of environmental pollution	88.24	83.98	112.04	135.00	156.37
Protection and rational use of natural resources	18.28	17.30	27.39	32.58	32.98
Waste management	5.09	4.39	7.02	32.04	29.99
Elimination of other environmental pollution	64.87	62.29	77.63	70.37	93.40
Conservation of protected areas	3.43	4.49	5.83	7.25	10.74
Research on environmental protection	3.80	2.38	5.86	10.80	14.30
Other activities in environmental protection	7.57	8.11	12.46	15.37	19.40

Source: Ministry of Finance, 2005.

Note: [1] Data as of 1 July 2005 (planned).

Table 6.3: Expenditures for environment protection by executive bodies, January–June 2005

Name	million US$	%
Total	200.82	100
Ministry of Fuel and Energy	62.99	31.37
Ministry of Environmental Protection	53.15	26.47
Ministry of Emergencies	28.91	14.40
National Academy of Sciences	10.96	5.46
Ministry of Defense	10.19	5.07
State Committee for Water Management	8.50	4.23
National Space Agency	7.92	3.94
State Forestry Committee	5.42	2.70
Ministry of Industrial Policy	4.65	2.32
State Committee on Natural Resources	3.17	1.58
Ukrainian Academy of Agrarian Sciences	1.17	0.58
State Management Office	1.06	0.53
Ministry of Agricultural Policy	0.99	0.49
State Committee on Land Resources	0.99	0.49
Kherson Oblast State Administration (floods)	0.44	0.22
State Nuclear Regulatory Committee	0.26	0.13
State Committee on Housing and Communal Service	0.03	0.02

Source: Ministry of Finance, 2005.

Most of the NEF's expenditures are capital expenditures (84% of the total in 2004). In 2003, the lion's share was spent on water protection (36%), while 20% was spent on waste management and 11% on air protection (see Table 5.3 in Chapter 5). Expenditures on land use, underground water resources and protected areas were very small.

Because of the lack of environmental reporting by the local funds and their overly large number, it is rather difficult to assess the impact of the activities funded by them on the environment. Funds are only obliged to report on the expenses of funded projects, not on their environmental performance. Nevertheless, some oblast funds are reporting to the MEP and to the State Committee for Statistics on their environmental activities. Chapter 5 provides an in-depth assessment of the functioning of environmental funds.

Environmental expenditures by enterprises

Enterprises under various forms of ownership are another major source of domestic environmental expenditures. The current accounting system for environmental protection expenditures includes the following elements:

- Capital investments
- Operating expenses
- Expenditures for capital repairs of main production facilities intended for environmental protection

During the period 2001–2004, total environmental expenditures represented 1.7%–1.8 % of the GDP (Table 6.4), of which the share from enterprises was 1.3%–1.4% of the GDP. In 2004, operating costs represented 69% of total environmental expenditures, capital investments 25% and repairs 6%. In 2004, capital investments for environmental protection were about US$ 279 million. Capital investments in environmental protection have been increasing and almost tripled in 2004 compared to 2002. About 80 per cent of the total capital investments for environmental protection are from enterprises (see Table 6.5).

See Chapter 8 for a detailed discussion of environmental expenditures in industry.

Table 6.4: Total environmental expenditures by type of expenditure, 2001–2004

	2001	2002	2003	2004
Capital investments in current prices (million US$)	90.6	97.3	162.1	278.8
Repair expenses in current prices (million US$)	56.5	45.3	53.0	66.2
Operating costs in current prices (million US$)	540.5	578.2	630.5	780.6
Total	687.6	720.9	845.5	1,125.7
GDP in current prices (million US$)	38,008.9	42,391.6	50,144.7	65,036.9
Expenditures as percentage of GDP	1.8	1.7	1.7	1.7

Source: State Committee of Statistics, 2005.

Table 6.5: Capital investments in environmental assets, 1997–2004

million US$

	1997	1998	1999	2000	2001	2002	2003	2004
Total investments in current prices,	128.70	91.04	60.91	68.49	90.58	97.34	162.08	278.84
of which the state budget	23.95	15.24	7.14	7.83	20.26	15.72	26.37	40.18
Total including								
Water protection	67.95	54.83	30.84	34.87	37.88	41.28	74.35	110.99
Air protection	21.75	13.39	7.00	7.85	18.34	16.92	31.77	105.00
Land	11.07	11.84	12.20	10.46	12.99	22.15	22.86	25.81
Flora	0.05	0.00	..	0.50	..	0.11	0.81	0.90
Mineral resources	23.90	12.53	8.33	12.59	12.02	12.26	14.46	15.28
Protected areas	..	0.00	..	..	0.02	0.32	0.19	0.58
Wastes	3.49	2.16	2.32	2.15	5.79	3.92	10.03	19.21
Fauna	0.16	0.24	0.19	0.06	0.17	0.34	0.64	0.47
Other	0.32	0.12	0.02	0.02	0.02	0.04	6.98	0.58

Source: State Committee of Statistics, 2005.

Capital investments and other expenses

Total capital investments for environmental protection represent 2 per cent of the total capital investments in the country. Most of the volume of capital investments for environmental protection is used in Zaporizhzhia Oblast (22.8%), Dnipropetrovsk Oblast (19.1%), Donetsk Oblast (14.6%) and the city of Kyiv (8.2%).

In 2004, as in previous years, environmental capital investments were directed primarily at the following areas: water protection – 39.8 per cent, air protection – 37.7 per cent, and land protection – 9.2 per cent (Table 6.5). For instance, capital investments for land management are about US$ 25.8 million, of which 30.3 per cent is for general-purpose buildings, 16.3 per cent for hydro-technical works (for instance, dykes, dams, reservoirs) and the rest for landslide protection and creation of green-belt protection zones.

In 2004, the country spent about US$ 66 million to repair environmental protection facilities and about US$ 780 million on operating costs (see Table 6.4). Environmental protection measures were taken by enterprises, organizations and government bodies. However, it is noteworthy that 97 per cent of expenses for major repairs of capital assets and 88 per cent of expenses for repairing facilities were incurred by enterprises or private business.

In 2004, the operating costs were distributed as follows: protection and rational use of water – 57 per cent, waste management (treatment and disposal) – 18 per cent, and air protection – 15 per cent, with the balance spent on fauna, flora, protected areas and mineral resources. At the regional level, a fourth of the total operating costs (26%) were concentrated in Dnipropetrovsk Oblast, 17 per cent in Donetsk Oblast and 10 per cent in Luhansk Oblast.

For the same year, expenses incurred in repairs and maintenance for environmental protection were mainly distributed as follows: water protection – 48 per cent and air protection – 42 per cent. At the oblast level, Luhansk Oblast spent 15 per cent, Donetsk Oblast – 13 per cent and Dnipropetrovsk Oblast – 11.5 per cent.

6.3 Use of foreign financial resources in environmental expenditures

The cumulative foreign direct investment (FDI) per capita from 1991 to 2004 for Ukraine (US$ 178) is smaller than the FDI flowing into South-Eastern Europe-8[2] (US$ 507) and the Russian Federation (US$ 331).

The Foreign Investment Advisory Council (FIAC) approved by Presidential Decree No. 325-97 was created in 1997 to attract investors from abroad, to facilitate dialogue with foreign companies and to help them invest in the country. The Council's board is chaired by the President and composed of heads of multinational corporations already investing in the country. In October 2005, at its sixth plenary meeting the FIAC welcomed the improved investment climate, the creation of a stable environment for the development of entrepreneurship, and the establishment of a constructive dialogue between business and public authorities. Ukraine also has an Investment Promotion Agency (IPA), which handles the economic aspects of investment but does not mention to new investor whether any environmental responsibilities or constraints are connected to the investment in question. While the State Committee of Statistics collects data on FDI, the results are broken down by activity and do not specify funds allocated to environmental protection.

FDI amounted to US$ 0.747 billion in 1997 and US$ 1.711 billion in 2004. In autumn 2005, Kryvorizhstal, a state-owned metallurgy company, was sold for US$ 4.8 billion. This exceptional amount represents almost three times the amount of FDI in 2004.

During the Extraordinary Ukraine Roundtable sponsored by the World Economic Forum in Kyiv in 2005, corporate leaders cited corruption, the poor regulatory environment, the unpredictability of government economic policy and the lack of an independent judiciary among the biggest obstacles to doing business in Ukraine.

Within the MEP, the Department of International Cooperation is responsible for coordinating cooperation with international organizations on implementation of environmental programmes and projects, but it has no right to financially manage an international project.

6.4 Decision-making framework

Background

Before 2001, environmental expenditures were included under the item "Natural Environmental Protection and Nuclear Safety", which also covered

[2] Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Romania, Serbia and Montenegro, The former Yugoslav Republic of Macedonia and Turkey

expenditures related to the Chernobyl accident. The Ministry of Finance's Order No. 604 of 2001 on budgetary classification, introduced a budget classification that meets the requirements of the United Nations Statistics Department's international classification for national accounts. This new system includes the functional classification code 0500 for "Environmental Protection". Table 6.2 shows the items included under environmental protection. Although pre-1999 data are provided, the chapter's analysis focuses on data from 2002 and later.

The consolidation of environmental protection funds into the budget was introduced by the 1998 modifications to the 1991 Law on Environmental Protection. This measure was aimed at strengthening control over the use of environmental extra-budgetary funds, as it appeared that these earmarked funds had been misused or channelled to uses other than environmental protection. At the same time, the oblast[3] and local funds were consolidated into oblast and local budgets. On the revenues side, the State Tax Administration was given the responsibility of controlling the timely and complete collection of the charges in 1999 (see Chapter 5).

Legal framework

Public expenditures for environmental protection are included in the annual Law on the State Budget. Several laws specify pollution charges as the main source of revenue for environmental funds (see Chapter 5).

The Law on Environmental Protection provides the main framework for environmental expenditures. It makes provisions for the "polluter pays" principle as well as other bylaws and codes related to environmental protection. Various decrees specify regulations and rates for use of natural resources. The law recognizes the following major sources of financing for environmental activities:

- The state budget and oblast and local budgets (including the budget of the Autonomous Republic of Crimea)
- Environmental protection funds
- Funds of businesses, institutions and organizations
- Voluntary contributions and other funds

[3] Hereafter "oblast" and "regional" are used interchangeably.

The first two items constitute the main source of environmental protection expenditures, whereas the third item pertains to private-sector environmental expenditure. The fourth one exists only in theory; no such contributions have in fact been made. While other means, such as ecological insurance funds and preferred-rate bank loans, have not yet been implemented in Ukraine, the MEP in consultation with relevant institutions is considering their introduction.

The Law on Environmental Protection stipulates various tax exemptions for legal entities that introduce technologies to lower waste generation and save energy and resources, and that implement nature conservation measures. It also provides for the creation of other funds to finance environmental protection measures. Other tax exemptions are mentioned in the 1992 Law on the Natural Reserve Fund and the 1998 Law on Waste.

Activities to finance environmental protection enjoy tax exemptions stipulated in the Law on Environmental Protection. Various exemptions can be granted to enterprises, institutions, organizations and other legal entities that introduce low-waste, energy- and resource-saving technologies, use non-conventional power sources or implement nature conservation measures.

However the Law on the Taxation System (1991) stipulates that tax exemptions may not be introduced or changed by other laws except laws on taxation. This incompatibility between laws could be used to get exemptions based on the Law on Environmental Protection that are not in line with the Law on the Taxation System. Tax laws that include a small part of the tax exemptions stipulated by the environmental legislation are the Law on Taxation of Enterprise Profits and the Law on Land Taxation. Other tax laws also provide for some insignificant exemptions that can be applied to environmental protection activities.

Resolution of the Cabinet of Ministers No. 634 of 1998 on the National Environmental Fund is the legal basis for the NEF. It mainly establishes principles, rules and procedures for obtaining financing from the NEF. However, it lacks clear rules for assessing the effectiveness of approved projects and measuring the efficiency of their implementation.

Resolution of the Cabinet of Ministers No. 1147 of 1996 lists the types of environmental protection activities that can be financed by the national, oblast and local funds. The MEP, which can revise and update measures for planning and financing the NEF, issued the its Order No. 189 on planning and

financing of environmental protection measures by the National Environmental Fund in 2002. This order specifies the conditions for obtaining funding and the MEP's responsibilities regarding the NEF, clarifies procedures for considering queries, and makes territorial organs of the MEP responsible for the full project cycle with regard to the environmental components. Resolution of the Cabinet of Ministers No. 181 of 2002 on modifications to the 1998 Resolution on the National Environmental Fund introduced the following modifications:

- The purpose of the NEF, as a constituent part of the state budget, is to consolidate earmarked charges to finance activities and actions for environmental protection. These activities and actions are directed towards preventing, reducing and eliminating pollution of the environment, including financing related to scientific research.
- The NEF finances actions to protect nature and conserve natural resources and is used within the limits of the budgetary programmes established by legislation. This implies that during consolidation of budgetary programmes, priority should be given to agreed actions to prevent, reduce and eliminate pollution.

Resolution of the Cabinet of Ministers No. 44 of 2001 stipulated the procedure for undertaking public environmental expenditures and for financing them from the state, oblast and local budgets. This document also approved a list of environmental activities to be financed from the state budget and committed the Council of Ministers of the Autonomous Republic of Crimea, oblast authorities, and the municipal bodies of Kyiv and Sevastopol to including corresponding activities in regional and local budgets and allocating the necessary funds. This resolution was cancelled by Resolution of the Cabinet of Ministers No. 1193 of 2002. No new resolution was approved for defining the main directions for spending environmental protection funds at the state level. Due to the lack of specific legislation, the Ministry of Finance and the Ministry of Economy still refer to Resolution No. 1147 of 1996 to validate any budget line involving state expenditures related to environmental protection.

Resolution of the Cabinet of Ministers No. 773 of 2005 on use of the NEF gives the MEP the right to create in the NEF a budget line which could be used to reduce the costs of commercial credits for an environmental project. While the MEP has not yet used this procedure, it hopes that this budget line will help enterprises to implement environmental protection projects at a reduced cost. Funds under this budget line would be used to provide companies with low-interest (or no-interest) loans and disbursed directly to banks issuing loans for such projects.

According to administrative statute, the MEP the State Forestry Committee and their local bodies, enterprises of Ukrainian State Railway company *Ukrzaliznitsya* that deal with the preservation of forests, and fish conservation bodies are exempted from settlement of damages caused by environmental pollution, violation of forest regulations, improper allocation of natural resources and use of fish resources.

The Law on Special Economic Zones (1992) was designed to attract, encourage and protect investments. It defines three types of economic zones: special economic zones; territories with a special investment regime; and territories of priority development. Enterprises operating in these areas receive special tax concessions (e.g., exemption from corporate profit taxes and VAT) and enjoy special conditions for payments and investments (see Box 6.1).

Box 6.1: Special Economic Zones (SEZ)

Since 1996, 21 special economic zones were established to boost regional industrial development. However, the Law on Special Economic Zones does not have direct references to environment-related investments. Practice shows that authorities responsible for making decisions regarding a particular investment look exclusively for economic benefits.
It has been rather difficult to assess the amount of uncollected revenues from various environment-related economic instruments as well as possible environmental investments of companies in SEZ. The lack of transparency made it difficult to assess the implementation of environmental policies in these zones.

IMF and international observers have criticized the use of the zones arguing that they lead to an unbalanced impact on the rest of the country e.g. distorting market competition. Moreover, given the independence of the management bodies on how to spend public funds and the lack of transparency, the level of corruption was such that in early 2005 the Government decided to abolish these zones. But the decision had such a negative impact on foreign companies that invested there that the Government reversed its decision. Finally, the status of special economic zones was cancelled in early 2006.

Institutional framework

In addition to the MEP, many other government bodies are also spending money on environmental protection: the State Management Office, the Ministry of Fuel and Energy, the State Forestry Committee, the Ministry of Defense, the Ministry of Industrial Policy, the Ministry of Agrarian Policy, the Ministry of Emergencies, the State Committee of Water Management, the State Committee on Land Resources, the State Nuclear Regulatory Committee, the the State Committee on Housing and Communal Services[4], the National Space Agency, the National Academy of Sciences, the Academy of Agrarian Sciences and the Kherson Oblast State Administration. For example, Kherson Oblast received direct funding to mitigate the impacts of floods. Due to the lack of a common methodology for reporting on environmental expenditures, it is difficult to trace expenditures to these organizations. Moreover, it seems that cooperation between various bodies is weak: for instance, the MEP does not know the amount of resources requested for environmental protection by other government bodies (see Table 6.3).

Policy framework and priorities for expenditures

Environmental expenditures are supposed to follow the priorities established in the *Main Directions of the National Policy of Ukraine for Environmental Protection, Natural Resource Use and Environmental Safety* (1998). Since 1998, other environmental policy initiatives have been launched, including the elaboration of a sustainable development strategy, which has been repeatedly stalled by the Parliament (see Chapter 1 and Annex III). As a consequence, the funds still follow Cabinet of Ministers Resolution No. 1147 on the list of activities belonging to the category of nature protection measures and the *Main Directions* (see Chapter 5).

The Autonomous Republic of Crimea, each oblast and the cities of Kyiv and Sevastopol are expected to develop their own environmental plans. Environmental activities are funded through local budgets and funds. Environmental expenditures are managed differently at the local and oblast levels. According to the study "Capacity Screening of Oblast Environmental Funds in Ukraine" prepared by the international consulting company COWI in 2001, half of the revenues are spent on non-investment projects and activities, some of which are even not related to environmental protection. However, this does not preclude the existence of local funds that strictly focus their expenditures on environmental protection.

Funds follow the Statute of the NEF, which gives overall directions for financing but does not specify environmental priorities. Some oblasts also implement a Regional Environmental Action Plan (REAP) and some cities a Local Environmental Action Plan (LEAP). For example, Kyiv Oblast has a five-year environmental programme. The cost of a several-year project is annually split and managed as annual projects for the same period. If the actual cost of a project exceeds the estimated cost for a specific year, the authorities can request the MEP for NEF co-financing. Through a lengthy procedure, the NEF's management analyses submitted requests and upon approval the requested amount is released.

As a general rule, the MEP with its regional and local departments establishes priorities which must be approved by the Cabinet of Ministers. The MEP prefers to approve the maximum number of projects, irrespective of priorities and needs, even if the money will not be available. The only criterion is that the project should comply with the list in the above-mentioned Resolution of the Cabinet of Ministers No. 1147. Modern appraisal methods using cost-efficiency and cost-benefit analysis are rarely applied. Staff members managing the funds acknowledge the lack of specialists able to perform these appraisals. It might be possible to modify the statute of the funds by adding a special budget to hire specialists to perform cost-efficiency analysis for projects.

Public-private partnership

Such partnerships do not currently exist in Ukraine. The MEP is working to extend some mandates to private business. To fight corruption and create an environment of trust, all financial actions are to be transparent. For example, when non-respect of the tendering procedure is suspected, the project is frozen.

Methodology for data collection and accounting

The methodology for data collection and accounting for environmental expenditures was developed in the Soviet era. Some modifications have been made, but only in the structure of statistical reports and tables. Before 2002, investments in forestry and fisheries

[4] Have been incorporated in 2005 into the Ministry of Construction, Architecture and Housing and Communal Services.

were not systematically included under environmental expenditures. To some extent, the current methodology and the OECD PAC[5] methodology are comparable. Statistical reporting by enterprises under the current methodology is more detailed and more comprehensive than using the OECD PAC methodology, but it is not very reliable. Another problem is that "environmental expenditures" has a much broader meaning in OECD PAC methodology.

Spending units do not all use the same methodology for environmental expenditures. Since their reporting does not conform to international standards, assessment of environmental expenditures is rather difficult. The State Committee on Statistics and the MEP are working together with OECD support to harmonize data reporting on environmental expenditures. They are implementing concepts defined under the OECD/Eurostat PAC methodology. The project aims to develop a system of classification and reporting for the whole country that (1) facilitates reporting and helps decision-makers; and (2) permits comparison with other countries. The reporting from enterprises is almost completed, but work on a methodology for reporting on households is still ongoing. The reporting system has to be approved by the Government and implemented by all government bodies. The staffs of the various government bodies would have to be trained in the system's use by the two responsible bodies.

Public information

Information on environmental expenditures is necessary for developing effective environmental policies and regulations, including decisions on national, regional and local governments' budgets and the design of administrative and economic instruments to support environmental protection. Moreover, this information can help to highlight relationships and trade-offs between environmental policies and fiscal, labour market, energy and other government policies. In most EECCA countries, however, expenditure information – whether for environment or other sectors – has rarely been used in policy development.

The Resolution of the Cabinet of the Ministers No. 634 on the National Environmental Fund, stipulates the obligation of the MEP to publish an annual report of the NEF spending at national level.

Since 2002, the quality of data sent by some oblasts has been questionable, since they are not obliged to report on their environmental activities to the MEP and the State Committee of Statistics. Similarly, only a few oblasts are reporting on the use of their environmental funds to the State Committee of Statistics. The unmanageable number of local funds and the lack of requirements for environmental reporting reveal the weakness of the current structure of environmental funds. Similarly, local funds have no obligation to report to the MEP about amounts spent and results achieved.

6.5 Conclusions and recommendations

Since the first EPR, and more precisely since 2002, Ukraine's expenditures for environmental protection have increased. Although the ratio of expenditures to GDP has remained fairly stable, in real prices environmental expenditures have doubled in absolute terms in the period 2002–2004. The share of expenditures by companies has been growing and now represents about 80 per cent of total expenditures. However, because of the insufficiently transparent accounting system, it is not possible to identify exactly on what areas these expenditures were spent and whether they financed the most pressing environmental measures.

Currently, Ukraine badly needs clear direction as to how it should spend its funds for improving its environment (see the discussion in Chapter 1). With the 1998 *Main Directions* outdated and Resolution No. 44 of 2001 cancelled, the Government and its ancillary bodies have no legal directives and simply use the list of activities in Resolution № 1147 of 1996 to label their environmental expenditures. Furthermore, the Ministry of Environmental Protection (MEP) is not involved in the decision-making process for environmental expenditures by other government bodies, and there is no cooperation between the different actors involved.

Under these circumstances, forecasting environmental expenditures is difficult. The unpredictability of revenue streams (due to possible exemptions granted by the Government) obliges the MEP to adjust expenditure programmes, usually to a smaller amount. Under the present system of unclear policy and poor planning, it is difficult for the MEP to plan environmental programmes whose implementation requires more than one year.

[5] Pollution Abatement and Control (PAC) methodology was developed by OECD and brought into line with the Eurostat European System for the Collection of Economic Data on the Environment (SERIEE).

Recommendation 6.1:
The Ministry of Environmental Protection should identify and set priorities for environmental expenditures in collaboration with the Ministry of Finance, the Ministry of Economy and other relevant stakeholders (public authorities, business and environmental NGOs in particular) in line with updated goals and targets for environmental protection.

See also Recommendations 1.1. and 5.4.

Total expenditures for environmental protection may also be inaccurately estimated because of the existing methodology for data collection and reporting. The lack of a unified reporting system for all government bodies could hide expenditures that might be considered environment-related, or on the contrary cause expenditures to be identified as environment-related when in fact they are not. Sectoral ministries and other government agencies have expenditures that include an environmental component, but they do not account for them separately. The State Committee of Statistics and the MEP have developed a classification system for industry reporting on environmental expenditures that is compatible with international and EU practice and methodologies. A unified reporting system would allow policymakers to better forecast and control public environmental expenditures.

Recommendation 6.2:

- *The State Committee on Statistics should implement the statistical reporting system for environmental expenditure that it has developed together with the Ministry of Environmental Protection.*
- *The Cabinet of Ministers should update and approve the list of activities that are to be considered as environmental activities in line with the Eurostat European System for the Collection of Economic Data on the Environment (SERIEE).*

Due to the excessive fragmentation of the local funds (10,056), their efficiency is difficult to assess. Moreover, evidence of cost-efficient use of the funds is limited, as it is not based on an appraisal of the results of any programme implementation. It is recommended that such appraisal techniques be introduced at all levels of administration to increase efficiency in the management of expenditures. Also, good planning would give funds the possibility to use periods longer than one year as the basis of their work.

See Recommendation 5.4.

PART III: INTEGRATION OF ENVIRONMENTAL CONCERNS INTO ECONOMIC SECTORS AND PROMOTION OF SUSTAINABLE DEVELOPMENT

Chapter 7

ENVIRONMENTAL MANAGEMENT IN THE ENERGY SECTOR

7.1 The energy sector[1]

Energy production

Ukraine depends heavily on imported oil and gas for its energy production. Imports made up 50 per cent of the total primary energy supply (TPES) in 1996 and 57 per cent in 2003. Domestic energy production has continued falling in Ukraine after 2000. Crude oil extraction totalled 4.1 Mt in 1996, decreased until 2000 and then slowly increased to nearly regain 1996 levels by 2003. Domestic production of natural gas followed a similar pattern, reaching 18.4 billion cubic metres in 1996, falling until 2000 and then rising again to reach 20 billion cubic metres in 2003. Currently there is much focus in Ukraine on how to make the country less dependent on oil and gas imports.

The TPES has decreased since 1996 (Table 7.1). Energy imports have also decreased – from 77.4 Mtoe in 1996 to 76.1 Mtoe in 2003 in real terms. During the same period, energy exports increased significantly – from 2.4 Mtoe in 1996 to 19.1 in 2003. The energy sector is based largely on oil and gas, of which 75 per cent is imported. Oil imports increased by 150 per cent between 1996 and 2003, while natural gas imports decreased by 16 per cent during the same period (Table 7.1). These two energy sources account for 55 per cent of TPES. Coal, which is mainly a domestic source, accounts for 31 per cent. The remaining 14 per cent of TPES consists of nuclear energy (13%) and renewable sources (1%). Currently Ukraine imports gas from the Russian Federation and Turkmenistan, crude oil from the Russian Federation, and petroleum products from the Russian Federation, the Baltic States, Kazakhstan and Western Europe. The Russian Federation and Poland sell coal to Ukraine.

Energy intensity

Energy consumption in Ukraine fell throughout the 1990s as a result of declining output (Figure 7.1). Between 1999 and 2004, GDP increased by 50 per cent, and annual growth in 2004 was 12.1 per cent, the highest in Europe. The same period saw a decrease in TPES and final energy consumption. Although the energy intensity of GDP decreased by 30 per cent in 1997–2003, Ukraine is still one of the least energy-efficient countries in the world. The energy intensity in Ukraine is higher than in all EECCA countries except Azerbaijan, Tajikistan and Turkmenistan.

Factors that have contributed (and still contribute) to the high energy intensity include slow restructuring of energy-intensive industries; old capital stock in the public, enterprise and household sectors; and inadequate reforms of the heat and power sectors. The most important factors are low tariffs in the heat and power sectors and the prevailing cross-subsidization of households' use by industrial consumers and of the coal sector by the power sector. Operational efficiency in the heat and power sectors remained low throughout the 1990s because of low investment in the energy sector. Fuel use per unit of energy produced is high in comparison with that in EU countries. Generation facilities converting primary energy into heat and power have low efficiency rates, and technical and commercial losses in the transmission and distribution networks are high. Figure 7.2 shows the trends in energy intensity and energy efficiency.

With Ukraine's heavy reliance on coal and its low energy efficiency, the country's carbon intensity in 2003 was 2.1 tons of carbon per US$ 1,000 (1995 at PPP) (compared to 0.6 in Lithuania and 1.2 in Russia). This figure shows progress since 1996, when the intensity was 2.8 tons of carbon per US$ 1,000 (1995 at PPP).

According to the Institute of General Energy under the National Academy of Sciences of Ukraine, the energy saving potential would be around 42-48 per cent for the whole country. Thirty-eight per cent of energy saving could be achieved in industry, 30 per cent in the residential sector (district heating) and 17 per cent in the fuel and energy production sector.

[1] This chapter does not cover the environmental impacts of nuclear installations or nuclear safety.

Electricity supply

Ukraine's power sector is the twelfth largest in the world in terms of installed capacity, with about 54 GW. Generation and consumption fell sharply after independence but have increased consistently since2000. In 2003, Ukraine generated 177 billion kWh of electricity (as compared to 178 billion kWh in 1997). The country is currently revamping its electricity sector through privatization, increased use of existing facilities, and the completion of two new nuclear power plants.

Ukraine has enough generating capacity to supply more than twice its electricity needs. In 2004, thermal power plants (using oil, natural gas and coal) were generating 40 per cent of electricity, nuclear power plants 50 per cent and hydropower plants about 10 per cent. However, the country's distribution system needs investment and maintenance, as significant amounts of energy are wasted via line losses. Since 1997 the losses have increased from 8 per cent to 10 per cent.

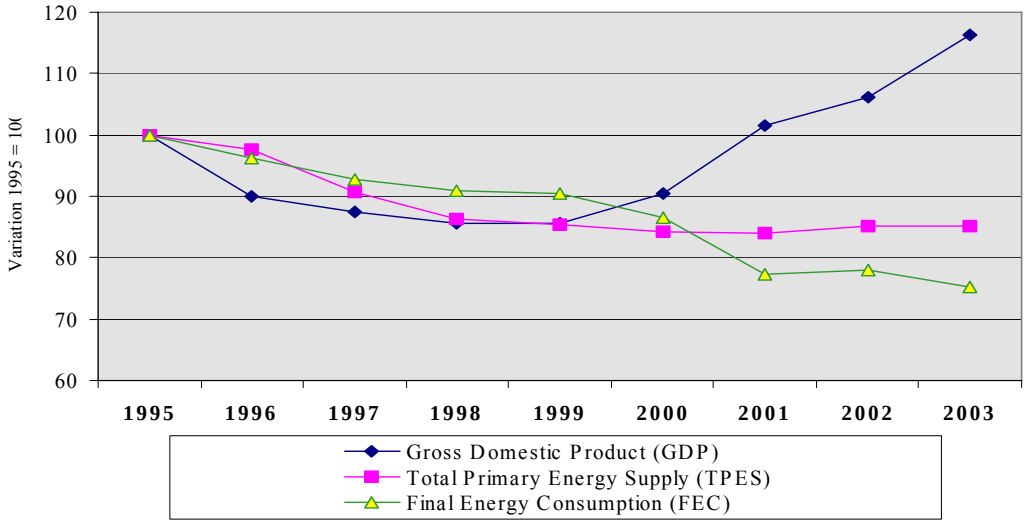
Table 7.1: Energy balance (in Mtoe)

Years	1996	1998	1999	2000	2001	2002	2003
Resources - TPES[1]	**154.0**	**142.9**	**141.2**	**139.6**	**130.1**	**132.0**	**132.6**
Domestic production	**79.0**	**80.4**	**80.9**	**82.3**	**72.0**	**72.8**	**75.5**
Exports:	**2.4**	**4.4**	**7.7**	**7.2**	**8.6**	**12.5**	**19.1**
Imports:	**77.4**	**66.9**	**68.0**	**64.4**	**66.7**	**71.7**	**76.1**
Oil	9.3	9.9	9.5	6.1	13.6	19.4	23.0
Oil products	5.6	6.1	4.7	4.4	2.0	1.3	1.1
Natural gas	54.8	44.9	50.3	49.7	47.7	47.1	46.3
Coal	6.7	5.2	3.1	4.0	3.2	3.4	5.0
Other	1.0	0.9	0.6	0.2	0.2	0.5	0.6
Final energy consumption:	**98.5**	**89.2**	**88.9**	**84.9**	**76.0**	**76.8**	**74.0**
Industry and construction	47.0	39.1	38.4	36.9	31.2	31.3	30.8
Agriculture	4.1	3.8	3.3	3.0	2.7	2.9	2.9
Transport	6.6	7.0	6.2	5.5	7.4	7.8	7.4
Households	27.4	25.9	26.9	25.8	23.9	23.8	22.5
Service	9.5	9.6	10.3	10.0	8.8	8.7	7.9
Other	3.2	2.9	3.0	2.9	0.3	0.3	0.3
Non-energy use	0.8	0.9	0.9	0.9	1.7	1.9	2.1

Source: International Energy Agency. Energy Balances of Non-OECD Countries 1999-2003, 2005 Edition.

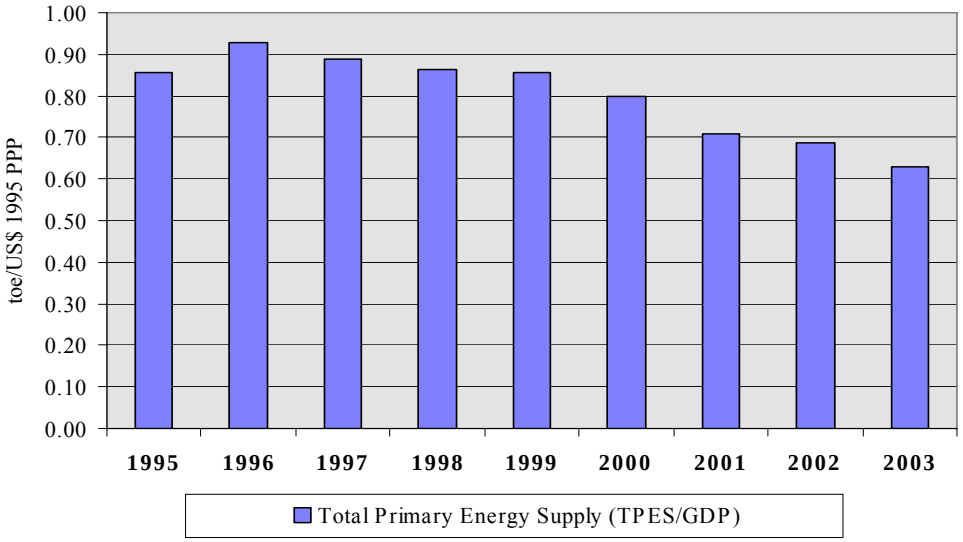
Note: [1] Total primary energy supply.

Figure 7.1: Trends in GDP and energy consumption growth



Source: International Energy Agency. Energy Balances of Non-OECD Countries 1999-2003, 2005 Edition.

Figure 7.2: Energy intensity



Source: International Energy Agency. Energy Balances of Non-OECD Countries 1999-2003, 2005 Edition.

Thermal power plants, although they account for the highest share of total installed capacities (36.4 GW), are running at very low capacity and therefore produce less electricity than nuclear plants. 96 per cent of thermal plants have reached the end of their service life, with almost half of them having exceeded their maximum service life. Only 10 per cent were built after 1980.

Currently Ukraine has four operating nuclear power plants with a combined power-generating capacity of 13.8 GW. In 2004, nuclear power plant capacities were utilized almost at full capacity (81.4%). In December 2000, Ukraine permanently closed the Chernobyl plant's 925-MW Unit 3, disabling the last remaining working reactor of the Chernobyl (Chornobyl) site. Decommissioning of the oldest facilities will start in 2010. Two new units, at the Rivne and Khmelnytskyi nuclear power plants, were built in 2004 and connected to the grid in 2005.

District heating sector

In Ukraine, as in other EECCA countries, the heat sector is dominated by district heating. In large cities, district heating systems supply as much as 65 per cent of all dwellings with heat. The total length of the pipelines is 45,000 km, and the total capacity of the network is 200,000 MW of heat. However, this infrastructure is in bad condition, with significant losses. This affects heat prices, which are increasing and becoming unaffordable for some consumers. Currently, the efficiency of the installed heat generation capacity is very low. Many boiler houses, both industrial and communal ones, do not operate at all, and the utilization factor is very low. This is due largely to a lack of maintenance and capital repairs in recent years. It is estimated that fuel consumption in the heat sector could be reduced by up to 30 per cent simply by improving equipment such as boilers, pipes, pumps and valves. Further energy savings might be obtained through appropriate design of plants and effective metering of heat consumption in the household sector.

Individual metering on heating systems is virtually non-existent and difficult to introduce in existing buildings. Effective metering of heat consumption in the household sector would not only help to save energy but also improve collection rates even after tariffs increase. Currently, because radiator installations are of the single-string type and have no valves, occupants cannot control the room temperature or heat consumption. Housing and communal service companies that manage building complexes, which may consist of several buildings with hundreds of apartments each, do not perform any heat adjustment. Individual metering would require equipment (several heat meters per apartment, reconstruction of the whole pipe system, thermostatic valves) and entail high investment costs.

District heating distribution networks in Ukraine are outdated and sometimes poorly insulated. Ukraine's 70,000 high-rise residential buildings (those with five or more stories) consume approximately 40 per cent of all of the country's heat energy resources. Heat losses during transmission (between the point of

production and the end-user) may range from 8 per cent to 25 per cent, depending on the length of the system. Switching to modern methods of laying and insulating pipe could result in fuel savings of up to 22 per cent and significantly decrease greenhouse gas (GHG) emissions.

Primary energy sources

Coal

In 2003, electricity and heat produced by burning coal represented about 30 per cent of all electricity and heat production, down from 50 per cent of 1996. The coal used in power plants, which is mostly of domestic origin, has high ash (35%) and sulphur (1.5%–2%) content, and therefore its burning generates large quantities of dust and SO_2 emissions. All power plants burning coal have electrostatic precipitators and scrubbers for capturing solid particulates (dust); however, they are not equipped with flue gas desulphurization. Fluidized bed combustion technology in power plants burning coal would make it possible to significantly reduce dust and SO_2 emissions into the atmosphere, but such technology has been installed in only one power plant in Ukraine, the Starobeshivska combined heat power plant (unit No. 4 of 200 MW), thanks to loans from the European Bank for Reconstruction and Development.

The low quality of coal also causes problems for coke-processing industries. In coke-processing plants, extraction of sulphur from air emissions is necessary when the sulphur content of the processed coal exceeds 1 per cent, which is the case for Ukrainian domestic coal. Only four of the sixteen coke-processing facilities are equipped for flue gas desulphurization (see Box 7.1). On the other hand, coke could be viewed as a rational economic option for enterprises that look for alternative energy sources after the steep rise of gas prices and the limits set on gas consumption by the government. Should this alternative develop using the existing coke-processing technology, it would have a negative impact on the environment.

Coal is the most carbon-intensive fuel, and the coke-producing and coke-burning industries share an interest in the successful application of clean coal technologies (CCT). CCT are designed to enhance both the efficiency and the environmental acceptability of coal extraction, preparation and use. CCT provide a substantial abatement of polluting emissions together with a significant increase in efficiency. However, the introduction of such technologies requires support, as they require large capital investments and have a long payback period (although their operating costs are lower than those of other technologies). Ukraine has huge coal resources and a well-developed coal-mining industry (see Chapter 8). The closure of coal mines would deprive the country of an important domestic source of energy and cause social problems for workers. This is one of the reasons why CCT could be preferred to other electricity supply options. Their implementation could be made possible through measures to promote investment in this sector. For instance, CCT would be considered joint implementation projects under the Kyoto Protocol, as they increase the efficiency of power production and therefore reduce the demand for fuel (in this case coal) to produce the equivalent amount of energy and consequently lower GHG emissions. (See Chapter 4 for information on the implementation of the Kyoto Protocol.)

Box 7.1: The Avdiyivka coke-processing facility

The Avdiyivka coke-processing plant (ACPP) is one of Ukraine's largest fully integrated mills and is based in Donetsk oblast. Its production mix ranges from blast furnace coke to of high-quality coal oils, and its capacity in 2004 was 4.8 million tons of coke products. 75 per cent of the production is from dry coke and the rest from wet coke. ACPP also supplies heat, water, steam and power to the city of Avdiyivka.

There are 13 basic units on the ACPP premises: 2 coal-preparing units that prepare coal for further processing (coal is extracted from a single coal-mining plant whose capacity is 6 million tons), four coke-processing units with a capacity of 6.4 million tons of coke, units that extract chemical compounds from coke gas (tars, benzene, ammonia, hydrogen sulphide), a wastewater treatment unit and other units that process chemical products recovered from coke gas. As units recovering chemical products from coke gas and other units processing coke generate wastewater that contains phenol compounds and other compounds, a wastewater treatment unit, with a biological step, is installed on the premises of ACPP. The quality of wastewater discharges is continuously monitored by an accredited environmental laboratory and does not exceed established norms**.**

ACPP is currently implementing advanced technology designed by Hal dor Topsoe A/S to remove hydrogen sulphide from coke gas in order to produce sulphuric acid. The cleaned coke gas contains 0.5 g/m^3 of hydrogen sulphide and meets the most stringent international requirements for air emissions.

Oil refining

Ukraine has six crude oil refineries with a combined throughput capacity of approximately 1 million barrels per day. However, Ukraine's refineries are operating significantly below capacity. Until recently, they did not even receive enough crude oil supplies to supply the country's domestic petroleum product demand. To secure sufficient crude oil supplies for its refineries, Ukraine has offered oil exporters in Russia and Kazakhstan a stake in the country's refineries. Success in privatizing refineries enabled the country to secure additional oil supplies to meet domestic demand, as well as to attract funds for necessary renovation work and boost utilization rates at its refineries. The rate of utilization of refineries increased from 20 per cent in 1997 to 41.5 percent in 2004. Currently the quality of the fuels refined in Ukraine does not meet the requirements set since 2005 to use low-sulphur heavy fuel oil (HFO) and diesel to satisfy EU environmental norms. The average sulphur content in HFO produced in Ukraine is 3.5 per cent; for diesel fuel the figure is up to 0.2 per cent. To renovate the oil refineries by installing desulphurization equipment would cost up to US$ 500 million per refinery. Only two privatized refineries (Kremenchuk and Lysychansk) are able to produce such high-quality oil products, since they have already been renovated. The Odesa refinery, owned by the Russian oil giant Lukoil, has been closed since July 2005 for large-scale reconstruction, involving installation of a catalytic cracking complex and power generating facilities. The reconstruction is estimated to cost over US$ 300 million and is expected to last until 2009. The remaining three state-owned oil refineries, which produce 23 per cent of Ukraine's oil products, have only started preparations for the necessary renovation at the end of 2005. Renovation would include installation of desulphurization equipment to produce gasoline and diesel fuel in compliance with Euro 2 and higher standards. This to a large extent explains why the implementation of the Euro 2 standards for vehicles has been postponed for years, which results in a high level of pollution by the transport sector (see Chapter 9). Moreover, the use of high-sulphur HFO to produce electricity and heat results in the release of large amounts of SO_2 into the atmosphere, as Ukrainian power plants are not equipped for flue gas desulphurization.

Renewable energy

Ukraine today has very few renewable energy sources (RES). In 1997, RES amounted to 0.1 per cent of the TPES, but as a result of the Government policy of promoting the use of RES, and of investment and technical assistance projects undertaken by various international donors, by 2006 RES reaches about 3% of the TPES. In that year the main RES for electricity production were wind turbines (installed capacity of 200 MW) and 63 small hydropower plants (total installed capacity of 105 MW). Ukraine intends to establish wind power as a significant source of electricity generation by 2020 (see Box 7.2).

Box 7.2: Wind energy projects

The industrial Donetsk Oblast is the largest power-consuming area in Ukraine. The oblast's energy sector consists of thermal power plants, which operate with coal of low thermal value. The Donetsk Oblast State Administration, jointly with the Windenergo company, is developing a programme for replacing thermal power with wind power to reduce GHG emissions and improve local air quality. The programme envisages that 20–30 per cent of the oblast's electricity production will come from wind turbines by 2020. For example, there are plans to replace one unit at the Vuhlehirska thermal power plant with a 500-MW wind power plant. With money allocated from the state budget, 21.3 MW of wind turbine capacity was commissioned on the shore of the Sea of Azov. The construction of other facilities is hampered by the shortage of financing from the state budget.

Wind energy projects could be developed more efficiently by using the Kyoto Protocol's flexible mechanisms or by attracting foreign investors by implementing feed-in tariffs or fixed increased electricity purchase prices for electricity produced from RES. The fate of wind energy projects depends on the adoption of the draft law on "green tariffs" for renewable electricity, which has been before the Parliament since March 2005. Without this law, wind energy projects are not profitable for private investors in Ukraine.

There are attempts to considerably increase wind energy potential in Crimea, which is the most favourable site for wind energy projects. The Kiev-based Ukrainian company Nova-Eco Ltd. plans to construct a 300-MW wind power plant in Crimea. The project has been offered to Austria's CDM/JI programme, the World Bank, the European Carbon Fund, J-Power, NEFCO and some other buyers and has received positive feedback from potential investors. Nova-Eco plans to install a series of 2-3 MW turbines. A company to supply the turbines has not yet been chosen, and Nova-Eco is currently considering a number of offers. Local wind power equipment producer Windenergo will be contracted to build the turbine towers, while the Swiss company ABB will provide the wiring and grid connections. The overall project investment is estimated at Euro 354 million. The implementation of this project depends on the ability to develop it within the framework of the Kyoto Protocol and register it as a joint implementation project (See Chapter 4).

Ukraine is also starting biofuel processing activities. According to EU requirements, the consumption of biofuels and other renewable fuels in EC members' consumption structure is supposed to reach 2 per centby the end of 2005 and 5.7 per cent by the end of 2010 (for a total of 520,000 tons of biofuel). The Concept (Outline) of Programme for Development of Diesel Biofuel Production until 2010 was approved in December 2005 (Cabinet of Ministers Resolution No. 576). Its goal is to provide the agriculture and transport sectors with domestically produced biofuel. Already the Ukrainian company KMT, based in Vinnytsia Oblast, is producing rapeseed oil and exporting it to European biodiesel producers. KMT is planning to build a biodiesel production plant together with foreign investors. Until recently, the use of biodiesel in Ukraine had not been encouraged either by environmental standards or by economic incentives. Certain economic and financial incentives for production and use of gasoline mix based on bio-ethanol were introduced into Ukrainian legislation in February 2006.

7.2 Environmental impact from energy production

Air pollution

In 2004, total emissions into atmosphere from stationary pollution sources amounted to 4.2 milliontons. The energy sector was responsible for 1.8 million tons, or 43 of the total, with SO_2, NO_x and dust emissions remaining quite stable since 1998 (Figure 7.3). In 1996, Ukraine adopted the National Energy Programme until 2010, designed to rehabilitate working thermal power stations to allow them to continue operating for the next 25 years. As ways to reach the objectives, the programme's mandate specified technological improvements, use of renewable energy sources and modernization of the power plants, including making them more environmentally friendly. The programme also specified that combined cycle-gas turbine equipment – as well as most of the auxiliary equipment – needed to be improved to reach acceptable safety levels. Good-quality coal was to be used to reduce environmental damage. However, many of these reconstruction and modification projects have been seriously delayed because of the shortage of state budget financing, unfavourable legislation, and the lack of private investment.

In 2003, GHG emissions in Ukraine amounted to 527 Mt of CO_2, or about 2 per cent of the world total. GHG emissions from fuel combustion were 429 Mt (81% of total GHG emissions) in 2003, marking a slight (2%) decrease compared to the 439 Mt of 1997. GHG emissions from energy production decreased from 296 Mt in 1990 to 150 Mt in 1997 and 103 Mt in 2003[2]. As an Annex I country under the United Nations Framework Convention on Climate Change (UNFCCC) and a signatory to the Kyoto Protocol in 1999, Ukraine has agreed to stabilize its GHG emissions at 1990 levels by 2008–2012. Ukraine's current emissions are more than 30 per cent below 1990 levels, and the country is eligible for joint implementation under the Kyoto Protocol and could benefit from support from industrialized countries. However, it needs to move swiftly to put all necessary mechanisms in place if it wants to consolidate its comparative advantage before joint implementation opens up to developing countries (see Chapter 4).

Water pollution

In the energy sector (thermal and nuclear power stations), water is mainly used for cooling purposes. The total consumption of water for cooling purposes was about 3 billion cubic metres in 2004. For average annual electricity production of 172 billion kWh in 2004, the quantity of wastewater discharged was 208 million cubic metres, of which about 90 per cent was not purified. (These data do not include cooling water discharges.) There are no statistical data on the corresponding loads of pollutants contained in these waters, although usually in similar cases these loads are insignificant, the pollution being essentially thermal.

Solid waste

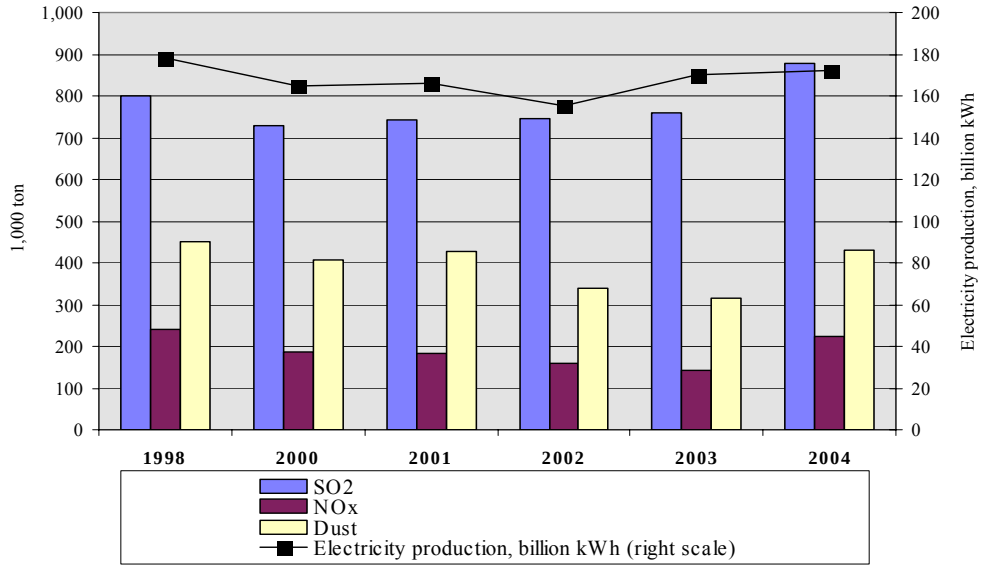
Toxic waste from the energy sector represented 15.9 per cent of overall generated hazardous waste in 2004. The main toxic waste from the energy sector and TPES are lead, nickel and oil products. There was a stabilization of toxic waste production in the energy sector during the period 2001–2004 (see Figure 7.4). The ash accumulated from coal burning at thermal power plants is disposed of in ash storage sites on the premises. The amount of ash accumulated directly on the premises increased from 1997 to 2003, after which there was a downward trend. The outdoor accumulation of ash on the site of enterprises leads to run-off in rainy weather because sufficient precautionary measures are not taken. Enterprises report annually to oblast authorities on the waste they generate by filling the appropriate forms on waste and on hazardous waste. Based on these reports, taxes are calculated and collected from enterprises (see Chapter 5).

[2] National Report on GHG inventory of Ukraine, Ministry of Environmental Protection of Ukraine, 2003

Box 7.3: The Trypilska power plant

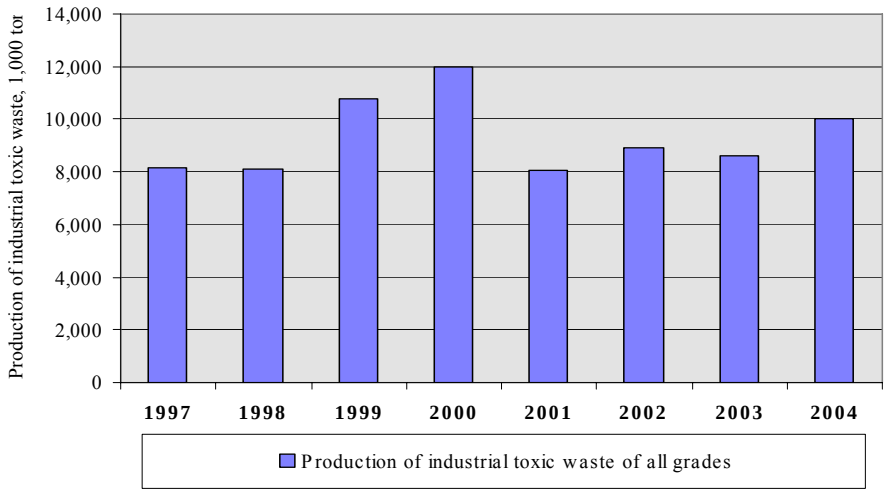
The biggest polluting source of energy production is the 1,740-MW **Trypilska** power plant, which is situated in Obukhiv rayon of Kyiv Oblast. This power plant is on the special list of the enterprises that are the most dangerous atmospheric pollution sources and are checked by the environmental inspectorate every year on an obligatory basis. In 2004, this thermal power plant emitted 131,000 tons of pollutants into the atmosphere, or about 8 per cent of Ukraine's total emissions from energy-generating facilities. The plant does not have flue gas desulphurization equipment and burns about 2.5 million toe of coal, 1.6 million toe of natural gas and 0.5 million toe of high-sulphur HFO per year. In 2004 the annual emissions of SO_2 from this plant exceeded 10 per cent of annual SO_2 emissions from the energy-generating sector, and the dust emissions were more than 8 per cent of the sector's total dust emissions. Since 1996 the plant has implemented several pollution abatement measures and has decreased dust emissions by 6,000 tons, SO_2 emissions by 8,500 tons and NO_x emissions by 20,000 tons annually. These measures included reconstructing the electrostatic precipitators (which resulted in an increase of up to 96% in the efficiency of dust capture), installing monitoring equipment to optimize combustion process parameters, refurbishing burners and installing low-NO_x burners. Despite being such a big pollution source, the **Trypilska** power plant does not exceed the current maximum allowable concentration (MAC) of pollutants in ambient air, mainly because of its high stacks (two stacks of 180 m each), which widely disperse the emissions. However, this situation will change after the new emissions standards on air pollutants from stationary sources were approved by the MEP Order No. 309 of 27 June 2006 and came into force in August 2006. The power plant will have to comply with the new standards.

Figure 7.3: Emissions of SO_2, NO_x and dust from power plants and electricity production



Source: Ministry of Environmental Protection, 2005.

Figure 7.4: Production of toxic industrial waste in the energy sector



Source: State Committee of Statistics. Environment of Ukraine, 2004.

Nuclear safety

Nuclear safety is an especially sensitive environmental issue in Ukraine since the Chernobyl disaster. Special conditions have been established to allow the functioning of the Chernobyl nuclear power plant's energy unit no. 3 for a certain period of time. Although the Chernobyl nuclear power plant was shut down in 2001, the problem of radioactive waste disposal remains, and the radioactive materials have still not been removed.

In general, nuclear and radiation safety levels in all of Ukraine's nuclear power plants are acceptable, and Ukraine complies with the provisions of the Convention on Nuclear Safety. To reach and maintain the necessary level of safety, a series of technical and organizational measures have been applied at the nuclear power plants. However, currently at all Ukrainian nuclear power plants, due to a shortage of spare parts, repairs of equipment are carried out by rearranging the parts of several operable elements or repairing broken elements (by welding, fusing, etc.), which causes recurring equipment breakdowns.

7.3 Implementation and enforcement of policies to mitigate environmental impacts

Integration of environmental objectives into energy policies and strategies

The 1998 *Main Directions of the National Policy of Ukraine for Environment Protection, Natural Resource Use and Environmental Safety* is still the main environmental policy document regulating environmental impact reduction in the energy sector. Other important supranational policy documents, such as the Environment Strategy for countries of Eastern Europe, Caucasus and Central Asia (EECCA) and the EU-Ukraine Action Plan for 2005–2007, give the following broad directions for energy policies:

- Incorporate energy efficiency (EE) objectives into strategies for climate change mitigation;
- Integrate environmental policies and EE into sectoral programmes;
- Eliminate energy subsidies;
- Mobilize investments for renewable energy sources (RES) projects;
- Use the Kyoto flexible mechanisms for EE and RES projects; and
- Develop modern legislation and economic mechanisms to promote RES and EE.

The EU-Ukraine Action Plan also establishes targets for convergence with EU energy policy, convergence towards the principles governing EU electricity and gas markets, progress in infrastructure development for energy supply, progress towards EE and RES, and cooperation on nuclear safety. However, there are significant delays in implementing some of the related measures, in particular there has been little progress in the adoption of energy policies more in harmony with EU energy policy objectives.

The main policy document until recently was the National Energy Programme until 2010, which was adopted in 1996. To make the country less dependent on energy imports, the President issued a Decree on measures to increase energy security in Ukraine (21 October 2005), and called for the elaboration of an Energy Strategy covering the period until 2030. The new Energy Strategy up to 2030 was approved in March 2006 by the Cabinet of Ministers Resolution No. 145-p. Its main objectives are:

- Increasing the level of the country's energy security;
- Reducing energy intensity in industrial production;
- Integrating Unified Energy System of Ukraine into the European one and increasing electricity exports;
- Strengthening Ukraine's position as a transit country for oil and natural gas flows;
- Creating conditions to reliably meet the demand for energy;
- Reducing environmental impact from the fuel and energy sector and ensuring population safety.

The Strategy focuses on traditional energy sectors, i.e. gas, oil, nuclear and coal. It briefly mentions renewable energies, and does not cover new energy technologies. It proposes the increasing demand in heat and electricity to be met by constructing 22 new nuclear reactors (additional 18.5 GW). Financing for nuclear energy development is anticipated in the amount of Hrv 230 billion, while financing for RES development – only in the amount of Hrv 7 billion. Ultimately, it aims at reducing country's energy dependence, in particular on natural gas import. The Strategy also addresses unsustainable energy pricing and debt issues. The goal of increasing the share of alternative energy sources in the fuel and energy balance to 19 per cent is stated in the Strategy, however it is not clear how it could be achieved. The Energy Strategy in its current format is being

strongly criticized by environmental experts, NGOs and other stakeholders for paying insufficient attention to measures for ensuring energy saving and energy efficiency.

Ukraine's Government wants to open its energy sector to Western investments in order to secure its energy supply, improve energy efficiency and increase extraction from domestic hydrocarbon reserves. In spite of this, recently the Parliament registered draft legislation that limits foreign investment in offshore reserves by requiring that 60 per cent of offshore ventures belong to state-controlled companies. The Fuel and Energy Committee of the Parliament has endorsed this legislation, which might hamper efforts to attract foreign direct investment in Ukraine's energy production.

Policies to enhance energy efficiency and the use of renewable energy sources

The Government has taken several concrete actions to promote lower energy consumption and greater energy efficiency. It established the State Committee on Energy Saving in 1995. The Committee implemented the National Comprehensive Energy Saving Programme (NCESP) and the National Support Programme for the Development of Unconventional and Renewable Sources of Energy (NSPDURSE), which were approved by the Cabinet of Ministers in 1997. These programmes are being updated to take into account the measures for increasing energy security that were approved in a recent Decree of the President (No. 1863, December 2005). After the rise in gas prices in early 2006, a new programme to reduce energy consumption has been adopted. The programme foresees a 30 per cent gas consumption reduction by 2030.

Energy security is a crucial issue for Ukraine. The recent (January 2006) increase in the prices of Russian natural gas affects the steel and chemicals sectors, which provide over 30 per cent of export revenues and require vast supplies of gas. The Government has expressed concern regarding the overly high consumption of gas, in particular by the steel industry. It wants Ukraine to strive to reach self-sufficiency, diversify energy production sources (including oil, gas, uranium ore, coal, and renewable resources) and cooperate with leading companies to start projects to rehabilitate old oil fields. Oil pipelines also need renovation. However, decreasing the energy intensity of the GDP and improving energy efficiency are among the main factors that will ensure a secure energy supply for Ukraine.

The key objectives of implementing energy efficiency and energy-saving policies are to reduce overall consumption of energy resources (primarily imports such as gas, crude oil and oil products); enhance the competitiveness of domestic economic sectors in domestic and international markets; and reduce adverse environmental impacts. The NCESP established clear energy-saving targets for the whole country, for every region and for economic sectors. The State Committee on Energy Saving (until late 2005) regulated and monitored private and state-owned enterprises. The measures and the associated financing were developed for the implementation of set targets. The NSPDURSE establishes targets for RES and measures for their promotion. The use of RES in Ukraine is also one of the main goals of the 1996 National Energy Programme and is mentioned in the 2006 National Energy Strategy.

The State Committee on Energy Saving has introduced a system of reporting by the enterprises to monitor their implementation of energy-saving programmes. The oblast energy authorities collect reports from the enterprises and submit consolidated reports for their oblast. Analysis of the results of implementing the NCESP has shown that the total energy savings amounted to 7.88 Mtoe in 2004, and that the total for 2001–2004 was as much as 19.9 Mtoe. Thus, the level of implementation of targets established by NCESP is over 90 per cent and consumption reduced by 10 per cent. Such results can be largely attributed to low-cost and institutional measures.

Reconciling economic and environmental interests by means of economic incentives is essential for Ukraine. In 2006, the National Agency for Efficient Use of Energy Resources has developed a draft Law on Energy Efficiency aiming at encouraging energy efficiency in Ukrainian enterprises. Enterprises that would improve their energy efficiency would benefit of tax rebates.

Restructuring and deregulation

Only the oil sector is liberalized in Ukraine. There have been attempts since 1997 to liberalize the natural gas, coal and power sectors, but they have failed. The electricity market has not been liberalized, though the electricity sector was restructured in March 1997. The combination of international pressure and domestic political problems has led to the "Ukrainian solution" – a reorganized but not sufficiently liberalized or privatized sector. There were plans for all 27 oblast electricity distribution companies to be privatized in 2003–2004 in an effort

to encourage investment. However, only six Ukrainian distribution companies have been fully privatized.

Since 1997, the National Energy Regulatory Commission (NERC) has facilitated a centralized market for wholesale electricity. Power producers sell into a common market operated by Energorynok, and a group of 27 distribution companies distribute the power to the end users. The number of non-payments and barter settlements, which were endemic at the time of the first EPR, has decreased sharply, and cash payments currently account for almost 100 per cent of the value of transactions. NERC is a national executive authority body with a special status. It is a formally independent body, is not a part of any Ministry or State Committee and reports directly to the President and the Cabinet of Ministers. However, the actual independence of this regulatory body is questionable, which does not create appropriate conditions for investments.

The state-controlled generating companies are obliged to purchase domestic coal at suggested prices (which are about 20 per cent above the market price), and the Government controls the prices and production volumes of its generators. This makes them less competitive than private generating companies. The Government is also taking measures to support the development of nuclear energy and its financing, which will result in a further reduction of fossil-fueled electricity generation and a further weakening of state-controlled generating companies.

Legal framework

Ukraine has a complicated legal framework for the energy sector, consisting of hundreds of laws, by-laws, regulations and orders. This also applies to energy efficiency and energy saving. The Law on Energy Saving of 1994 provides for a system of institutional and regulatory measures and incentives to encourage fuel and energy resource savings. The National Comprehensive Energy Saving Programme (NCESP) was approved in 1997 (Cabinet of Ministers Resolution No. 148), as was the National Support Programme for the Development of Unconventional and Renewable Sources of Energy (NSPDURSE) (Cabinet of Ministers Resolution No. 1505). In view of the difficult economic situation during the NCESP's implementation, amendments to it were made in 1999 and additional measures to introduce energy-saving technologies on a mass scale were adopted in 2000 (Urgent Actions to Implement the Ukrainian National Comprehensive Energy Saving Programme, Cabinet of Ministers Resolution No. 1040). Most of the provisions of the Law on Energy Saving have now been implemented. The regulatory basis of energy saving includes the following:

- Standardization and norms for setting the unit cost of energy resources for energy-intensive industries (Cabinet of Ministers Resolution No. 786 of 1997);
- Economic sanctions for companies exceeding unit cost allowances established by the state standard system and administrative sanctions for non-compliance with energy-saving regulations (Cabinet of Ministers Resolution No. 1071 of 2000);
- Definition of the activities of the Government Energy Saving Inspectorate (Cabinet of Ministers Resolution No. 1039 of 2000) and of sanctions for non-compliance to achieve rational uses of fuel and energy resources (Cabinet of Ministers Resolution No. 1071 of 2000). The Code of Administrative Violations, Article 255, now authorizes the State Energy Saving Inspectorate officers to document administrative infractions;
- Compulsory expert review of energy saving at the design stage of new construction projects (Cabinet of Ministers Resolution No. 1094 of 1998); failure to comply with the review requirement entails administrative sanctions.

There are more than 100 legal acts and regulations relating to energy saving and promoting the use of RES. The four main ones are the Law on Alternative Liquid and Gaseous Fuels (2000); the Law on Wind Energy (2000); the Law on Alternative Energy Sources (2003); and the Law on Combined Heat and Power Production (2005).

Institutional and regulatory framework

This is another sector where frequent changes in the institutional structure and legislation are weakening human capacities and hampering the development and implementation of solid long-term comprehensive energy and environmental policies. Energy policy is developed and implemented by numerous agencies and entities, including the Ministry of Economy, the Ministry of Fuel and Energy, the Agency for Efficient Energy Use, the National Energy Regulatory Commission (NERC), the Ministry of Construction, Architecture and Housing and Communal Services and the national and government-run energy companies, including Naftogaz of Ukraine, Energoatom and National Energy Company of Ukraine. The energy-saving

inspectorate carries out inspections of energy saving at enterprises and registers so-called "energy passports".

In 2005, the State Committee on Energy Saving was abolished (Presidential Decree No. 678). Even though this executive body was controlling and monitoring energy savings essentially through administrative command methods instead of applying economic incentives, it has achieved some good results. In the end of 2005, the National Agency for Efficient Use of Energy Resources was established (Decree of the President No. 1900, 31 December 2005) as a central executive authority to run overall energy policy including energy use, energy conservation and development of non-conventional and alternative energy sources.

The large number of regulatory bodies, the frequent changes in the institutional structure, the jungle of laws, the lack of political will and the accumulation of debts are all major obstacles preventing the successful restructuring and modernization of the energy sector so that it can attract investments and implementing long-term market-oriented energy policies to reduce the sector's environmental impact. Since 1997, the regulatory bodies of the energy sector have been merged and split several times. The Ministry of Fuel and Energy was created in 2000 out of four bodies – the State Department of Oil and Gas, the Ministry of Coal, the Ministry of Energy and the State Committee for Nuclear Energy. In 2005, the Ministry of Coal was separated again from the Ministry of Fuel and Energy.

Environmental standards

The Government is currently considering a thorough reform of its environmental permitting system. The lead role in the development of a new system has been assumed by the Air Protection Department of the Ministry of Environmental Protection (MEP). A new BAT-oriented approach to permitting on pollutant emissions into the air was declared in the Law on Air Protection (2001), followed by a number of by-laws (implementing Resolutions by the Cabinet of Ministers). The MEP has prepared a draft law on approval of maximum allowable concentrations of pollutants in flue gases for stationary combustion sources. The standards will be gradually strengthened to meet EU requirements implemented under the large combustion plants (LCP) and sulphur Directives. According to the CoM Resolution on Continued monitoring of emissions of pollutants into the atmosphere from enterprises, continued monitoring should be established for all operating enterprises which emit more than 75 kg/year of NO_x and SO_2 and for thermal power plants which emit more than 150 kg/year of NO_x and/or more than 10 kg/year of solid particulates. For new combustion sources the standards required by the LCP Directive should be applied. These are all positive steps.

Environmental standards for fuels will be much harder to implement. There are no sulphur or ash content requirements for coal in Ukraine. The coal used in thermal power plants has an ash content of up to 35 per cent. The heavy fuel oil (HFO) used in Ukraine has average sulphur content of 3.5 per cent, and diesel fuel has sulphur content of up to 0.2 per cent. Since 2005, Ukrainian regulations have required that the sulphur content in HFO not exceed 2 per cent; however, implementation of this standard is very difficult because only two out of six refineries are able to produce oil products with lower sulphur content.

Implementation and enforcement issues such as permitting, environmental impact assessment and monitoring are covered in more detail in Chapter 2.

Energy pricing

In Ukraine the prices of crude oil and petroleum products are largely governed by market-driven mechanisms. Coal prices are only partly deregulated. Coal prices for households are established by the oblast administrations.

In district heating, which plays a leading role in Ukrainian heat supply, there is a monopoly of state-owned utility companies and heat suppliers. Heat prices are regulated by local government authorities. These authorities set prices for industrial users, state and public institutions and households. Even though end-user prices have increased in recent years, they are still far below cost-recovery levels. For heat, the residential price constitutes an estimated 17 per cent of long-run marginal costs, according to a study by the European Bank for Reconstruction and Development in 2002, whereas the industrial price constitutes 27 per cent. For electricity, the residential price represents an estimated 25 per cent of long-run marginal costs, whereas the industrial price represents a little less than 29 per cent. There is immense cross-subsidization in the heat and power sectors in favour of public institutions, such as hospitals, schools and kindergartens, and public utilities, such as water utilities. Also, non-payers are not disconnected.

The situation with gas prices is similar, with industrial prices higher than those applied to the

residential sector and to government institutions (See Chapter 5, section on energy). To prevent social problems and because coal is the only abundant domestic energy resource, the coal industry is also heavily subsidized.

Economic instruments

Ukraine has largely adopted the "polluter pays" principle, although pollution taxes for atmospheric emissions are significantly lower than in EU countries. Because these taxes are low, they do not provide incentives for energy saving or pollution reduction. (For more information on pollution taxes see Chapter 5.)

There are some economic incentives for developing the use of renewable energy. A regulation adopted in 2000 increased the average electricity tariff by 0.75 per cent, with the increase earmarked to finance research and development and the manufacturing of wind power generators. Draft legislation on "green tariffs" has been stalled in the Parliament since March 2005, reportedly because of opposition from the pro-nuclear lobby. The latest version of the draft legislation on "green tariffs" has been submitted to the Parliament in August 2006.

In 2000, the Committee on Energy Saving introduced some economic incentives for energy saving. A system of fines was created and adopted in 1997. The Committee set norms for energy consumption per unit of production and issued energy passports for enterprises with annual energy consumption exceeding 1,000 toe. The Energy Saving Inspectorate carries out inspections and imposes fines when these norms are violated. The fines consist in charging double price for the energy amount that exceeds the norms. The revenues from fines go to the State budget. Activities relating to government control of energy savings and energy efficiency actions and the NCESP's development and oversight are funded from the State budget.

There were plans to use a mechanism for government support/funding of energy efficiency measures through a dedicated extra-budgetary energy saving fund that would be supported through a special energy consumption tax. However, the economic crisis prevented the creation of such a fund, and before 2001 no dedicated centralized funds were available to provide government support to specific energy efficiency activities. At the same time, energy efficiency plans were implemented in individual economic sectors, predominantly through low-cost measures. In 2001, a US$ 5 million special budget allocation was made to support the implementation of specific energy efficiency priorities. Starting in 2001, more funds were made available to implement energy efficiency measures established by NCESP: in 2001, US$ 100 million was spent, and in 2004 more than US$ 262 million (US$ 14 million from the State budget, US$ 52 million from local budgets, US$ 154 million from companies and US$ 40 million from other sources, mainly loans).

7.4 Conclusions and recommendations

Key problems of Ukraine's energy sector are the overly high energy intensity and the ageing technology associated with energy production. The resulting high levels of CO_2, SO_2 and NO_x emissions per unit of GDP have direct adverse effects on health and the quality of the environment. Slow restructuring of energy-intensive industries, old facilities and equipment, inadequate reforms and the slow privatization process are all factors contributing to the high energy intensity. Excessively low energy prices and extensive cross-subsidization have reduced the incentive effect of economic instruments. In turn, low energy prices and non-payments have put energy companies in huge debt and have impeded their modernization and the introduction of better technology.

The most pressing energy-related priority in Ukraine is to improve energy efficiency. Currently there are no economic measures for promoting energy saving or increasing energy efficiency, which are carried out through state regulation. At the same time, the use of renewable energy sources could be promoted – for instance, through the introduction of "green tariffs". Tax reductions should be granted to enterprises introducing energy-saving measures or using renewable energy sources.

Recommendation 7.1:

- *The Ministry of Economy, in collaboration with the Ministry of Finance, the Ministry of Fuel and Energy and the National Agency for Efficient Use of Energy Resources, should develop a policy of energy pricing that reflects the actual cost and signals to both companies and households that higher energy prices are unavoidable. A credible schedule should be devised for gradually increasing prices and reducing cross-subsidization.*
- *The Cabinet of Ministers should ensure implementation of energy saving programmes and foster a national information campaign to raise the awareness of the public and business*

sector regarding the importance and benefits of energy saving.

National Energy Regulatory Commission (NERC), the national regulator of prices in the energy sector, is a formally independent governmental body that reports directly to the President and the Cabinet of Ministers. However, the actual independence of this regulatory body is questionable, which could lead NERC to make biased decisions and choose options harmful to environment. For instance, it might encourage the burning of domestic coal without introducing appropriate technology for preventing air pollution. Moreover, NERC in its current form cannot implement any reform of the electricity sector or implement market principles in the power sector. The current situation has a negative impact on the environment because of huge losses and overcapacity in the system and a lack of investments into rehabilitating and modernizing the power sector.

Recommendation 7.2:
The Cabinet of Ministers should complete the electricity sector reform, ensure the independence of National Energy Regulatory Commission, and create favourable conditions for rehabilitating the power sector and reducing its negative impact on the environment.

Economic incentives for promoting environmental compliance and energy saving are weak and do not send a strong enough signal to induce customers to modify their behavior. Cross-subsidization of households' and public institutions' energy consumption by industrial customers does not encourage the former to save energy. Energy consumption in Ukraine is not yet heavily dependent on energy prices, and price elasticity is low. The recommendation of the first EPR to introduce market pricing in the energy sector and remove energy cross-subsidies has not been implemented, except through a few readjustments of the energy prices since the beginning of 2006. If cost-reflective prices are not affordable for low-income consumers, then social measures should be devised to compensate for the price increases.

Recommendation 7.3:
The Cabinet of Ministers should introduce an energy tariff reform so that prices paid by end users reflect long-run marginal costs. Social measures should be worked out to mitigate the effects of the price increase on those who cannot afford it.

Energy issues should become one of the priorities of the Ministry of Environmental Protection. An integrated approach to achieve maximum fuel savings and emissions reductions should be pursued by implementing environment-friendly policies in the energy sector. Information campaigns to raise the awareness of energy providers and the public are needed. Ukraine has ratified the Kyoto Protocol and is preparing and implementing adequate legislation. Joint implementation projects and CO_2 tradable permits can contribute to moving the energy sector in a more sustainable direction, including energy saving and an increase in the use of renewable energy sources. The Kyoto Protocol's flexible mechanisms can be used to attract investments in developing renewable energy projects (windmills, biofuels and small hydropower plants) and implementation of clean coal technologies. These technologies could contribute to decreasing Ukraine's dependence on energy imports.

Recommendation 7.4:
The Ministry of Fuel and Energy and the Ministry of Environmental Protection should continue to promote the use of renewable energy sources by setting clear targets and timeframes, encourage decentralized heat and power systems and the implementation of clean technologies, in particular clean coal technologies.

See also Recommendation 4.3 on the implementation of the Kyoto Protocol.

Chapter 8

ENVIRONMENTAL MANAGEMENT IN THE INDUSTRIAL SECTOR

8.1 Development trends in industry[1]

Overview

Industrial restructuring has been delayed by the slow pace of market reforms. The country's main challenge has been to diversify away from many of the industries that relied on government subsidies, are big environmental polluters and became even less viable after traditional export markets collapsed. Privatization and foreign investment have proceeded more slowly in Ukraine than in Central and East European (CEE) countries, and privatization methods have reportedly lacked transparency. Privatization of small enterprises is by now almost complete, but privatization of large industrial enterprises has progressed at a slower pace (at the beginning of 2006, 5,849 out of total 6,874 large enterprises in main industries have been privatized). Foreign direct investment (FDI) inflows are low, and Ukraine's business environment remains unattractive to foreign investors.

Ukraine inherited an energy-intensive industrial sector from the Soviet era. The share of heavy manufacturing industries in the economy is high (about 35%), and the shift towards services, which are less energy-intensive, is proceeding slowly. Although industrial energy use has declined, Ukraine's industry is still several times more energy-intensive than that in CEE and Western Europe. This is explained partly by relatively low energy prices and the old and obsolete industrial equipment still in use. The rapid, industry-led economic expansion of the period 2002–2004 increased the energy demand by industry.

Mining and quarrying

Extractive industries have grown moderately but steadily since 2001. In 2003, the mining industry accounted for 9 per cent of industrial production. Ukraine is the world's fifth-largest producer of iron ore (63 million tons in 2003), exporting around 15 per cent of its total output. Ukraine is also one of the largest producers of manganese, coal, titanium, graphite and kaolin. The areas with the most large-scale development of mining works are Donbas, Kryvbas, Prykarpattya and Naddnipryanshchyna.

Mining of energy-producing materials is dominated by the extraction of coal, oil and natural gas. Ukraine's proven coal reserves stood at 37.6 billion tons in 2003. The Donbas coal basin, Ukraine's most important mineral resource, is estimated to contain around half of the former Soviet Union's coal reserves. Total annual output fell sharply from 1990 to 1995, to about 80 million raw tons per year, and has not changed since then. All extracted coal is consumed domestically, roughly two thirds of it by power stations and the rest to produce coke for the metallurgy sector. Ukraine has the second-worst coalmine fatality rate in the world, with 200 fatalities in 2004 alone and over 4,000 fatalities since independence in 1991. However, on a positive note, the number of coalmine fatalities in Ukraine declined every year during the period 2000–2004. The root cause of accidents with large numbers of fatalities is the release and ignition of the high levels of methane found in the coal seams and surrounding rock strata of Ukrainian coal mines. Ineffective safety standards and obsolete equipment (over half of all mines are 50–60 years old) also contribute to accidents in the mines. There are approximately 165 coal mines (162 underground and three surface mines), of which 25 have been privatized. These 25 mines account for about 35 per cent of total coal production in the country. The coal mining industry employs about 300,000 workers. This sector, which features a large number of unprofitable mines and until recently was heavily subsidized by the Government, is in need of restructuring. The Government has already developed two programmes (in 1994 and 2001) for the coal industry sector to modernize existing mines and build new mines in order to increase the country's coal output. However, implementation of the programmes has encountered several obstacles, including the lack of financing. Currently, a new programme for the coal sector until 2030 (the first phase running from the present until 2010) has been developed according to the Concept of Coal Industry Development adopted by the Cabinet of Ministers (Resolution No.

[1] Does not include energy activities.

236 of June 2005), which has nearly the same goals as the previous programmes.

Ukraine has proven oil reserves of 1.3 billion tons. Total production of crude oil and gas condensate equalled 4.2 million tons in 2004 (an increase of 5% over the previous year). Naftogaz Ukraine, the state-owned oil and gas company, dominates oil extraction. After Ukraine privatized some of its refineries in 1999–2000, new Russian and Kazakh owners invested heavily in the refining sector. Ukraine's refineries processed 21.2 million tons of oil in 2003, a 9 per cent increase from 2002 figures. However in 2005 refineries in Ukraine processed 17.4 million tons of oil, a decrease caused by the drop in oil supplies from the Russian Federation. The vast majority of Ukraine's fuel oil output is exported. Ukraine's proven natural gas reserves amount to 6.4 trillion cubic metres. Total gas production in 2004 equalled 19 billion cubic metres, enough to meet just over one quarter of domestic consumption. The country's oil and gas output grew moderately in 2003–2004 after stagnating throughout most of the post-independence period.

Manufacturing

The manufacturing sector accounts for over 75 per cent of total industrial production and has been the driving force behind Ukraine's sustained economic growth over the past five years. Average annual growth in the sector's output surpassed 15 per cent in 2000–2004.

The economic recovery that began in Ukraine in 2000 relied heavily on low-value-added manufacturing sectors, particularly metallurgy, which accounts for around 22.1 per cent of industrial output. During this period, higher-value-added sectors (including the engineering and food sectors and light industries) also became increasingly important contributors to growth. The food-processing subsector, which has recovered strongly in recent years and is the major recipient of foreign direct investment (FDI) in the country, accounts for around 18.9 per cent of total industrial production. Machine-building, a relatively high-value-added subsector, emerged as the fastest-growing component of the manufacturing sector in 2003, accounting for about 13.4 per cent of that year's industrial output. Coke-coal production is another large subsector which has boomed in recent years (8.3% of industrial production in 2003). For the same period, the output of the chemical and petrochemical industry and light industry accounted for 7.2 per cent and 1.4 per cent of total industrial production, respectively. According to the Ministry of Industrial Policy, in 2004 Ukrainian chemical and petrochemical industry enterprises increased their production output by 14.4 per cent compared with 2003. Production output in the chemical industry grew by 11 per cent, while the manufacture of rubber items and plastics increased by 28.8 per cent. In 2004, internal consumption of chemical and petrochemical products increased by over 30 per cent compared with 2003. Exports of these products are dominated by traditional commodity groups such as non-organic chemicals (synthetic ammonia, calcinated soda, titanium dioxide), organic chemical compounds (adipic acid, acetic acid, caprolactam, chlorine vinyl) and mineral fertilizers (carbamide).

Construction materials

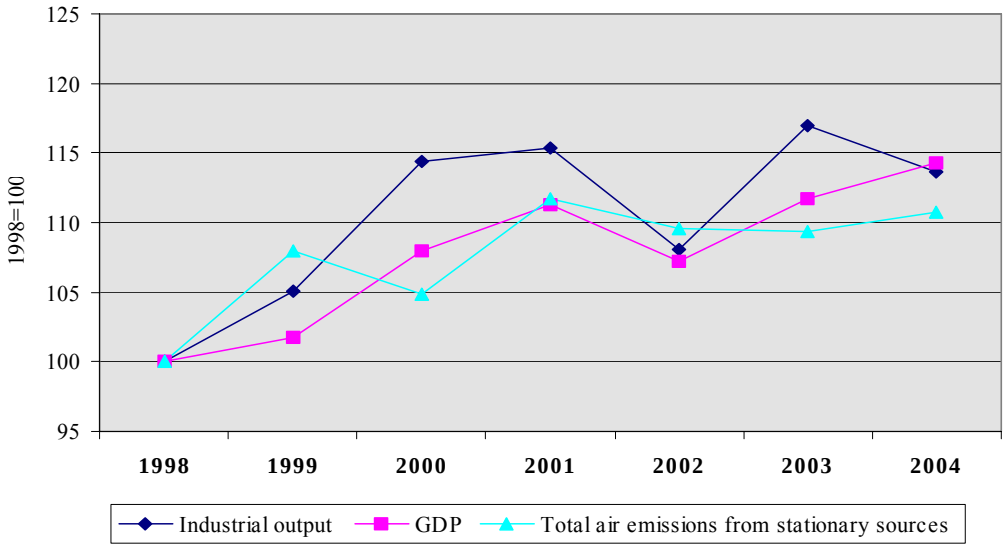
After a sharp decline in 1999, prompted by the drop in investment and economic activity brought on by the region-wide economic crisis, the construction materials sector showed signs of recovery in 2000–2001. After a weak performance in 2002, the sector grew by roughly 25 per cent in real terms in both 2003 and 2004. This upturn was primarily the result of ongoing construction and engineering works in the oil and gas sector and in railway transport systems. It also reflected increased financing (from both state and local budgets) of construction, repairs and maintenance of roads and road infrastructure. A boom in housing construction has also proved important in driving the sector's recent expansion.

8.2 Environmental pressures from industrial activities

Major industrialized zones of the country are also environmental hot spots, not only due to the past and current pollution of air, soil and surface and ground water, but also because of the risk of industrial accidents. In addition, industrial processes generate huge amounts of wastes, including hazardous wastes.

The highest environmental impact is caused by the production and processing of metals and the mining and chemical industries. The most polluted oblasts are Donetsk, Dnipropetrovsk, Zaporizhzhia and Luhansk. Mariupol and Kyiv are the country's most polluted cities.

Figure 8.1: Trends in GDP, industrial output and air emissions from stationary sources (1998 = 100)



Source: State Committee on Statistics, 2005.

Industrial air emissions

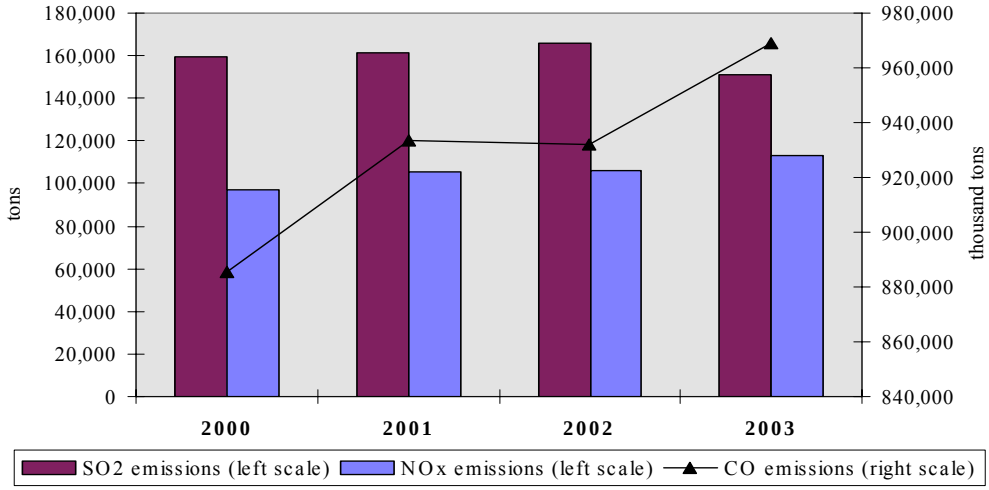
Industry is one of the main economic sectors driving air pollution in Ukraine, after the energy sector. From 1998 to 2004, air emissions from stationary sources (including energy industries) did not directly follow the increase in GDP and industrial output (see Figure 8.1). In fact, the slower than expected increase in air emissions from stationary sources can be explained by some rehabilitation of previously installed equipment for air pollution abatement mainly at large metallurgical plants (e.g. repair of electrostatic filters), although technology remains obsolete overall and has not benefited from significant modernization.

In 2004, air emissions from leading industrial sectors were distributed as follows: 62 per cent from manufacturing, 37 per cent from mining and quarrying and 1 per cent from construction materials. Compared to 2003, emissions increased in all leading industrial sectors. In contrast, emissions from more value-added subsectors, such as machine-building and electric and electronic equipment, declined in 2004.

Emissions from mining of metals, minerals and energy-producing materials totaled 991.4 thousand tons in 2004, representing an increase of almost 10 per cent over 2003. Metallurgical enterprises alone accounted for 75 per cent of all manufacturing industries emissions in 2004, with 1,210.1 thousand tons, 6 per cent more than the previous year's figure. Production of non-metallic mineral products accounted for 5 per cent of total manufacturing air emissions. This subsector had a sharp emissions increase in 2004 of about 22 per cent over 2003. The construction materials sector showed only a limited increase (2%) in its air emissions for the same period.

Industrial processes (chemical and allied products, metals processing, petroleum and related industries, other industrial processes, and waste disposal and recycling) are major sources of emissions of air pollutants such as carbon monoxide (CO), nitrogen oxides (NO_x), volatile organic compounds (VOCs), sulphur dioxide (SO_2), particulate matter less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$), lead (Pb) and other heavy metals. The incompleteness of the country's data on industrial air emissions has hampered a deeper analysis of air pollution from this sector. The available data for major air pollutants from the industry sector indicate an increase in both CO and NO_x emissions from 2000 to 2003, and an increase until 2002, followed by a decrease in 2003, in SO_2 emissions (Figure 8.2). Most SO_2 and CO emissions are from metal production and mineral products, while emissions of CO, VOCs and NO_x are mainly from the chemical and petrochemical industries.

Figure 8.2: Industrial air emissions of main pollutants, 2000–2003



Source: State Committee on Statistics, 2005.

Donetsk oblast alone accounts for about 40 per cent of total air emissions in Ukraine, followed by Dnipropetrovsk (21%) and Zaporizhzhia (6%) oblasts. The city of Mariupol, in the Donetsk oblast, has accounted for about 5 per cent of total emissions in Ukraine. This huge amount of air emissions is mainly due to the large metallurgical plants operating in the city (Azovstal and Mariupol Metallurgical Works named after Illich).

According to the national greenhouse gases (GHGs) inventory done in 2003, total CO_2 emissions from industrial processes amounted to 45,175 Gg [2], with an increase of 20 per cent from 1998 to 2003. This is mainly due to the increase in metal production. However, CO_2 emissions from industrial processes are still below their level in 1990, when they accounted for 65,817 Gg. The manufacturing and construction industries are also major sources of CO_2 emissions (due to fuel combustion), ranking just behind the energy industries. In 2003, CO_2 emissions from this source amounted to 94,322 Gg, an increase of 8 per cent over 1998 figures. CH_4 from fugitive emissions of coal mining and oil and gas extraction increased in 1998–2003 from 5,351 Gg to 7,631 Gg, mostly due to the increase in the oil and gas sector's activities. As the industrial sector increases its output, GHG emissions will rise unless significant interventions are made to restore sinks and minimize sources.

Metallurgy was responsible for the highest volume of wastewater discharges in 2004 (1.545 billion m^3), followed by the coal industry and the chemical and petrochemical subsectors (581 million m^3 and 218 million m^3, respectively). The share of insufficiently treated and untreated wastewater in total discharges is highest in the coal (89%), metallurgical (70%) and chemical and petrochemical (60%) industries. In 2004, the volume of wastewater discharges from the coal industry increased by 6.5 per cent compared to 2003. During coal mining, groundwater is pumped into settlement tanks and, in most cases, discharged without treatment into the nearest river system. Mine waters are highly mineralized and contain elevated phenols and suspended substances, with sulphates, nitrates, iron, copper, COD and BOD frequently exceeding limits. Acid mine drainage is also a major issue related to mining tailings due to the high potential of groundwater contamination by heavy metals (see the following section). When a mine is closed and pumping temporarily stops, the water table rises and causes flooding in inter-connected coal mines. Wastewater discharges by other subsectors, such as metallurgy, chemicals and petrochemicals, oil and gas, machine-building, food processing, transport equipment and construction, did not change significantly in 2004 compared to the previous year.

The amount of solid waste (industrial and household) accumulated in landfills in Ukraine is very high, totalling more than 25 billion tons. Accumulated hazardous (toxic) waste amounts to 4.5 billion tons. Total waste intensity (including industrial and household waste and excluding radioactive waste) increased from 1998 to 2000 but has declined since

[2] Gigagrams, or tons, of carbon dioxide equivalent (CO_2-e).

Box 8.1: Coal mine methane as an environmental and safety issue: The case of the Zasyadko mine in Donetsk Oblast

Globally, Ukraine is the fifth-largest emitter of coal mine methane (CMM) emissions in absolute terms. Increasing recovery and use of CMM would have significant benefits for Ukraine, including reduced greenhouse gas (GHG) emissions, improved mine safety and mine productivity, energy independence and partial substitution of dirtier fuels with a cleaner-burning one. Underground coal seams and surrounding rock strata contain large volumes of methane that are estimated to be in excess of 11 trillion cubic metres. During the process of mining, this gas is released to the mine workings and to the atmosphere. Methane represents a serious safety problem for mining, as well as being a global environmental issue. Many fatalities during coal mining are the result of explosions caused by the ignition of explosive concentrations of methane. Also, methane is a potent greenhouse gas, 21 times stronger than carbon dioxide. Currently, of all CMM released by Ukrainian coal mines, approximately 15 per cent is extracted through degasification systems, and only half of this amount is utilized. The reduction in emissions could also financially benefit the country through carbon credits trade.

The Zasyadko mine, located in the city of Donetsk, is one of the country's most profitable coal mines. It was opened in 1958 and currently employs about 10,300 people. Coking coal reserves are about 125 million tons and the mine's methane deposits contain about 18.9 billion cubic metres of gas. Annual coal production is about 4 million tons, while methane released totals 300 million cubic metres a year. Since 2001, the mine has operated its own coal methane degassing, collection and removal programme, processing about 150 million cubic metres a year. The mine is also piloting limited methane utilization (about 4 million m^3/year) through boiler co-firing with coal and use of methane as truck fuel.

In April 2005, the Zasyadko mine, together with Austrian partners, developed a joint implementation (JI) project for recovery and utilization of coal methane through power generation in the framework of the implementation of the Kyoto Protocol. According to this project, CMM drained and recovered from operating and abandoned mine works and mine ventilation works, as well as methane produced by surface wells at the Zasyadko mine, will be used to (i) produce electricity for mine works, thus reducing and avoiding methane emissions in the atmosphere; (ii) replace coal currently used to produce heat at a higher efficiency than the current coal-fired boiler by installing heat recovery systems at gas-fired power generators to produce heat for the mine and external consumers, including municipal boilers; and (iii) produce, by refining the mine-gas mixture, market-quality natural gas for domestic, commercial and industrial use, including as truck fuel. The utilization of around 150 million m^3 of CMM captured annually from mining activities at Zasyadko will result in the generation of 340 GWh of electricity and 295 Gcal of heat, 100 million m^3 of purified gas for household consumption and approximately 10 million m^3 of gas to be used as automotive fuel annually.

The expected operational lifetime of the project is 15 years, from 2005 until 2020. Over the crediting period 2008–2012, an emissions reduction of 11.9 million tons of CO_2 equivalent is expected.

then (Figure 8.3). However, hazardous waste intensity has decreased sharply since the first EPR, indicating improved management of such wastes (Figure 8.3). Recovery of all wastes increased from 81.3 million tons in 1998 to 125.4 million tons in 2004. Hazardous waste recovery has also improved, increasing by 9.3 per cent since 1998.

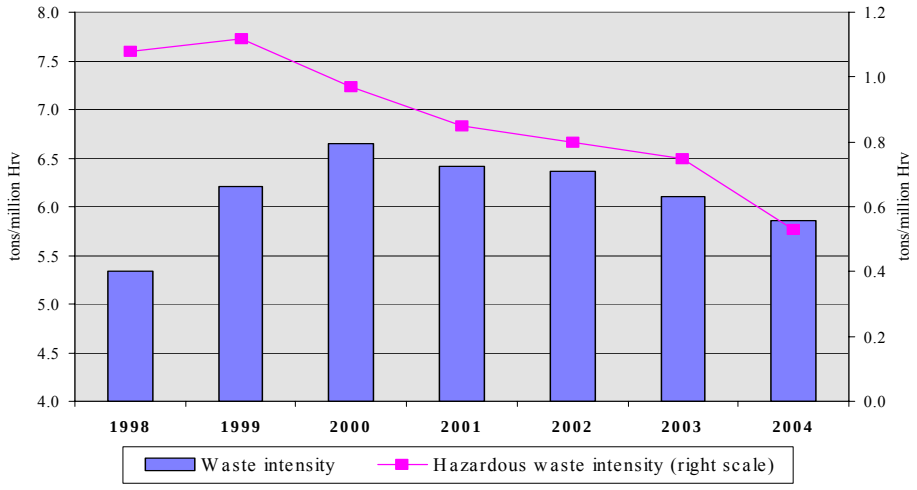
Industrial waste

Industrial waste dominates the overall pattern of waste generated in the country, while hazardous waste accounts for 9 per cent of total waste. Major sources of industrial waste are the mining, chemical and petrochemical, metallurgical, machine-building,wood, pulp and paper industries. In 2004, the industrial sector generated 564 million tons of waste, an increase of 41 per cent over 1998 (Figure 8.4). In 2004 about 63 million tons of hazardous waste was generated, of which 58 per cent was disposed of in managed landfills. Hazardous waste generation has declined sharply (33.5%) since 1999 (Figure 8.4).

Due to the absence of a self-sufficient national infrastructure for waste management and disposal, many regions of Ukraine are having trouble processing and disposing of hazardous waste. Most companies have to store hazardous waste on their sites in dangerous amounts. Only a few companies have disposal facilities properly engineered for this purpose.

There are not enough specialized sites for centralized processing of hazardous waste. Key data on waste generation, accumulation, recycling and disposal are in most cases estimated rather than measured, and a number of cases need to be further investigated due to flaws in the system for collecting national statistics and difficulties in getting reliable statistical data from private companies. Recycling this waste could be an important source of raw materials for industry. The level of use of waste as secondary raw materials has been fairly stable since 1998. Only 18 per cent of industrial waste (e.g. wood, rubber, oil and organic waste) generated in 2004 was recycled and reused. The remaining 82 per cent was stored at industrial sites or disposed of in landfills or sludge ponds.

Figure 8.3: Intensity of total waste and hazardous waste generation, tons/million Hrv.



Source: State Committee on Statistics, 2005.

Ferrous metals extraction, processing and metallurgy generate about 120 million tons of waste annually, of which 71 per cent is from ore mining, 25 per cent from metallurgy, 2.6 per cent from coke and chemical processes and 1.4 per cent from ferrous alloys. Mining tailings and wastes are major sources of heavy metal pollution due to the formation of acid mine drainage in poorly managed or abandoned tailings and waste heaps. Due to the low pH of mine waters (between 1.5 and 3.0), heavy metals such as copper, zinc, cadmium, arsenic and lead can be leached from the rock and mobilized, causing severe contamination of surface water and groundwater, soil and vegetation. Consequently, heavy metals can enter and bioaccumulate in the natural and human food chains, posing a serious risk to human health. In addition, mining and other industrial waste heaps generate about 10 million tons of dust in Ukrainian cities and towns. In Donetsk oblast alone there are about 600 waste heaps resulting from coal mining, most of them located in towns.

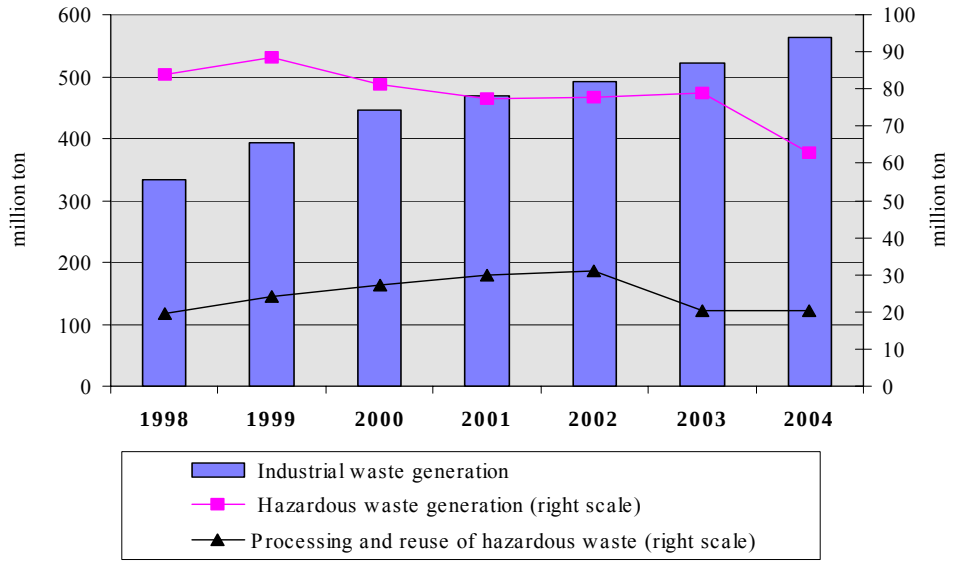
Landfills are a typical means of disposing of industrial waste, particularly on enterprises' territory. Few landfills and mining tailings have undergone rehabilitation work (waterproof bottom layers, drains, and monitoring drilling). In some landfills that are used for chemical and metallurgical waste, drying layers or pits for various types of sludge have been designed in order to protect groundwater better from infiltration.

The main types of industrial hazardous waste in Ukraine include oil waste, slag from ferrous and non-ferrous metallurgy, residue from organic chemistry (e.g. phenols, solvents, oil products) and sludge containing heavy metals (e.g. lead, iron, manganese, nickel, cobalt, cadmium, copper). The waste originates mostly from the mining, metallurgical, chemical and oil-refining industries. There are four classes of hazardous wastes in Ukraine, defined according to the degree of waste toxicity (class I being the most toxic). In 2003, 8,911 tons of class I hazardous (toxic) waste were produced, including 3,533 tons of lead, 92 tons of nickel, 14 tons of copper, 31 tons of mercury, 26 tons of galvanic waste, 7 tons of oil-processing waste and 6 tons of benzo(a)pyrene.

Contamination of land and groundwater by heavy metals is a major problem at industrial sites. For industrial waste that cannot be recycled, industrial operations have specially equipped storage sites, theoretically with insulation and protection.

However, often waste disposals do not comply with the norms and represent a real danger to soil and groundwater. According to the Ministry of Environmental Protection (MEP), the concentration of heavy metals in soils in the industrial regions (e.g. Donetsk, Dnipropetrovsk) is very high and exceeds maximum allowed concentrations (MACs), particularly near mines and industrial plants. Data on radioactive wastes from uranium mining and milling were not available for this report.

Figure 8.4: Industrial and hazardous waste generation and re-use, 1998–2004



Source: State Committee on Statistics, 2005.

8.3 Integration of environmental and sustainability issues into industrial policy

Policy and legislation

The legal framework for environmental protection is described in Chapter 1 of this review. The Law on Air Protection (revised in 2001), the Law on Waste (1998, amended in 2002) and the Law on Environmental Audits (2004) are among the most important laws regarding the industrial sector. The Law on Air Protection requires that enterprises whose emissions exceed thresholds for individual substances be included in the State Air Emissions Register. A Law on Environmental Safety and a new Mineral Resources Code are being drafted. Also, the Parliament has adopted laws on Standardization (2001), Confirmation of Conformity (2001) and Accreditation of Bodies for Estimation of Conformity (2001) in order to reform the national system of technical regulation. These laws deal respectively with standardization, certification and accreditation.

Recent resolutions by the Cabinet of Ministers "On Increasing Payments for Use of Natural Resources and Extending Application of Incentives for Nature Protection Activity" (June 2004) and "On Tax Rates for Use of Natural Resources (Environmental Tax)" (February 2005) encourage enterprises to invest in environmental protection and monitoring equipment by providing tax reductions and waivers of environmental charges. However, except for high-risk industrial installations, the country still lacks a legal basis for providing environmental insurance. This type of insurance has been widely applied to industrial plants all over the world and is particularly important for the mining sector, where environmental rehabilitation after closure continuous to be a major problem.

In addition, Ukraine has joined many international conventions related to environment and industry, such as the Convention on Long-range Transboundary Air Pollution (Geneva, 1979), the Convention on Transboundary Movements of Hazardous Wastes (Basel, 1989), the Convention on Transboundary Effects of Industrial Accidents (Helsinki, 1992) and the Kyoto Protocol to UNFCCC (2004). (See Chapter 4 for an overview of implementation of international agreements and commitments).

Environmental strategies and programmes concerning industry

In 1998 Ukraine adopted a Strategy for European Integration and developed the EU-Ukraine Action Plan, which was adopted in 2005. Regarding the industrial sector, the Plan foresees continued alignment of Ukraine with EU and other international regulatory and administrative practices, advances in the restructuring of solid fuels mines and implementation of Kyoto Protocol provisions.

Among the main objectives of the Environment Strategy for Eastern Europe, Caucasus and Central Asia (EECCA) countries adopted by Ministers at the "Environment for Europe" Conference in Kiev in 2003 is the regional implementation of the World Summit on Sustainable Development (WSSD) Plan

of Implementation, which includes issues related to sustainable industrial development.

The National Commission on Sustainable Development, established in 2002, has approved a framework programme for the implementation of decisions made at the WSSD. A National Sustainable Development Strategy has been drafted, although not yet approved.

Ukraine in 1998 adopted a National Strategy for the Environment (*Main Directions of the National Policy of Ukraine for Environmental Protection, Natural Resource Use and Environmental Safety*), which has been the basis for developing programmes in areas such as environmental safety, sustainable management of natural resources and cleaner technology. The Ministry of Industrial Policy (MIP) has developed sectoral programmes such as the State Programme on Coal Mining and Metallurgy until 2010 and the Chemical Technologies Programme for the chemical and petrochemical industry. In general, there has been no integration of environmental sustainability issues into industrial policy and sectoral programmes. An Industrial Solid Waste Strategy until 2030 is being developed. The National Hazardous Waste Treatment Programme (2000) and the Programme for Recycling and Reuse of Production and Consumption Waste until 2005 (1997), both funded by the state budget, ended in 2005. A new waste classification was developed in 2005 but has not yet been approved. This classification is based on the Basel Convention and on the European Waste Catalogue (a list of descriptions established by European Commission decision 2000/532/EC2), which is mostly based on industrial sectors and on materials and processes, including hazardous waste.

Implementation of the Ukrainian Coal Programme (2001) has progressed rather slowly. Concrete actions to restructure the coal mining industry, including the specification of mines to be closed, are still lacking, although coal mines were consolidated into 21 state enterprises in 2003, a classification of mines (according to their profitability, ownership and need for investments) was carried out in 2004, a national coal company was set up in 2004 and some privatization took place in 2004–2005. In 2000, the US Department of Labor funded a coal mine safety programme in Ukraine, which was completed during 2003. In 2004, the US Trade and Development Agency awarded a US$ 585,000 grant to the Donetsk Oblast administration for a feasibility study on a proposed coal mine methane/coal bed methane project in the Donbas region to increase the domestic supply of natural gas, as well as the safety and environmental conditions of the mines. The NATO-Ukraine cooperation plan for 2005 includes the development and reform of the system of mineral resources use for 2004–2010. It will deal with inventorying of mining tailings and dumps, recycling of these wastes and wastewater treatment in mining enterprises.

Introduction of cleaner production

Since the first EPR, the introduction of cleaner production in the country has advanced slowly. One of the few initiatives in the field of cleaner production was the 1998–2000 pilot project in the framework of the Tacis/Phare Cross-border Cooperation Programme in Ukraine and Romania. This project was implemented in three Ukrainian wood-processing enterprises located in Chernivtsi Oblast. The country has two cleaner production centres, in Kyiv and Dnipropetrovsk. However, these centres are not very active and have only developed a few small-scale projects.

In 2005, a draft Strategy to Introduce Cleaner Production in Ukraine was developed by experts of the Academy of Sciences for the Environmental Committee and the Industrial Policy Committee. The Strategy provides for the establishment of a cleaner production policy and economic incentives for enterprises involved in introducing cleaner technologies, and for the creation of a National Agency for Cleaner Technology, which would act as the national cleaner production centre. Currently, the strategy is being reviewed by other ministries in order to be approved by the Parliament and implemented.

Management of industrial risks

Management of industrial risks is based on the Law on High-Risk Installations (2001), which includes principles from the EU Seveso II directive and the UNECE Convention on Industrial Accidents. The law provides for permitting requirements such as a safety declaration and financial insurance for damage which may result from emergencies at industrial facilities (article 13). Enterprises are also required to prepare internal emergency response plans in case of accident and submit them to local, regional and national authorities for external coordination of response planning (article 11). The emergency response plan is subject to revision every five years. The Ministry of Emergencies coordinates these plans in cooperation with the MEP and the Ministry of Industrial Policy. Also, the Ministry of Emergencies has developed a risk assessment methodology based

on human and technological factors, and it uses computer software to calculate industrial risk and make forecasts for emergency situations.

Two registers were developed based on the 2002 CoM Resolution on "Identification and declaration of high-risk installations". The register of potentially hazardous installations includes 9,500 enterprises, and the register of high-risk installations has 5,020 enterprises. The 2002 CoM Resolution on "Rules and measures for environmental insurance and civil liability for high-risk installations" introduces a methodology for calculating accident damage and related financial insurance, which is a requirement for granting permits to such industrial enterprises. A law on environmental insurance has been drafted in 2004-2005 by the MEP with participation of other stakeholders but has not been approved by the Parliament.

8.4 Instruments for environmental management in industry

Permits

Industrial enterprises need to carry out environmental expertise or environmental impact assessment (EIA) before obtaining permits to start their activities. Permits for air emissions, wastewater discharges and waste generation are issued by the state administration offices for environmental protection in the oblasts, while the Ministry of Health plays a very important consulting role. Permits are reviewed every two to five years. Recently, a change was introduced for air emissions permits; their validity is ten years as of 2006 (See Chapter 2.)

The Government is currently considering a reform of its environmental permitting system. The first steps toward the implementation of integrated permitting in Ukraine were taken in connection with the World Bank's technical assistance project in 2003. An Integrated Permitting Working Group has been established within the MEP. For the largest enterprises, the MEP envisages integrated pollution permitting in line with the EU IPPC Directive (96/61/EC). The sectors and installation types to be covered by the integrated permitting system have been proposed in the study supported by the OECD EAP Taskforce in 2004 ("Approach to the Introduction of Integrated Environmental Permitting in Ukraine"). Currently, consultants from the World Bank are preparing a first-stage report on environmental audits of eight enterprises, with recommendations regarding selection of enterprises for a detailed, second-stage audit. On the basis of this report, the World Bank and the MEP will select three enterprises for the second stage of the analysis. These enterprises will be potential candidates for the introduction of integrated pollution permitting and therefore eligible for investment support under a proposed World Bank loan to reduce pollution by Ukrainian industrial enterprises (see also Chapter 2 on permitting and approximation to the EU IPPC Directive).

Monitoring and reporting of industrial emissions

Industrial enterprises have to monitor their air emissions, wastewater discharges and wastes. All large enterprises have their own accredited laboratories. However, most industrial enterprises are not yet equipped with continuous automatic outlet measurement and recording of air pollutants. Annual reports on self-monitoring- results are provided to the oblast offices of MEP, the oblast committees on water resources, the State Committee on Statistics and other relevant bodies. (See Chapter 2 for an overview of issues involved in self-monitoring.) In 2005, the forms for statistical reporting on air monitoring by industrial enterprises were modified to follow the CORINAIR methodology; they also incorporate EEA indicators.

The State Committee on Statistics, which maintains the Enterprise Register, collects enterprise-specific data on air and water pollution, generation of hazardous waste, and fuel consumption and industrial output. Data on wastewater discharges and waste generation and disposal are still reported aggregated by company, without proper links to installations or technological processes.

Environmental Management Systems (EMS), standardization, certification, accreditation and eco-labelling

The State Committee on Technical Regulation and Consumer Policy is responsible for developing policies relating to standardization, certification and accreditation. The Ukrainian Scientific Research and Training Centre for Standardization, Certification and Quality Problems has the task of promoting and implementing international environmental standards (e.g. ISO 14000 and EMAS), training and certifying environmental auditors and accrediting analytical laboratories. The Institute on Quality Management for ISO 14000 has been created to promote certification. There are 154 Technical Committees for developing standards in the country, of which two, Technical Committees 82 and 93, deal with environmental standards. International standards such as those specified for the ISO 9000 and ISO 14000

series are not common at Ukrainian industrial enterprises.

In 2004, the Tacis project Environmental Management Standards for Enterprises promoted and implemented environmental management systems (EMS) according to ISO 14001. Certification audits were carried out at five selected Ukrainian enterprises, which were recommended for certification. In addition, a group of 13 new ISO 14001 auditors was trained. By the end of 2005, about 30 companies had been certified according to ISO 14000 standards, including a few in the industrial sector, such as Stirol (see Box 8.2), the Lakma paint factory, the Kharkiv machine-building plant FED, the Zhytomyr Butter Dairy. As of June 2006, 68 persons and 25 legal entities have been certified as ISO 14000 auditors. In addition, 47 Ukrainian industrial companies in areas such as pharmaceuticals, oil and gas processing, metallurgy, winemaking and beverage manufacturing have obtained certification according to national environmental management standards. Companies consider that getting certification is a costly exercise. Although ISO 14000 is a tool to improve environmental performance, it does not ensure that a certified enterprise complies with its regulatory obligations.

The Ukrainian NGO Living Planet handles eco-labelling certification under the international standard ISO 14024 in the System of Independent Certification (SIC, Canada). To date 68 Ukrainian products have been certified within the framework of the national Eco-labelling Programme.

Pollution charges

Pollution charges have been stable since the first EPR until 2004, and then increased by 1.082 in 2005, and by 2.373 in 2006 (See Chapter 5). So far, charges were too low and unlikely to give enterprises an incentive to invest in environmentally friendly innovation instead of paying taxes. Limit values are determined for emissions of harmful substances into air and water, and for waste disposal, and tariffs per ton are applied (for instance, Hrv 80 per ton SO_2 before 2006, Hrv 180 since then). The charges for values in excess of the limit are five times the standard rate. Tax rates are discussed in detail in Chapter 5.

The share of pollution charges in the production costs of leading industrial sectors is very small – less than 0.5 per cent (see Table 8.1). This share decreased in 2004 to only 0.14 per cent for mining and quarrying, 0.03 per cent for manufacturing and 0.01 per cent for construction materials.

Environmental expenditures in industry

Most environmental expenditures are incurred directly by enterprises and partly co-financed by transfers from the state budget (see Table 8.2). Environmental expenditures channelled through the State Environmental Fund constitute only a small part of environmental expenditure by industry.

Box 8.2: Environmental management at the Concern Stirol

Concern Stirol is a chemical company founded in 1933 in the city of Horlivka (Gorlovka) in Donetsk Oblast. Since 1995, it has been a joint-stock company with more than 5,000 employees. The company produces liquid nitrogen fertilizers, ammonia, urea, ammonium nitrate, polystyrene, urea-formaldehyde, paintwork materials and pharmaceutical products. Stirol is one of the world's leading producers of ammonium nitrate (1.6%), ammonia (0.9%) and urea (3.0%). Stirol also accounts for about 26 per cent of Ukraine's ammonia production, 26 per cent of fertilizer production and 100 per cent of polystyrene production.

In 1995, Stirol became one of the first companies in the country to obtain ISO 9002 certification. A few years later, the company established an environmental management system (EMS), with the help of a USAID grant, in order to create the necessary conditions for ISO 14001 certification. Stirol's Environmental Management Plan (EMP) establishes annual targets for reducing air emissions, water pollution and waste generation and disposal. The departments of Standardization and Certification and Environmental Protection, together with other departments, implement the EMP.

In 2002, Bureau Veritas granted an EMS certificate to Concern Stirol in accordance with the requirements of ISO 14001. This has boosted the company's competitiveness in international markets by increasing business partners' trust. Moreover, implementation of the EMS has had direct economic benefits. Consumption of energy and raw materials has decreased due to more effective environmental protection measures. Decline in emissions and effluent and solid waste generation and accumulation have also reduced production costs and resources consumption. Since 1993 Stirol has used an automated system to continuously monitor ambient air quality. The company has also invested in a wastewater treatment plant using closed-circuit reverse osmosis technology. In 2001 this made it possible to stop annual discharges of 17,000 tons of harmful substances into natural water reservoirs and halt consumption of fresh water for production needs. The current wastewater treatment technology (nano- and ultra-filtration) enables the company to reuse municipal and coal mine effluents after treatment. In February 2005, Stirol was found to meet the standards of the new version of ISO 14001.

However, the role of the state budget in environmental expenditures remains important in some industrial sectors, such as construction (43%) and mining (1.9%).

The composition of expenditures on environmental protection and rational use of natural resources by the industrial sector in 2004 is as follows: mining and quarrying – Hrv 982 million; manufacturing – Hrv 1.8 billion; and construction materials – Hrv 18 million (see Table 8.2). Among manufacturing industries, the metallurgical subsector accounted for the highest expenditures in 2004 (Hrv 743 million), followed by the chemical industry and production of coke, refined petroleum and nuclear fuel (Hrv 343 million and Hrv 326 million, respectively).

Table 8.1: Share of pollution charges in production costs for selected industrial sectors, 2004

	Actual payments of pollution charges		Percentage in production costs
	million US$	as % of total payments	
Mining and quarrying	**9.4**	**15.70**	**0.14**
Mining of coal and lignite; extraction of peat	4.2	7.00	0.13
Extraction of crude petroleum and natural gas	0.2	0.30	0.02
Mining of metal ores	4.7	7.80	0.24
Other mining and quarrying	0.3	0.50	0.06
Manufacturing	**18.9**	**31.50**	**0.03**
Manufacture of coke oven products	1.7	2.80	0.06
Chemicals	1.6	2.70	0.05
Rubber and plastic products	0.1	0.10	0.00
Metallurgy	11.9	19.80	0.07
Construction	**1.2**	**2.00**	**0.01**

Source: State Committee on Statistics, 2005.

Table 8.2: Expenditures of enterprises on environmental protection and rational use of natural resources, by selected industrial sectors, 2004 (million US$)

	Number of enterprises	Total expenditures	Including from		
			State budget	Local budget	Own funds
Mining and quarrying	**363**	**184.6**	**3.5**	**0.0**	**181.1**
Energy-producing materials	252	38.9	0.3	..	38.5
Except energy-producing materials	111	145.8	3.1	0.0	142.6
Manufacturing	**3,340**	**336.7**	**0.4**	**0.1**	**335.7**
Food products, beverages and tobacco	928	16.9	0.1	0.0	16.8
Textile and textile products	201	2.2	0.0	..	2.2
Leather and leather products	49	1.6	..	..	1.6
Wood and wood products	82	0.9	0.0	..	0.9
Pulp, paper and paper products, publishing and printing	101	8.0	0.0	..	7.6
Coke, refined petroleum and nuclear fuel	33	61.3	0.2	..	61.1
Chemicals, chemical products and man-made fibres	163	64.5	0.0	0.1	64.3
Rubber and plastic products	90	2.0	..	0.0	2.0
Non-metallic mineral products	315	6.5	0.0	0.0	6.5
Metallurgy	294	139.6	0.0	..	139.6
Machine-building	483	17.4	0.0	0.0	17.4
Electrical and electronic equipment	251	6.2	..	..	6.2
Transport equipment	198	8.8	..	..	8.8
Construction	**530**	**3.4**	**1.5**	**0.0**	**1.9**

Source: State Committee on Statistics, 2005.

8.5 Conclusions and recommendations

Despite improvements since the first EPR, Ukraine still faces considerable barriers in developing its industry in a sustainable way. Progress on crucial structural reforms remains slow, and many industrial sectors, such as coal mining, are in poor shape. Progress in the implementation of strategies and programmes regarding industrial development has also been slow. Furthermore, there has been no integration of environmental sustainability issues into industrial policy.

Recommendation 8.1:
The Ministry of Industrial Policy, the Ministry of Coal, and the Ministry of Fuel and Energy, together with the Ministry of Economy and the Ministry of Environmental Protection, should establish clear policy objectives for sustainable development of the industrial sector and include them in the forthcoming national sustainable development strategy. This should be along the lines of the EU IPPC Directive and serve as a basis for industrial subsectors' planning.

The release of methane in coal mines and its subsequent ignition should be addressed, since these are the main factor in Ukraine's high rate of mine accidents and fatalities. This fatality rate can be reduced through adequate measures such as the installation of enhanced methane degasification systems, a decrease in levels of rock dust, underground water filtration, improved ventilation systems and the enforcement of safety regulations. Moreover, coal mine methane can be used for energy production. According to the EU-Ukraine Action Plan for 2005–2007, the country also has to take measures to advance the restructuring of its coal mines. So far the current Government's programme to restructure the coal sector (by closing a certain number of mines and modernizing some others whose coal output could be increased) has progressed very slowly, and the implementation of the 2001 Coal Programme has not had the expected results. However the establishment in 2005 of a Ministry of Coal shows renewed strategic interest in the exploitation of coal resources.

Recommendation 8.2:
The Ministry of Coal, with the cooperation of appropriate other ministries, should:

(a) Urgently develop and implement a national mine safety programme in order to reduce accident risks and improve safety at coal mines; and

(b) Take concrete actions to further implement the coal sector restructuring programme, including the compilation of an inventory of specific mines to be closed and these mines' related environmental, social and economic impacts.

There is significant potential to improve environmental indicators in industry by replacing obsolete technology with cleaner technology and best available techniques (BAT), which are connected with the gradual introduction of the IPPC Directive in Ukraine. First steps towards the introduction of an integrated permitting system have already been taken. At the same time, a National Strategy to Introduce Cleaner Production was recently drafted. However, the development of a policy and legal basis, a BAT database, technical guidance on sectoral and horizontal BAT, and training on procedural and technical aspects of BAT are needed to ensure the effective implementation of integrated permitting in Ukraine.

Recommendation 8.3:
The Ministry of Industrial Policy and the Ministry of Environmental Protection should promote the adoption of the draft Strategy to Introduce Cleaner Production in Ukraine. Within the framework of introducing cleaner production, the Government should promote cleaner technologies and best available techniques (BAT), including by establishment of appropriate institutional structure.

See also Recommendation 2.2.

The new draft waste classification, based on the European Waste Catalogue, will require changes in the current waste monitoring and reporting system. In addition, regulations concerning the management of mine waste are needed and could incorporate the concepts included in the draft EU Mine Waste Directive, which deals with the management of waste rock and tailings from the extractive industry (since mining does not fall under the IPPC Directive). This draft directive also provides for financial guarantees to ensure full restoration of waste facilities based on BAT.

Recommendation 8.4:
The Ministry of Environmental Protection should:

(a) In cooperation with the State Committee on Statistics and the Ministry of Industrial Policy, revise the monitoring and reporting system for industrial waste, including hazardous waste based on the new waste classification and envisaging the introduction of integrated permits. A geographic information

system (GIS) for obtaining more reliable information on wastes (e.g. places of storage, components, amounts) should be integrated into the national observation network system so that related information can be used in decision-making; and

(b) Develop regulations for the management of mine waste.

Recommendations related to the implementation of the Kyoto Protocol by industry and on pollution charges appear respectively in Chapters 4 and 5.

Chapter 9

ENVIRONMENTAL MANAGEMENT IN TRANSPORT

9.1 Transport infrastructure

Ukraine is geographically located as a transit country between Central Europe and the Caucasian region as well as between Southern Europe and Russia. The motorized transport systems include railways, road transport, inland and maritime navigation, and air transport. Transportation by pipelines is not considered in this report.

The government-controlled rail, road and aviation networks have seen insufficient investment and little restructuring. In 2003 and 2004, the construction sector grew by roughly one quarter in real terms. This was primarily the result of ongoing construction and engineering works in the oil and gas sector and in railway transport systems. It also reflected increased investment (from both state and local budgets) in the construction, repair and maintenance of roads and road infrastructure. However, conditions for travel in many places, especially in rural areas, remain difficult. In addition to problems in land transportation, the inadequate infrastructure at Black Sea ports has hampered the country's export trade.

The *rail network* in 2004 comprised a total of 22,000 km of which 9,250 km have been electrified. Ukraine is linked by rail to all neighbouring countries. However, its use of the broad gauge hampers interoperability with countries on its western border, which use a smaller gauge.

While the rail network remains more reliable than the road and motorway system, it is also coming under strain and is in dire need of investment. Railway revenues are mainly used for operating expenses, and little money is left for capital investment. Freight transport seems to be more profitable, so that its revenues cross-subsidize passenger transport. Surpluses are mostly absorbed into the national budget and can thus not be reinvested in infrastructure. Therefore, much of the rolling stock is kept in service much longer than is desirable, and the refurbishment of most routes is also lagging.

Still, there have been recent improvements in rail transport. Some long-awaited investments in railway cars have been made, and some railway lines have been upgraded to a maximum speed of 130 km/h. (This has been true of the Kyiv–Kharkiv line since 2002 and the Kyiv–Dnipropetrovsk line since 2003.) Furthermore, some restoration and construction work has been done; for example, the Kyiv main train station has been renovated and expanded to twice its previous passenger capacity.

The *road network* comprises a total of approximately 170,000 kilometres (2003 data). Close to 97 per cent of the roads are paved, however many roads have been poorly maintained in recent years. The country has about 2,000 km of expressways, which (especially in the area around Kyiv) match Western European standards.

The stock of passenger cars in Ukraine is still relatively small. With around 110 cars per 1,000 people, passenger car ownership in Ukraine lags behind that of neighbouring countries. (The corresponding year 2000 figures for Belarus and Poland are respectively around 150 and over 250 cars per 1,000 people.) The situation in Ukraine is partly a relic of the Soviet past, when the Ukrainian per-capita car ownership was 25– 40 per cent of the East European level, but mainly it reflects the limited purchasing power of most Ukrainian consumers today. The passenger car stock is, however, growing quickly and by 2004 has increased 66 per cent compared to 1990. The growth in car sales became particularly strong since 2002.

Inland, marine and combined river-sea navigation had been traditionally used for freight and passenger transportation, but has drastically decreased since 1998 (Table 9.2). Inland waterways comprise a total length of 2,200 kilometres. Almost 1,670 km are on the Dnipro and Prypyat Rivers and are suitable for commercial inland navigation. The southern border of Ukraine is formed by the Black Sea and the Sea of Azov, with a coastline of 1,600 km and 1,100 km respectively. Some large commercial warm-water ports (of which Odesa is the largest) are located on this coast.

The *civil aviation sector* is growing fast. As of 2005, Ukraine had 14 airports with runways more than 3,000 metres long. The country's major cities have international airports.

A future increase in *all transport activities* is inevitable if the country pursues its economic growth. Additionally, Ukraine will play an important role as a transit country because of its geographic position. Therefore Ukraine's transport policy aims to improve the whole transport infrastructure.

9.2 Transport performance

Transport of goods and people with motor vehicles is always associated with the use of resources and with negative impacts on the environment. Data on vehicle mileage are a good indirect indicator of the amount and temporal development of environmental impacts, especially of road transport. These data are not available or are not published in the official Ukrainian statistics. Another useful indicator is transport performance, which is mostly expressed in terms of freight (tons) or passengers and distance (km) transported. The transport performance indicator includes the modal split, which states the contribution of different transport modes (with their different environmental impacts) to total transport performance. Trends in the transport performance indicator and the modal split are important indicators for the development of transport-related environmental impacts.

Passenger transport

Data on passenger transport are available for the decade 1995–2004. These data show no significant changes in the number of trips or in total transport performance (see Table 9.1). Rail passenger transport decreased slightly, while passenger transport via buses and electric trams, metro (subways) and trolleybuses increased. Air traffic grew quickly but to a still relatively low level. According to available data, railway trains and other rail vehicles like trams, trolleybuses and metro (subways) account for nearly 60 per cent of the total passenger transport performance of about 130 billion passenger-kilometres.

However, passenger transport data are incomplete, as data on individual road traffic are not included in the statistics. Assuming an average annual mileage of 10,000 km for the roughly 5.4 million passenger cars in Ukraine, the country's total mileage could be estimated at around 55 billion vehicle-kilometres, and the transport performance at 100 billion passenger-kilometres. This rough estimate for passenger car transport alone is nearly as high as the total for other road passenger transport (see Table 9.1). Therefore the official statistics do not adequately reflect the absolute figures or the increase in passenger transport performance in Ukraine.

Freight transport

For freight transport, data on transport performance are available for the decade 1995–2004 (see Table 9.2). After an initial decrease and then a dip in 1999, freight transport performance increased again, mainly due to freight transport by rail. According to these data, rail transport accounts for 85 per cent of total freight transport performance. Additionally, pipeline transport amounts to about 70 per cent of the transport performance of mobile vehicles.

However, the data for the respective transport modes show relatively large annual variations, which could be explained by changed definitions for data collection. (See, for example, the data on sea transport.) Furthermore, freight transport by private trucks is not reflected in these statistical data, which therefore wrongly suggest that freight transport by road accounts for less than 10 per cent of all transport with mobile vehicles. The stock of private trucks has increased since 1997 by more than 60 per cent and now accounts for about 30 per cent of the total truck fleet. For freight transport, a higher absolute figure and a larger increase in transport performance can be assumed.

9.3 Environmental impacts from transport

The environmental impacts of motorized traffic can take many forms. Examples include energy consumption and associated emissions, which affect climate, human health, ecosystems and buildings; noise pollution; land use by infrastructure; and the fragmentation of natural habitats. Since there is little information on this topic and no comprehensive overview of it, the following analysis is limited to the impacts from energy consumption, carbon dioxide emissions and emissions of airborne pollutants during the operation of vehicles. The lack of data also makes it impossible to consider other environmental impacts such as noise pollution, land use, water pollution, and impacts resulting from the production, maintenance and disposal of vehicles or infrastructure. Direct damages resulting from transport accidents are usually not treated as environmental impacts.

Table 9.1: Transport performance of passenger transport modes, 1995–2004

billion passenger-km

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total	**120.2**	**116.1**	**111.3**	**109.9**	**108.2**	**113.1**	**112.8**	**117.2**	**121.2**	**128.6**
Railway	63.8	59.1	54.5	49.9	47.6	51.8	49.7	50.5	52.6	51.8
Road (bus, passenger van)	34.8	34.8	27.3	26.3	26.8	28.8	31.0	35.8	40.1	47.5
Tram, trolley, underground	17.7	19.0	27.0	31.5	32.0	30.7	30.2	28.3	24.6	23.9
Sea	0.5	0.3	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
River	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
Air	3.3	2.9	2.4	2.1	1.7	1.7	1.8	2.5	3.8	5.3

Source: State Committee on Statistics. Transport and Communications of Ukraine. Statistical Yearbook. Kyiv 2004.

Note: Data for private vehicles not included. According to estimates, share of passengers transported by private cars is 90 per cent of total number of passengers transported by automobile transport.

Table 9.2: Transport performance of freight transport modes, 1995–2004

billion ton-km

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total	**359.1**	**253.9**	**217.6**	**202.3**	**194.2**	**206.6**	**209.8**	**227.1**	**264.8**	**278.0**
Railway	195.8	163.4	160.4	158.7	156.3	172.8	177.5	193.1	225.3	234.0
Road	34.5	22.2	20.5	18.3	18.2	19.3	18.5	20.6	24.4	28.8
Sea	123.1	62.4	31.2	19.5	14.1	8.6	10.1	8.8	9.9	10.1
River	5.7	5.9	5.5	5.8	5.6	5.9	3.7	4.2	4.7	4.8
Air	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.3
Total including pipelines	**544.0**	**450.3**	**402.4**	**391.7**	**388.0**	**394.1**	**394.0**	**411.3**	**457.5**	**480.1**
Pipelines	184.9	196.4	184.8	189.4	193.8	187.5	184.2	184.2	192.7	202.1

Source: State Committee on Statistics. Transport and Communications of Ukraine. Statistical Yearbook. Kyiv 2004.

Note: Data for privately owned trucks not included. According to estimates, share of freight transported by privately owned trucks is 72 per cent of total freight transported by road transport.

Energy use and CO_2 emissions

In 2005, the Government of Ukraine reported data on energy consumption and carbon dioxide emissions from transport as part of climate reporting to the United Nations Framework Convention on Climate Change (UNFCCC). However the UNFCC pointed out serious inconsistencies and inexplicable large fluctuations in data time series. For instance, the data showed a sharp decrease in energy consumption between 1990 and 2004 (diesel fuel consumption would have decreased by 96 % and gasoline fuel by 98 %), a period during which, according to all observations, transport activities grew rapidly. So far, the Ukrainian authorities have produced no other, more reliable data on this topic.

According to a rough estimate based on the road vehicle stock and rough assumptions concerning vehicles' annual vehicle mileage and average fuel consumption, fuel consumption of the road sector in Ukraine 2003 could be in the range of 300 TJ (while the report to the UNFCCC gave the figure of 20 TJ). These estimates are in line with data from the International Energy Agency, which states gasoline consumption of about 200 TJ and diesel and kerosene consumption of about 100 TJ for 2002.

One possible explanation for these discrepancies is that the official data reflect only fuel consumption by vehicles of government or associated institutions. This approach to reporting was common during the Soviet era but, with a significant increase in transport not owned by state, no longer reflects the actual consumption.

Since carbon dioxide emissions from transport have been calculated based on fuel consumption, these data are similarly problematic. The supposed large decrease in transport energy consumption and carbon dioxide emissions claimed since 1990 seems to be a statistical artefact resulting mostly from an obsolete reporting system. Therefore the data cannot be used to accurately assess the environmental performance of the transport sector in Ukraine.

Airborne emissions

Important airborne emissions from vehicles with combustion engines are carbon monoxide (CO), nitrogen oxides (NO_x), hydrocarbons (HC) (which include benzene) and particulate matter. The emissions amounts for these substances are determined mainly by the type of combustion and exhaust after-treatment. Because of their toxicity for humans and their ecological relevance, emissions of

these substances for individual new registrations are limited by law. The content of certain substances (e.g. lead compounds, sulphur and benzene) in fuels is also regulated.

In Ukraine, only road vehicles seem to be subject to regulations and subsequent control. Until recently, all vehicles had to meet individual exhaust gas standards established for NOx, CO and HC (Soviet GOST standards of 1987) from gasoline engines and for soot (opacity) (Soviet GOST standards of 1975) from diesel engines. As of 2006, state standards of Ukraine (DSTU) are in force, and they are getting harmonized with the relevant EU standards. The vehicles can be checked at stationary testing facilities operated by the Ministry of the Interior, and theoretically the checks must occur twice a year. Road vehicles are also subject to random checks, generally performed by the Road Transport Police (DAI) for one month each year as part of the "Clean Air" campaign. However, the system of testing is not optimized, does not guarantee the accuracy of environmental control and is not immune to corruption.

As of 1 January 2006, tractors, cars and buses imported to Ukraine have to meet the Euro 2 standard. This also applies to vehicles produced in Ukraine, which represent about 10 per cent of all new registrations. All other newly registered vehicles will have to meet the Euro 2 standard from 1 January 2007. However, the capacity of the appropriate institutions to enforce the requirements of this standard is questionable. The number of currently registered passenger cars with catalytic converters or in compliance with Euro 1 and Euro 2 emission limits is unknown. Modern passenger cars with catalytic converters from Western Europe are used, but their share is currently marginal though growing.

The poor quality of the fuels available in Ukraine also has a negative influence on emissions levels and on engine performance. Sales of leaded gasoline have been prohibited since 2003, and the sulphur content of fuels is currently limited by legislation to 500 ppm for gasoline and from 500 to 2000 ppm for three different types of diesel fuels. In the European Union, by contrast, the sulphur content of both gasoline and diesel fuel is currently limited to 50 ppm. While the actual sulphur content of fuels in Ukraine is not known, the lack of desulphurization capacity in Ukrainian refineries makes it likely that all fuels have rather high sulphur content. The benzene content of gasoline is limited to 5 per cent.

Little information is publicly available on the level of transport emissions of CO, HC and NO_x. Values estimated by the State Committee of Statistics are given in Table 9.3. The data by the State Committee of Statistics seems to be reliable, at least for the years 1995–2004. Airborne emissions from road transport have increased by about one fourth in this period (from 1.6 million tons to 2.0 million tons). Emissions from other transport modes make up a relatively small share of the total emissions and are only significant for nitrogen oxides.

Table 9.3: Air emissions from transport, 1990–2004

Road transport emissions (in kilotons)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
All emissions[a]	6,110	5,541	3,637	2,707	2,146	1,797	1,579	1,433	1,885	1,747	1,949	1,995	2,027	2,010	2,077
CO	..	..	..	..	..	1,427	..	1,144	1,530	1,435	1,546	1,582	1,608	1,591	1,643
HC[b]	..	..	..	..	..	263	..	203	243	207	267	272	276	272	279
NO[c]	..	..	..	..	..	107	..	85	112	105	121	124	126	128	135

Emissions from other transport modes (rail, water, and civil aviation)[d] (in kilotons)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
CO	..	..	..	..	..	..	..	..	..	..	..	..	..	28	29
HC[b]	..	..	..	..	..	..	..	..	..	..	..	..	..	11	11
NO[c]	..	..	..	..	..	..	..	..	..	..	..	..	..	44	45

Source: State Committee of Statistics.

Notes:

[a] Data from the State Committee of Statistics for the sum of all harmful substances (CO, HC, NO, SO_2 and soot).

[b] Hydrocarbons including methane.

[c] Nitrogen oxide is given as NO, not as NO_2 (as usually used in international statistics).

[d] Reporting was introduced in 2003.

Table 9.4: Air quality standards in Ukraine and the European Union

Pollutants	Ukrainian standards	Current EU air quality standards
Nitrogen dioxide (NO_2)	0.04 mg/m^3 *	0.04 mg/m^3 (2010) *
Particulate matter (PM)	0.15 mg/m^3 *	0.04 mg/m^3 (PM_{10}) *
Sulfur dioxide (SO_2)	0.05 mg/m^3 *	0.125 mg/m^3 as daily mean value
Carbon monoxide (CO)	3.00 mg/m^3 *	10 mg/m^3 as 8 hour mean value

Source : Ministry of Environmental Protection and EU legislation.

Note: * Maximum allowable annual mean concentration.

Local-level air quality

Another indicator of the transport sector's environmental performance, in addition to energy consumption and pollutant emissions, is the local ambient air quality directly influenced by road traffic. This is the pollutant concentration along urban roads with heavy traffic.

The Ukrainian national air quality standards are in the same order of magnitude as the standards recommended by the World Health Organization (WHO) *Air Quality Guidelines for Europe*. According to Ukrainian ambient air quality standards, there are maximum allowable concentrations (MAC) for specific pollutants, which are applied uniformly throughout the country. The only exception is resort areas where the limit is 0.8 MAC. The available monitoring data describe annual or daily atmospheric concentration levels of NO_x, CO, SO_2 and PM.

National as well as WHO standards for specific pollutants are exceeded in almost all major Ukrainian cities. The values for nitrogen dioxide and particulate matter are exceeded at almost all of the country's measurement stations, the reason being that pollution from industry and power plants overlaps with traffic emissions. The cities with the highest air pollution are located in the Donetsko-Prydniprivskyy industrial area. Here, annual mean concentration limits for carbon monoxide and sometimes for sulphur dioxide are also exceeded.

Road traffic in Kyiv has increased considerably in recent years. Exact figures on vehicle mileage are not available. The vehicle stock has increased between 1995 and 2004 by 70% and the stock of private passenger cars has almost tripled in the past decade.

Even though Kyiv's air quality is still largely determined by emissions from industry and power plants, rising concentrations of nitrogen oxide are a clear indication of increasing road traffic emissions. The annual mean concentration at the seven Kyiv measurement stations, which are all located at busy main roads, increased by almost 40 per cent between 1995 and 2004 and is now 2.75 times higher than MAC. Such concentrations are currently found in very few Western European cities and only at specific measurement stations under extremely unfavourable traffic and meteorological conditions. Therefore the particularly sharp increase in recent years in Kyiv is alarming.

9.4 Policy, legal and institutional frameworks for environmental protection

The Ministry of Transport and Communications is the main governmental body responsible for developing and implementation of national policy for road, rail, air, marine and river transport and for ensuring transport safety. The Ministry of Transport and Communications controls activities of companies on issues related to negative environmental impact of transport and environmental safety of the transport sector. The Ministry of Environmental Protection, as the main governmental body for all environmental protection issues, is responsible for environmental management and implementation of national environmental policy in all sectors of the economy, including transport.

Ukraine has no comprehensive national strategy for the transport sector. The development of a national transport strategy is requested in the EU-Ukraine Action Plan for 2005–2007. The main policy document for transport sector is the National Programme for Development of Transport and Road Sector (CoM Resolution No. 1931, 30 December2000). A concept (outline) of development of transport and road sector for medium term and until2020 has been drafted and is supposed to be adopted soon. There is also no comprehensive policy document in the area of transport and the environment, although some related programmes and plans exist. These include the Plan of actions on mitigating negative impact of road transport for 2004-2010 (see below), the Plan of implementation

Table 9.5: Annual mean concentrations of nitrogen dioxide measured at busy main roads in Kyiv

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
NO_2	0.08	0.08	0.08	0.10	0.08	0.08	0.06	0.08	0.12	0.11

Source: State Hydrometeorological Service of Ukraine, 2005.

Note: * Mean values from 7 stations in mg/m^3. Ukrainian standards for the NO_2 maximum allowable annual mean concentration is 0.04 mg/m^3.

in transport sector of the *Main Directions of the National Policy of Ukraine for Environmental Protection, Natural Resource Use and Environmental Safety* for 2002-2006 (Order of the Ministry of Transport and Communications No. 291, 29 April 2002), and the Sectoral Programme on energy saving and introduction of alternative types of fuel in transport sector for 2006-2010 (Order of the Ministry of Transport and Communications No. 114, 9 February 2006).

Ukraine has joined some important international agreements which have to be reflected in the national policy on transport and environment, in particular in 2000, the 1958 Geneva Agreement concerning the adoption of uniform technical prescriptions for wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles and the conditions for reciprocal recognition of approvals granted on the basis of these prescriptions. Regulations of this agreement are regularly updated and have been regularly transposed by the EU through Euro 1 to Euro 5 standards (Euro 4 is currently implemented and will be replaced by Euro 5 on first January 2008). Over 80 of these regulations have been adopted by Ukraine as national standards for new vehicles. Nevertheless, Ukraine is quite late in the implementation of the Geneva Agreement. The Euro 2 standard (which was implemented in the EU by 2000) is obligatory for all newly registered tractors, buses and cars since January 2006 and is to apply to all newly registered vehicles as of 2007. Ukraine is still not implementing Euro 2 on vehicles already registered in Ukraine.

Ukraine also ratified other agreements that have a direct link with the transport sector: the UN Framework Convention on Climate Change (UNFCCC) in 1997 and its Kyoto Protocol in 2004. As a country with an economy in transition and an Annex I party, Ukraine committed itself to stabilizing its greenhouse gas emissions at their 1990 level by 2012. Ukraine has joined a series of conventions relating to air pollution, including the Convention on Long-range Transboundary Air Pollution (CLRTAP) and three of its protocols including on nitrogen oxides and sulphur emissions (see Chapter 4 for details).

Ukraine has only a few pieces of national legislation specifically targeting vehicle technical standards and related environmental pollution emissions by the transport sector. What exists is mostly derived from the transposition of the regulations of the Geneva Agreement mentioned above through the changes in legislation regarding introduction of Euro 2 standards adopted in 2005. Also, the Law on Transport (1994) contains provisions regarding environment protection. However, where rules exist, there is no evidence that they are properly enforced. This is especially true of the standards on fuel quality, air emissions and technical requirements for vehicle equipments. The reported low fuel quality leads to higher emissions, as evident from high emission limits set by the national standards. Twelve indicators of fuels, including benzene, phenol, hydrocarbons, sulphur, are regulated, although they still do not conform to the EU standards; the use of leaded fuels has been prohibited since 2003. All fuels have to be certified and fuels at gas stations are controlled, although spot-checks conducted at the gas stations occasionally find violations of fuel standards.

Air quality standards are exceeded in many cities. Road transport contributes significantly to this urban air pollution, in particular on NO_2 emissions. In 2004, Resolution of the Cabinet of Ministers No. 37 approved the Plan of actions on mitigating negative impact of road transport for 2004-2010 drafted jointly by the MEP and the Ministry of Transport and Communications. This Plan contains a list for introducing environmental requirements, in particular on fuels. New standards have been introduced that are closer to EU standards. For instance, two national standards on norms and methods for measuring exhaust gases transparency, and content of carbon oxide and hydrocarbons in exhaust gases of cars with gas and gasoline engines have been developed by the MEP and are mandatory since 2006.

Regarding requirements for testing environmental indicators for Euro 2 standards, regular technical inspections of new vehicles are mandatory every two

months for passenger buses, annually for commercial vehicles and bi-annually for private cars. According to the new Law on Road Transport adopted in February 2006, inspections will be made by accredited technical centres. The first such centre is under construction by the State Road Transport Research Institute. However, it will be able to perform tests on Euro 2 standards only, and would need further significant investments to be capable of performing tests on Euro 4 standards that correspond to the current requirements under the 1958 Geneva Agreement.

9.5 Conclusions and recommendations

The impact of the transport sector on the environment in Ukraine has increased significantly during the last decade. In spite of insufficient and unreliable data, there is evidence that:

- Official calculations show an increase in all types of emissions from road transport;
- Associated with the emissions, energy consumption by road transport has also increased;
- Based on the increased stock of private passenger cars, there has been a corresponding increase in transport volume and vehicle mileage; and
- A modal shift has occurred in the overall traffic volume, with road transport increasing its share.

The local situation in Kyiv also supports the assumption of deteriorating environmental performance:

- The stock of private passenger cars has almost tripled in the past decade.
- Air pollution in Kyiv has worsened due to increased transport volume and a lack of catalytic converters, even in new vehicles.
- Nitrogen dioxide concentrations have increased since 2001 and are now about 2.75 times higher than the national standards.

Experience in other countries in transition has shown that improvements in the economic situation are generally accompanied by an increase in transport volumes. Therefore, it is likely that further economic growth will lead to an increase in transport activities and the use of private vehicles, and therefore an increase in energy consumption and air-polluting emissions. For all these reasons, the environmental impact of transport activities is beginning to create serious health and environment problems, and Ukraine, which until now has paid little attention to this issue till now, urgently needs to address it.

Before any sectoral strategy is developed, reliable statistical data need to be collected and appropriate internationally recognized indicators used. These are necessary not only for determining policy directions but also for measuring the effects of any policy that is finally implemented. The serious inconsistencies and gaps in Ukraine's official data on transport indicators and related environmental impacts are cause for concern. These data are insufficient to support any decision-making and cannot be used to adequately reflect trends. This shows that government competencies are not being used appropriately and that cooperation between government institutions is lacking. In addition, the overall political responsibility for transport and its environmental impacts does not seem to be coordinated by one government body but rather is distributed among several ministries, institutions and oblast and local authorities.

Recommendation 9.1:
The State Committee of Statistics, in cooperation with the Ministry of Transport and Communications and the Ministry of Environmental Protection, should gather, manage and publish all information on transport and its environmental impacts, following internationally recognized statistical systems and indicators.

As their standard of living improves, Ukraine's inhabitants will increasingly purchase and use private vehicles. This will result in higher road transport volumes and mileage. Consequently, the modal shift from rail to road transport, which is already noticeable today, can be expected to continue. Further increases can be expected in transport-related environmental impacts, including energy consumption, carbon dioxide emissions, and air and noise pollution. More attention needs to be devoted to reducing these impacts.

Recommendation 9.2:
The Ministry of Environmental Protection, together with the Ministry of Transport and Communications, should:

(a) Carry out an analysis of the environmental impacts of the transport sector; and

(b) Based on the results of this analysis, elaborate strategic concepts for developing sustainable transport and solving related environmental problems. All data, definitions and concepts should

be made publicly available and discussed with the stakeholders.

Better knowledge of the environmental impacts of transport and an improved sense of political responsibility are prerequisites for raising awareness of environmental problems and winning acceptance of mandatory improvements in the transport sector. Technical measures are generally accepted most readily because they do not influence traffic behaviour and because, at least in some areas, they have very high efficiency. For instance, emissions of major air pollutants from vehicles complying with current EU standards are up to over 90 per cent lower than emissions from vehicles complying with the current Ukrainian national standards. It is important that requirements of national standards on pollutants emissions for new vehicles are brought closer to EU emission limits as soon as possible. However, the purchase of new vehicles depends on their affordability for a potential consumer. Therefore many cars built to dated environmental standards will continue to be used for some time, as will low-quality fuels. To be effective, policies will need to include measures that improve the current vehicle stock.

Improving the quality of fuels and checking their compliance with quality standards would also reduce air pollution. Equipping vehicles with catalysts and filters further reduces emissions of nitrogen oxide, carbon monoxide, hydrocarbons and possibly particulate matter. In order to check the increasing energy consumption and the growing emissions of greenhouse gases, other measures have to be considered, and technical inspection of cars needs to be carried out strictly and regularly. Such measures, when accompanied by changes in driving behaviour, usually lead to a reduction in fuel consumption and therefore in air emissions.

<u>Recommendation 9.3:</u>
The Ministry of Transport and Communications and the Ministry of Environmental Protection should:

(a) Request the relevant authorities, including State Customs Service, to swiftly implement the Euro 2 standards, and prepare steps for transition to Euro 3 and 4;

(b) In cooperation with the Ministry of Fuel and Energy, introduce EU standards on motor fuels EN 228-2004 and EN 590-2004 as national standards for vehicles with improved environmental indicators, facilitate improvement of fuel quality, in particular regarding sulphur content, and strengthen the enforcement of related quality standards;

(c) Develop incentives to encourage the renewal of the car fleet and preferably to give a comparative advantage to cars with good environmental performance; and

(d) Establish a national testing centre to check compliance of vehicle types with requirements of international standards.

Globally, it has been observed that increased use of public transport (relative to the use of private passenger cars or aircraft) normally leads to lower environmental impacts. This applies to passenger transport via railways, trams or metro (subways) as well as to freight transport by rail or inland navigation. Passenger transport in the large cities of Ukraine could have a particularly large environmental impact. These cities have well-developed public transport systems whose relevance could, however, decrease in the future given the growing numbers of private passenger cars. Municipal authorities should devise measures to maintain attractive and competitive public transport services.

<u>Recommendation 9.4:</u>
The Ministry of Transport and Communications should continue and intensify the promotion of public transport by:

(a) Developing a programme for modernization of the railway infrastructure;

(b) In cooperation with municipal authorities, introducing measures to improve public urban transport. This includes modernization of the passenger fleet to decrease its emissions (e.g. retrofitting diesel vehicles with particulate filters, use of natural gas and other cleaner fuels for buses, and extension of tram, trolleybus and metro networks), facilitation of public transport flows, optimization of schedules and connections, and introduction of other appropriate measures favouring public transport.

Chapter 10

LAND MANAGEMENT AND PROTECTION

10.1 Land classification and land use

The 2001 Land Code divides the land fund into nine categories: land in urban and rural settlements; agricultural land; land for industry, transport and communication; land under environmental protection; land for recreation; land for health-related purposes; land of historic and cultural significance; land of forest fund; and land of water fund. Each land fund category has its reserves. These categories, and numerous subcategories, form the basis for the definition of rights and obligations, the structure of land use and management, statistical reporting and the division of administrative responsibilities among state and municipal agencies.

Land in urban and rural settlements

Ukraine has a complicated spatial planning system which includes general scheme for planning of the territory of Ukraine, large-scale plans for oblasts, rayons and cities, medium-scale and detailed plans for rural settlements and urban areas, and small-scale plans for parcels and individual buildings. These plans describe in narratives and graphics the type of land use, the category of development, urban services and infrastructures, but for most of the country's territory they need to be developed or updated. Currently the process of regulating, developing and using the territory is far from optimal.

The procedure for obtaining all the necessary permits for a developer is complicated and cumbersome. It requires the investor to shoulder all the financial risk, since the investor has no legal right to use a mortgage to finance construction. Failure to identify existing patterns and rights of ownership at the planning and building stages leads to delays in urban development programmes, unsustainable development and environmental degradation. All over the country there are many sites with unfinished construction because of lack of financing, ownership disputes among the parties, and similar reasons. In this unclear context, political pressure on development projects is huge and corruption is widespread. Pursuant to the Law on planning and building up of territories (2000), public participation in the decision-making process on urban planning must be ensured.

Agricultural land

The situation of agriculture, the main sector for land use in Ukraine, is difficult. Decreasing production in the 1990s led to considerable social problems. Off-farm job creation and improved public services in rural areas are needed to prevent increased rural poverty and continued migration to the cities.

Due to the abundance of very fertile land, including over 25 per cent of the world's resources of chernozem soil, the proportion of agricultural and arable land is very high. As much as 41.7 million hectares out of a total of 60.3 million hectares is categorized as agricultural land. While the proportion of arable land – 32.5 million hectares – is 53.8 per cent, this figure is considerably higher in the southern oblasts. During Soviet times the acreage of arable land was increased over and beyond what made economic sense. A slight decrease in arable land was seen in 2000–2005, and it is likely that economic factors will contribute to lowering the acreage further over time.

The practice of individual possession of *small land parcels* was introduced in the Soviet period. In rural areas, members of collective farms were granted parcels of land for individual gardens and livestock to produce additional food for their own use and sale. In urban areas, the population (industrial workers, war veterans, members of professional associations) received such parcels for secondary houses and gardens, without formal ownership rights but with the right of use and possession by the heirs. The period of "perestroika" saw the beginning of a process to transform the right to possession and use into an ownership right. As the national economy and agricultural sector declined in the early 1990s, these smallholdings became more important for survival, and the government increasingly recognized the small land parcels as key components of economic life. Today almost half of the country's population has received smallholdings. However not all of these are held in ownership, since many citizens are reluctant to pay the surveying and registration fees needed to claim a State Act (the formal document of ownership).

Table 10.1: Structure of land fund, 2004

Land types	Territory	
	1,000 ha	%
Total territory	60,354.8	100.0
Water surface	2,421.0	4.0
Total land	57,933.8	96.0
of which:		
Agricultural land	41,800.4	69.3
Ploughed land	32,544.1	53.9
Perennial plantations	912.8	1.5
Hay and pasture	7,938.7	13.2
Forests and other forest areas	10,438.9	17.3
Built-up area	2,463.0	4.1
of which:		
Housing	438.0	0.7
Industrial facilities	229.2	0.4
Communal buildings	291.8	0.5
Streets, squares, quays	510.7	0.8
Transport infrastructure	491.3	0.8
Marshland	951.8	1.6
Land without vegetation cover	1,040.2	1.7
Other land	1,239.5	2.0

Source : State Committee on Land Resources, Ministry of Environment Protection, 2005.

Another form of farmer holding is independent private farms, which were introduced in the early 1990s. For such farms the land was allocated not from collective farms but from state land reserves, which were in general of lower quality for agricultural purposes and with poor access to transport infrastructure. Private family farming was expected to allow the rural population to promote their farming skills as well as their initiative in order to boost efficiency and productivity in the agricultural sector. In recent years the government decided to expand this form of individual farms, and the 2001 Land Code introduced a new form of private farm on the basis of leased land (land shares of different families). Over the last 15 years, the number of such farms has increased from 80 to 43,403 (as of 1 January 2004). The average size of a private farm is 66 ha.

The principle of *agricultural land sharing* was defined in the Land Code of 1992 with two purposes in mind: (a) the internal reorganization of collective agricultural enterprises (CAEs) and (b) the overall reorganization of agricultural production and rural society. In 1994, according to the President Decree "On Urgent Measures to Speed Up the Land Reform in the Area of Agricultural Production", the lands in collective ownership were to be divided into "land shares" and the members of CAEs were eligible to receive land share certificates. The shares were still kept in common ownership, but each share certificate specified the individual holder's proportion of the land assets of the farm by value. However, the land share policy did not rapidly bring the expected positive results, as the transformation of collective ownership into real private rights to land was slow. In addition, land management agencies recorded deterioration in the quality of the land.

Recognizing this failure, the President issued the Decree "On Urgent Measures to Accelerate the Reform of the Agrarian Sector of the Economy" (December 1999), which set up a new policy of farm reorganization based on transformation of shares into real land parcels. CAEs were restructured as new businesses operating on the basis of private ownership of land. The Decree created the legal basis for nationwide privatization of CAEs and agricultural land. At the core of this policy was the concept of a new enterprise to which active farmers would provide their shares as fixed capital, while non-active shareholders would offer their shares in lease. Through the lease relationship, the passive farm members would get a regular annual income (rent), while the active farmers were expected to take the risks and reap the profits of the farm operation. Privatization of agricultural land (67.7% of all productive land) and disintegration of CAEs have drastically changed the landscape of land relationships in the country. The efficiency of the agricultural sector and crop production have improved since 2000, but it is too early to draw any more definite conclusions.

The 2001 Land Code legalized private ownership of agricultural land. It stipulated three forms of land ownership: state ownership, municipal ownership, and private ownership (by individual citizens and legal entities). At the same time, the Code introduced a moratorium on sales of agricultural land until January 1, 2007 (in February 2006, local self-government authorities requested its extension until 2012) to avoid the possibility that, because of non-transparent procedures and low prices, agricultural land would immediately end up in the hands of a small number of big farmers. The moratorium was a way of giving new landowners a chance to acquire knowledge of their assets and prevent a quick sell-off at unrealistic prices in an environment where the market works imperfectly. The Land Code does not allow foreign physical or legal entities to acquire agricultural land.

Severely degraded agricultural land was not excluded from privatization. The fact that the land is private now makes it difficult to introduce management restrictions or withdraw the land from agricultural use.

Land for industry, transport and communication

While the Land Code of 1992 did not allow private ownership of land by trade, industrial, transport, service and energy enterprises, it introduced the lease of land by the state to enterprises with the payment of rent. Only after the economic crisis of 1998 and with the 2001 Land Code was the privatization of land under urban enterprises made possible in order to make these enterprises attractive to investors. However, the process of land privatization was slow due to the reluctance of the state and municipal agencies to give away productive land, and to the poor economic situation of most enterprises.

Protected lands

In 2005, 4.6 per cent of Ukraine's territory was protected, an increase from the 3.9 per cent (in 1999) reported in the first Environmental Performance Review (Chapter 11). The legislation defines several categories of land requiring protection, which should be under state or municipal ownership: the forest fund, the water fund, lands requiring environmental protection, recreation lands, land with historical and cultural objects, and other lands in exclusive state ownership (mines, energy and transport infrastructure, airports, experimental farms, etc.). The protection regime for these lands provides that the responsible authority requires the user to ensure protection and conservation of the land during and after its exploitation. However, so far, environmental protection has been ineffective due to low financing, lack of trained personnel and equipment, and weakness of the state organizations in charge of land protection activities.

In 1998, most of the lands were still state property. However, in the privatization process, land plots have been allocated to private owners, including lands that are now planned to be put under a protection or restricted use regime. The instruments needed to apply protective measures to private land have not been developed properly, and financial compensation will now be needed to buy or pre-empt lands for placing them under a protection regime, or compensate for land use restriction. For example, economic instruments and financing are needed in order to develop protected green corridors on agricultural land in the National Ecological Network of Ukraine (see Box 10.2).

Forest area

10.5 million hectares (17.3% of the total land area) are categorized as forest area and 9.6 million hectares are covered with forests. This coverage is low historically and compared to that in other countries of Eastern and Northern Europe, but the area covered by forests increased by almost 900,000 hectares between 1988 and 2004. There are considerable geographic disparities in the forest coverage, from 51 per cent in Zakarpattya oblast to 4–5 per cent in Kherson and Zaporizhzhia oblasts. The forests include five different ecozones: mixed forests in the north, forest-steppe, steppe, the Carpathian Mountains and the Crimea Mountains. A specific problem is the radioactive contamination of forests in the north as a result of the Chernobyl accident (see subsection on Radioactive and other contamination of land below).

The most important legislation for forestry are the Land Code (2001) and the Forest Code (2006). According to the Forest Code (2006), forests are divided into four groups: protected forests (34%), recreational forests (8%), forests with environmental importance (14%) and production forests (44%). The proportion of production forests has been decreasing.

68 per cent of the forest is managed by the State Committee of Forestry, 17 per cent by the Ministry of Agrarian Policy and 7 per cent by municipalities. The rest is managed by various authorities such as the Ministry of Defence and the Ministry of Transport and Communication. 1 per cent consists of protected areas under the Ministry of Environmental

Protection. According to the present policy, some forest land (consisting of former kolkhoz forests) will be transferred from the Ministry of Agrarian Policy and municipalities to the State Forestry Committee. Forests will continue to be owned by the state or municipalities, but small forest plots – for example, those planted on unproductive or agricultural land as well as field protective belts – can be private.

Extending the acreage covered by forests, improving productivity and conserving biodiversity are important objectives outlined in various policy and legislative documents. In particular, the planting of new forests is an important component of the State Programme "Forests of Ukraine" for 2002–2015. There are plans to increase the rate of planting of protection forests from the current 10,000 hectares a year to 40,000 hectares. The ultimate objective is to "increase the percentage of forest cover to the optimal level in all natural zones".

State financing of forestry declined substantially after independence, but since 2000 the financing has stabilized and has even increased marginally. For instance, the "Forests of Ukraine" programme has not been fully funded to date.

Special attention is being devoted to the development of sustainable forestry in the Carpathians, where projects supported by donors are being implemented against the background of an intensive illegal logging and clearance of the mountain slopes. Consequences of drastic floods in 1998 and 2001 in the Carpathians due to heavy precipitation are considered to be worse because of the tree clearance. Forest Stewardship Council certification has been introduced in some forestry enterprises. Even though the volume of commercial logging has increased from about 11.4 million m^3 in 1997 to 15.2 million m^3 in 2005, there is nevertheless a shortage of timber. Illegal logging in forested areas includes cutting of shelterbelts around agricultural land. Violations are investigated by the State Forestry Committee as well as local police. High unemployment and social problems and poverty in rural areas are major contributors to illegal logging.

The State Committee of Forestry and its system of forestry enterprises fulfil the combined functions of control, administration and policy development with forest management and commercial activities. It is preferable to separate these functions, and in 2006 the Cabinet of Ministers approved a concept for a gradual reform in this direction – "Concept for the reform and development of forestry".

10.2 Degradation of land and landscapes

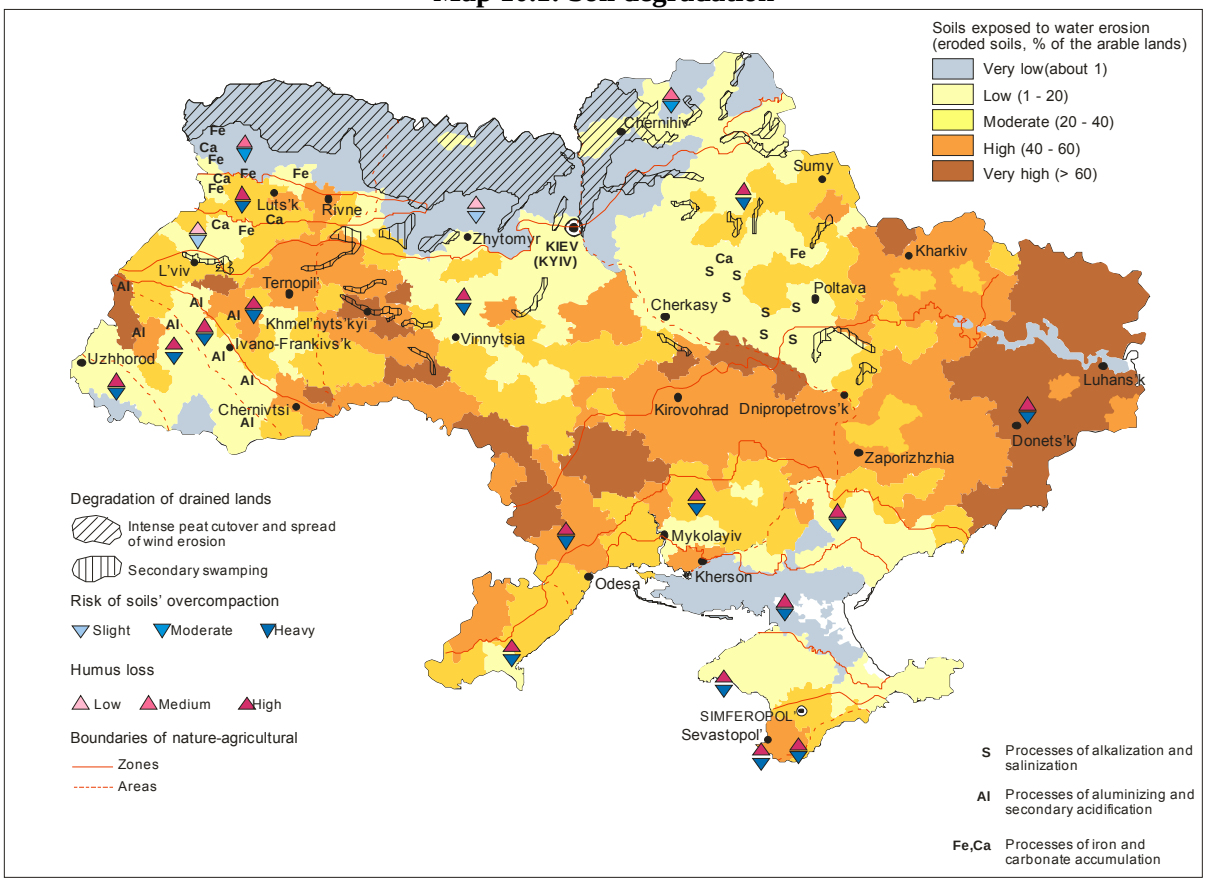
Fertile agricultural land is a key natural resource of Ukraine. But according to the UN Food and Agriculture Organization (FAO) as much as 76 per cent of the total land is severely degraded by human activities. This high figure results largely from a history of intensive agriculture. The State Committee on Land Resources has estimated the annual economic loss caused by land degradation at more than 22 billion Hrv. It is argued that 8 million hectares of severely degraded agricultural land should, instead of being privatized, have been withdrawn from use in agriculture or should have been subjected to management restrictions.

The Law on land protection (2003, No. 962-IV), the Law on land use arrangement (2003, No. 858-IV) and the Law on state control of use and protection of land (2003, No. 963-IV) include provisions to restrict improper use of land, but resources for ensuring their application are limited. A State Programme for the use and protection of land in 2006–2015 is being developed and includes soil protection measures at the farm, village and rayon levels. The programme envisages decrease of arable land by over 3 million hectares and includes measures to improve soil quality. Significant resources from the state budget – 10 billion Hrv – will be needed for the implementation of this programme. Considering the state of Ukraine's economy, it could be argued that a less ambitious but more focused programme would have a better chance of being prioritized and implemented. Presently only marginal resources are used for land and soil protection – only a portion of the revenue from the land tax that is supposed to be earmarked for this purpose.

The state land inspectorates of the State Committee on Land Resources could play a critical role in land protection, but due to lack of resources their influence is limited. Only a minority of the violations reported involve soil degradation issues.

The authorities take a top-down approach to land degradation, rather than trying to develop the knowledge and self-interest of individual farmers (see Box 10.1).

Map 10.1: Soil degradation



The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations

Source: State of the Environment Reporting Information System (SERIS), Ukraine Soil Data, National Report 2002. http://countries.eea.europa.eu/SERIS/view_on_coverage?country=ua.

There is also a lack of active cooperation between responsible authorities such as the State Committee on Land Resources and the Ministry of Agrarian Policy, even though the State Programme for the use and protection of land is the result of merging two separate draft programmes of these two authorities.

Soil fertility and soil erosion

Soil fertility has declined in Ukraine. Soil fertility is a complex characteristic and depends on several factors such as humus content and level of plant nutrients. Increased cultivation of row crops[1], in particular sunflower, as well as cereals is decreasing the humus content of the soil. The drastic decrease of fertilizer use – application rates for wheat were down to 24 kg in 2000 from 149 kg in 1990 – is another important reason for declining fertility. Other factors decreasing fertility are soil compaction by heavy tractors and destruction of the soil structure by irrigation, in particular where water has a high pH.

Restoring soil fertility is difficult. Nutrients can always be replaced, but humus content cannot be stabilized without changes in crop rotation. There are different ways to supply organic matter to the soil. Addition of manure, sludge from wastewater treatment and organic waste from different types of production are among the options. Increasing the acreage of forage crops, in particular perennial grasses, in balanced crop rotation is another. Despite the range of opportunities, today none of these options is broadly used in Ukraine's agriculture. Due to the contraction of the livestock sector, both the acreage of forage crops and the use of organic fertilizers have decreased since the 1980s.

Soil erosion is a significant problem which also decreases humus levels in soil. Ukraine's relief and climate and its very high proportion of arable land make erosion a widespread natural phenomenon.

About a third of the arable land is threatened by water and wind erosion. Poor land management practices, such as crop cultivation on steep slopes, excessive cutting of forests, shrubs and bushes, and overgrazing accelerate erosion. As a side effect,

[1] Cultivation of row crops implies frequent cultivation of the soil during the growing period, which leads to humus loss.

Box 10.1: Extension services, organic farming and good agricultural practices

Considering the importance of agriculture in Ukraine, the development and demonstration of environmentally friendly agriculture are crucial.

Training programmes and extension services are needed in the development of the economy as well as the sustainability of privatized agriculture. So far the efforts have not been sufficient, even though the National Association of Agricultural Advisory Services includes centres in 24 oblasts and the Autonomous Republic of Crimea. In several cases extension centres have worked well with donor support, only to have activities scaled down when the external funding ceases.

Organic agriculture has been practiced in Ukraine since the 1970s, when a system based on soil tillage without ploughing, application of organic harvest residues and physical and biological plant pest management was introduced. There are still farms applying these principles in Poltava oblast.

In the late 1990s a new phase started when principles of organic agriculture were introduced in international projects. In 2004, 255,000 hectares were cultivated according to organic farming, including important crops such as cereals, sunflowers and buckwheat. The internal market for organic products is small, and most such products are exported. The organic farming association Bio-Lan Ukraine was registered in 2004. Today it is a challenge for Ukraine to introduce regulations for certification of organic products. Provision of advisory services is another need.

The concept of good agricultural practices (GAP) has evolved in recent years in many countries as a result of the concerns and commitments of a wide range of stakeholders about food production and security, food safety and quality, and the environmental sustainability of agriculture. GAP applies recommendations and available knowledge to addressing environmental, economic and social sustainability for on-farm production and processing. So far GAP has not been developed or applied in Ukraine. The development of GAP should not be top-down but should involve important stakeholders such as farmers and farmers' organizations. Ukraine, as a major agricultural producer, with significant acreage and very diverse natural conditions, might benefit from the development of regional rather than national GAP and regional guidelines for their implementation. A decentralized approach is likely to promote local or regional ownership of the process.

erosion is causing sedimentation in rivers, lakes and water reservoirs. The most severely affected oblasts are Dnipropetrovsk, Donetsk, Kirovohrad, Luhansk, Odesa and Kharkiv.

Erosion by water is a major problem, in particular on agricultural land situated on hillsides (see Table 10.2 and Map 10.1). Landslides are a severe form of water erosion. In 2003 alone, 20,000 landslides were registered in Ukraine. The highest risk of landslides is in the Carpathian region and on the Crimean peninsula. Valuable land is also lost to sea abrasion along the coasts of the Black Sea and the Sea of Azov. There are 830 kilometres of coastal protection structures, 90 per cent of which should be rehabilitated. The 2001 National Programme for the Protection and Restoration of the Environment of the Black Sea and the Sea of Azov for 2001–2010 has not made yet a big difference, due to lack of financing.

Erosion by wind is affecting over 13 million hectares of land (see Table 10.2). Zaporizhzhia, Luhansk and Kherson oblasts and the Autonomous Republic of Crimea are the most severely affected.

The last comprehensive Inventory of Soil Quality conducted in 1996 indicated that the acreage of eroded arable land increased by 50 per cent between 1958 and 1996. While no systematic inventory has been made since then, erosion is still a major concern and has been worsening in the last decade. Land privatization has decreased the size of fields to some extent, which is a positive factor. However, the proliferation of short-term leasing contracts for land may decrease farmers' interest in considering land use in a longer perspective. Increased cultivation of row crops and cereals is another negative factor. Anti-erosion measures such as cultivating the soil across the slopes and optimal crop rotation are applied less than earlier. Terracing and planting of new forest protection belts has ceased, and the existing protection belts are damaged by cuttings.

Radioactive and other contamination of land

The Chernobyl accident led to significant radioactive contamination of the soil in Ukraine – more than 37 kBq/m^2 ^{137}Cs was deposited on 3.7 million hectares in Ukraine. Radioactive contamination is widespread on forest land as well as agricultural land mainly in the Zhytomyr, Rivne and Kyiv oblasts. The timber and non-timber production (wild fruits, berries, mushrooms, etc.) of a considerable acreage can no longer be used. Cows feeding on contaminated poor organic soils may still produce milk with radiation levels caused by high ^{137}Cs concentrations that exceed allowed levels. But the main remaining danger is probably the risk of redispersal of radioactivity by forest fires. Overall, the measures taken seem to be appropriate, even if there is still some debate. Due to the extra social support given to the "Chernobyl areas", local populations show

Table 10.2: Land degradation

	million ha	per cent of total area
Wind erosion	13.3	22.0
Water erosion	19.4	32.1
Combined erosion	2.1	3.4
Soil acidification	10.7	17.7
Soil salinization	1.7	2.8
Soil alkalization	2.2	3.7
Land slides	0.2	0.3

Source: Ministry of Environmental Protection. UNCCD Country Profile, 2006.

reluctance when authorities propose to declare certain areas no longer contaminated. (See also Introduction.)

Fertilizer and pesticide use has decreased substantially, and therefore related contamination of soils has declined. Still, in 2004, DDT residues were found in Donetsk, Zaporizhzhia and Kherson oblasts. A still unsolved problem is the contamination risk from more than 19,000 tons of often improperly stored obsolete pesticides.

Other land contamination problems exist:

- There is contamination by heavy metals of soils in industrial areas such as Luhansk, Khmelnitskyi, Donetsk and Kyiv oblasts. A total of 5 million hectares are contaminated. 43 military sites are registered as potentially contaminated by toxic waste.
- Acidification is also a substantial problem (Table 10.2 and Map 10.1). Vinnytsia and Kirovohrad have large acreages of acidified land.
- Salinization is decreasing, as the use of irrigation has decreased substantially during the past 15 years. Currently 1.7 million hectares are identified as saline (Table 10.2). Significant acreages of saline land are found in Kherson oblast.

Management of contaminated sites is generally weakly developed, with the exception of the areas contaminated by the Chernobyl accident.

Degradation of landscapes

The steppe and other landscapes in the south of Ukraine are under particular pressure. In this region the fragmentation of habitats, pressure from agriculture and development of infrastructure are intensive and make it difficult to protect natural and balanced landscapes as well as biodiversity. The establishment of the National Ecological Network of Ukraine (see Box 10.2) is an important development to counteract landscape degradation.

10.3 Land management and land reform

The legal basis for land management

Land management and land use are regulated in three areas of legislation and institutional set-up, as defined in the Land Code of 2001 and related laws. First, all lands are subject to land use classification. Second, through land administration (cadastre, land registration) and land management, the state monitors and guides land use and enforces restrictions in order to ensure environmental and social protection while implementing economic policies and programmes. Third, development of an effective land market is regulated through procedures and standards set by the state.

Until recently, the Land Code had not been rapidly supplemented by the necessary related by-laws. A certain number have now been adopted by the Parliament, namely laws on state control of land use and protection (2003), on the delimitation of the land in municipal and state ownership (2004), on the procedure of physical demarcation of land shares (2003), and on state registration of real estate entitlements (including land plots – 2004). A few other major laws (for example, on state cadastre, on the land market, and on the establishment and functioning of land mortgage institutions) are still awaiting adoption. These laws are urgently needed. In fact, the creation of the new land registration system and land cadastre was slowed by institutional disagreement over the issue of who would carry out land and real property registration. This situation favours speculation, corruption and the operation of a black market for land transactions.

Box 10.2: Establishment of the National Ecological Network of Ukraine (ECO Network)

The National Programme for the Development of a National Ecological Network of Ukraine (ECO Network) for 2000–2015 was approved in 2000 and the Law on the Ecological Network in 2004. The programme is a commendable and ambitious plan and a priority for the Ministry of Environmental Protection. It contributes to the Pan-European Biological and Landscape Diversity Strategy (PEBLDS) in the Environment for Europe process and the implementation of the European Landscape Convention (see the first Environmental Performance Review of Ukraine, Chapter 11).

To coordinate Programme implementation, oblast programmes and plans of actions for establishing regional ECO Network have been developed. Regional schemes of ECO Network have been developed in Ivano-Frankivsk, Kyrovohrad, Sumy, Kharkiv, Khmelnytskyi, Chernihiv, and Chernivtsi oblasts and in the city of Kyiv. In other oblasts, the work is at the research stage to establish main elements of ECO Network and develop regional schemes. Coordination of activities of national and regional authorities is implemented through Coordinating Councils at the national and oblast levels. The National Coordination Board for the ECO Network development supervises the whole programme.

While the work on the extension of existing and establishment of new protected areas is underway, the establishment of corridors between protected areas is more difficult. The main reason is that much of the land designated for this purpose is private agricultural land. This problem was predicted in the first EPR of Ukraine, which recommended creating protected zones as needed before land was privatized.

Water protection zones around the coasts of the Black Sea and the Sea of Azov as well as rivers and lakes are significant parts of the corridors. In this case there is legal support for their establishment.

Resources for the development of the ECO Network are lacking, as are sufficient knowledge and firmly established principles for the work. The single most problematic issue is how to deal with privatized land. Economic mechanisms need to be developed and resources made available to make it possible to introduce proper management restrictions.

The land market

The land market policy in Ukraine is formally based on the concept of a "socially oriented market economy". This affects the development of the land market in three ways. First, the legislation prohibited or put limitations on the sale of land in all land categories. Second, in all legal acts related to land transfers, there were requirements for administrative verification. Third, land valuation was required to be done by the State Committee on Land Resources or by dual valuation (using both state values and market prices). The state value is binding for the purpose of calculating the transaction tax and other fees, but the parties are free to set an actual sale price based on the market price.

Land privatization has created the basis for the development of a land market. However, the mere introduction of private land ownership is not enough for establishing a land market that functions properly. Any efficient land market implies the existence of a comprehensive legal and institutional framework that makes it possible to use the land as collateral, and thus facilitates land management and land transfer. In 2005, only 1.6 per cent of all formal transactions took place in the form of purchase-sale (non-agricultural lands, mainly in urban areas). Most of the transactions (86%) were recorded in the area of land inheritance, since most landowners are pensioners in rural areas.

At the same time, private dealers are quite active in the black market for land, and in taking advantage of the incoherent land legislation. At the beginning of the reform they were buying land share certificates; in the period 2002–2005, the legislation allowed the exchange of land share certificates, and many illegal exchanges took place (e.g. exchanges of land share certificates for apartments or cars). There are also reports that local rural authorities sold parcels of agricultural land (1,500–2,000 m^2) to inhabitants for individual housing construction by changing the land-use category of the parcels. Then many of these parcels were bought by rich people from nearby cities at much higher prices. A massive sell-off of agricultural lands in the near future is inevitable given that the living standards of rural landowners are extremely low, 53 to 56 per cent of landowners are pensioners and therefore no longer cultivate their plots, and 30 per cent of them do not have heirs living in Ukraine.

The land reform that started in the early 1990s has not yet been fully accomplished. The share of agricultural land still in state ownership in 2005 was only 9 per cent (mainly lands of state farms that carry out scientific and research work). 6.9 million of rural residents have obtained the basic rights of private ownership in the form of land shares. By 1 January 2006, about 5.7 million land state acts had been issued. (7 million were expected to be issued by 1 April 2006.)

The process of exchanging land share certificates for land ownership titles (land state acts) is slow, as the rural population does not have a clear understanding of the benefits of obtaining a land state act through a procedure that costs about 300–400 Hrv. Among rural residents there is little awareness of the land reform process's legal aspects and its outcomes. The privatization and sales of industrial enterprises conducted in the mid-1990s, which resulted in the concentration of a significant portion of the nation's wealth in the hands of a few owners, made rural dwellers more suspicious about the land reform process.

Finalization of the land reform

In 2003, the World Bank approved a US$ 195.13 million loan for the Rural Titling and Cadastre Development Project in Ukraine. The objective of this project is to establish a national cadastre and title registry system, privatize land parcels to individuals in rural areas, and establish their property rights by issuing state acts for land. It was envisaged that by the year 2005, this process would create the necessary infrastructure for an agricultural land market, enable the functioning of a mortgage market, and facilitate urban and environmental planning.

However, the creation of the new land registration system was slowed down by disagreement between the State Committee on Land Resources and the Ministry of Justice on which organization would perform land and real property registration. In February 2006, the World Bank threatened to stop payments for this project unless the Government resolved this dispute and took urgent measures to implement previous decisions on land privatization, cadastre and land registration.

In February 2006, the Commission on Consideration and Comprehensive Solution of Issues Related to Implementation of State Policy on Rational Land Use and Protection was established by the President's Decree, showing the existence of strong political will to proceed. The Secretary of the Council of National Security and Defence was designated as Chairperson of the Commission. The Commission has been entrusted with the preparation of proposals for improving the state policy on land relationships, rational land use and land protection. The Commission is also in charge of coordinating the work of state bodies and local authorities in the implementation of the state policy and related legislation on land use and land reform and environmental protection of the land. The President has set a deadline of 1 April 2006 for issuing all state acts on land privatization.

10.4 Conclusions and recommendations

Given the multiple functions of land in society, the legal framework for land use has to be set up carefully, taking into account the balance between economic, societal and ecological needs. In recent years, environmental problems in the farming sector and in agricultural land uses are likely to have deteriorated in Ukraine.

The traditional approach to land and soil protection remains the development of national programmes that are underfunded or not funded at all. This tends to create situations where state authorities do not assume their responsibilities – there is always a programme that is supposed to take care of the problems, but nothing or little can be done, as the funding is not forthcoming. National programmes could and should be developed, but they need to be focused and strongly prioritized – and fully funded.

Land protection

An important task in promoting environmentally sound land use is the development of a concrete and focussed national programme for land protection. The State Programme for the use and protection of land in 2006–2015 that has been proposed is very ambitious, and there is a risk that the considerable funding needed will make it difficult to approve and fund. Further prioritization may be needed.

Recommendation 10.1:
The Cabinet of Ministers should adopt the national programme on land use and protection and submit it to the Parliament for approval. Sufficient funding should be ensured to achieve its objectives.

Land administration

There is a lack of consistency and inter-ministerial coordination in the preparation of legislation affecting land reform. The government has specified that 38 first-priority laws have to be prepared to support the Land Code, of which a majority have still not been adopted by mid-2006. It could be recommended that the focus should be on improving existing laws and regulations (instead of creating new laws).

Attention should also be given to streamlining institutional responsibilities. During the last 15 years a number of new institutions and functions have been created in the area of land reform and land ownership rights, with the aim of promoting the market economy. Thus, it is no surprise that there are conflicting goals and overlapping responsibilities

among different agencies, institutions and levels of the government, with wide distribution of decision-making authority. For example, the State Land Resource Committee and the Ministry of Justice take similar initiatives but act incoherently in establishing the land cadastre and land registration system. As a result, decision-making requires numerous inter-ministerial consultations, which delays decisions on major issues and spreads confusion among citizens, the private sector and potential investors.

Ukraine has a unique possibility to develop a land cadastre and land registration system from zero, which would allow the development of a single, unified system within one state agency (institution) in charge of all land administration policy and issues. This system should cover the whole territory and apply the same rules and principles throughout the country in order to secure land ownership rights and effective land market development and to perform mass valuation of land for taxation purposes.

Provided that a unified state cadastre is developed, all necessary technical information required for rights registration should be held by a single agency. This agency must be neutral and must take fair and balanced account of the interests of all other administrations involved in the process. To improve customer services, the principle of a one-stop shop should apply. The possibility of locating cadastre offices and rights registration offices on the same premises should be considered, since in the present situation weak communication links are evident, especially in rural areas. It is necessary to fully use the potential of a unified cadastre as a fundamental source of aggregated information not only for real property rights registration but also for environmental monitoring, environmental impact assessment, land-use planning, municipal management and the like, and therefore the possibility of including information from other "cadastres" in the unified national cadastre at cadastre offices/chambers would be a plus.

Recommendation 10.2:
The Cabinet of Ministers should designate a single body (ministry, committee or agency) to be in charge of establishing a unified property cadastre (national cadastre) as a sole source of information on real estate property including land.

Land use in rural areas

As a result of land privatization, the number of landowners and that of land parcels in private ownership have increased dramatically. Thus, in order to ensure environmentally and economically effective land use, the government should address the issue of land consolidation and land reallocation. Given the current moratorium on agricultural land sales, there are two basic ways for land consolidation: (a) the renting of land by large- and medium-size farmer enterprises and (b) the expansion of small private farms by pooling the land shares of private landowners. As of now, there is no state policy on land consolidation.

One of the main principles for an efficient and competitive agricultural production is to preserve and increase land fertility and prevent soil degradation processes, which are closely linked to land management practices. However, because of the slow land reform, the 47 per cent of the 6.9 million landowners in rural areas that still have land shares use land as if they were renting it, which makes them less motivated to use land in a sustainable way, implementing protection measures to preserve its fertility, than if they were real owners.

The lifting of the moratorium on agricultural land sales is essential for the consolidation of land and for long-term planning in the agricultural sector. It is important to prepare territorial development schemes with transport infrastructure and development of off-farm economic opportunities in order to attract investments and reduce the possibility of conflicts when the Government has to buy the land for infrastructure development and other projects of national importance.

Recommendation 10.3:
The Cabinet of Ministers should establish, as a matter of priority, infrastructure essential for the proper functioning of a land market, including cadastre and land registration, valuation of land, and procedures for securing property rights and market transactions; give land owners unrestricted access to information on their legal rights and ensure that they receive information in a timely manner..

In the current economic situation, it is not easy to introduce environmental protection schemes in the agricultural sector. New practices are only likely to be introduced successfully if they also contribute to improved production and an improved standard of living. More sustainable agriculture that optimizes productivity, agricultural practices and use of inputs would have a positive impact on soil and land management.

Training is a key issue in the development of private agriculture in Ukraine. Although many farmers are skilled and have considerable experience, training

and extension services are very important elements in the development of the economy as well as the introduction of sustainable agriculture. Maintaining a well-developed and well-balanced rural economy is also crucial for the protection of the environment and natural resources, including the long-term preservation of soil and landscape. At the national level, it is important to further support the development of extension services in order to promote principles of sustainable and efficient agriculture. The establishment of good agricultural practices, possibly on a regional basis, is a key element in this process. Practices protecting against land and soil degradation are one important issue.

Recommendation 10.4:
The Ministry of Agrarian Policy should establish a process for the development and promotion of good agricultural practices and guidelines for their implementation to guide policy development and extension services in the agricultural sector. Advising farmers on how to counteract land and soil degradation should be a central component of this work.

Considerable areas of non-utilized land are found in Ukraine. Much of this land, frequently seriously degraded agricultural land, should be planted with forests. Not only does the new forest protect and regenerate the degraded land and provide opportunities for future income, it also contributes to creating new stabilized ecosystems. The State Programme "Forests of Ukraine" for 2002–2015 could be an efficient instrument for increasing forest areas if sufficient funding were allocated for its implementation.

The establishment of a National Ecological Network of Ukraine in accordance with the State Programme on Developing Econetwork is a commendable and ambitious endeavour. In a country where agriculture is so dominant, the establishment of the network is an important step for the protection of biodiversity as well as landscapes. Although the establishment of the network is developing, there are considerable problems. One of them is the difficulty of introducing management restrictions in the now private lands of the corridor zones that connect protected areas. Similar restrictions in land use are needed on large areas of degraded agricultural land that should be withdrawn from arable agriculture.

Recommendation 10.5:
The Cabinet of Ministers should ensure financing to make it possible to accelerate the implementation of the State Programme on Forestry for 2002–2015 and the State Programme on Developing Econetwork, in particular with regard to the enlargement of forested areas.

Recommendation 10.6:
The State Committee on Land Resources, in collaboration with the Ministry of Environmental Protection and the Ministry of Agrarian Policy, should develop economic mechanisms/compensation schemes and regulations to make it possible to introduce proper management restrictions on private land, particularly in the ecological network corridors, and to withdraw severely degraded land from arable agriculture.

Land use in urban areas

Land management in urban and rural settlements needs to be improved in order to contain urban sprawl, optimize the infrastructure and rationalize the use of land.

Decisions on master plans and related development should be made by municipalities, which should involve their population through public hearings. If needed, appeals to the regional government should be possible. The municipality should be responsible for issuing building permits on the basis of the approved master plans. It should not be possible to issue building permits that contradict existing master plans.

It should become obligatory by law for urban municipalities to pre-empt or privatize real property through open tenders, regardless of whether it is being sold, leased or rented; a possible procedure for such open tenders could be:

(a) Municipalities in urban areas report all real property for sale, lease or rent to the regional authority.

(b) The regional authority publishes every quarter, in at least two broadly available media publications, a list of real property to be put out for tender in each urban municipality. The list should very briefly describe each property, the form of transaction planned (sale, lease, rental), the deadlines for tendering, and information on where in the municipality further information can be obtained and tenders submitted.

The state authorities should develop guidelines on flexible, efficient and transparent procedures for land-use planning and zoning in urban areas. Such guidelines should include recommendations on procedures for making changes to already approved plans. Public participation in the decision-making

process should be a routine practice and should be provided for in urban planning legislation.

Recommendation 10.7:
In order to better control urban sprawl:

- *Municipalities and relevant governmental bodies, within their competence, should prepare or update documentation related to urban planning including land use planning;*
- *Municipalities should grant building permits in accordance with this documentation;*
- *Clear procedures for making changes to already approved plans should be specified; and*
- *Public participation in the decision-making process should be a routine practice and ensured by compliance with the relevant legislation.*

ANNEXES

Annex I : Implementation of the recommendations in the first Environmental Performance Review

Annex II : Selected regional and global environmental agreements

Annex III : Selected economic and environmental indicators

Annex IV : List of major environment-related legislation

Annex I

*IMPLEMENTATION OF THE RECOMMENDATIONS IN THE FIRST REVIEW**

PART I THE CONDITIONS OF ENVIRONMENTAL POLICY AND MANAGEMENT

Chapter 1: Legal instruments and institutional arrangements for environmental protection

Recommendation 1.1:
A deadline should be set for the former Soviet regulations to be replaced or abolished. The laws that were drafted before the new Constitution was adopted should be re-examined critically. The harmonization between laws and their effective enforcement should be regarded as a priority.

The Constitution of Ukraine has been adopted on June 28, 1996. Since then, most legislative acts adopted before 1996 have been revised. However, some former Soviet regulations, e.g. some environmental standards, are still in force.

Recommendation 1.2:
The National Environmental Action Plan should be revised and refined in close cooperation with other ministries and social groups concerned, to set clear priorities, targets and time frames in the different sectors of environmental protection. See also Recommendations 3.1 and 7.4.

Key policy document "Main Directions of the National Policy of Ukraine for Environmental Protection, Natural Resource Use and Environmental Safety" (Resolution of Verkhovna Rada of Ukraine № 188/98-VR, 5 March 1998) has not been revised. The draft Strategy of Sustainable Development of Ukraine is now in the process of consideration and approval. The draft Strategy formulates priority goals and objectives including those related to the environmental sector. It is expected that national environmental policy will be revised after the adoption of the Strategy of Sustainable Development.

Recommendation 1.3:
There should be a continuous exchange of views between the different administrations and interest groups involved throughout the law-making process; substantive contacts and cooperation between ministries and with other institutions should be possible without the authorization of the Cabinet of Ministers.

Ad hoc working groups and task forces for drafting legal and regulatory acts as well as for solving the intersectoral problems are typical forms of cooperation between different governmental bodies.

Recommendation 1.4:
Environmental auditing of industrial enterprises should be considered a suitable basis for gradually developing an integrated permitting system, covering air, water and waste at the same time. The organization of the various inspecting services should be reconsidered with a view to improving their combined economic efficiency. See also Recommendation 13.6.

Introduction of integrated permit system requires substantial revision of current legislation. The Ministry of Environmental Protection of Ukraine is in the process of drafting the set of relevant legal acts.

* The first review of Ukraine was carried out in 1999

Recommendation 1.5:
The Ministry of Environmental Protection and Nuclear Safety should strengthen its coordinating activities regarding environmental monitoring. A coherent and comprehensible national monitoring system should be developed, for which the harmonization of data systems and methodologies is a prerequisite. The data should also be systematized, integrated and processed for management decisions. The European Environmental Agency should be provided with comparable data. The work on the development of an adequate environmental information system should be accelerated in order to assist in the strengthening of public and governmental awareness of environmental problems. See also Recommendations 4.7, 7.6, 8.2, 9.5, 10.5, 11.6.

The Cabinet of Ministers established the Interdepartmental Commission on Environmental Monitoring in 2001 (Resolution No. 1551 of 17 November 2001). In 2002 the Ministry of Environmental Protection approved the Procedure for Information Exchange between the Ministry's Bodies and Other Environmental Monitoring Entities when Conducting Prescribed Observations of the Environment. The European Environment Agency was provided with comparable datasets for the 2003 Pan-European State of Environment Report (Kiev Assessment).

Recommendation 1.6:
The Ministry of Environmental Protection and Nuclear Safety should improve public access to environmental information in accordance with the Aarhus Convention and should seek more contact with the entire NGO community, particularly when preparing legislation and developing policies or action programmes. Suitable methods for improving public participation should be adopted after consultation with the NGO community. Environmental impact assessment should be seen as one tool for strengthening public participation in environmental decision-making. The Ministry should intensify its contacts with the press. The public should be encouraged to pursue its environmental rights, and procedures for public participation in environmental decision-making should be put in place speedily.

In 2003, the Ministry of Environmental Protection approved the procedure for providing public with environmental information and the regulations on public participation in decision-making in environmental matters. The Public Council was established in 1999 at the Ministry of Environmental Protection. The Council consists of representatives of different environmental NGOs and agenda of its meetings includes consideration of draft legal and regulatory documents and different issues of development and implementation of environmental policy. In 2003, the Aarhus Information and Training Center was opened at the Ministry of Environmental Protection. The Ministry signed an agreement with the All-Ukrainian weekly "Ukraine and World Today" in order to share environmental information through regular publications. The State Construction Norms DBN A.2.2-1-2003 "Structure and content of the documentation for environmental impact assessment (EIA) in designing and building industrial enterprises, buildings and structures. Main regulations for design." established a procedure for public participation in EIA.

Chapter 2: Economic and regulatory instruments

Recommendation 2.1:
The necessary and sufficient economic instruments needed for the introduction of the polluter-pays principle should be identified. Investigations are necessary in preparing decided moves towards an unequivocally market-oriented fiscal and economic policy. They should clarify what levels of environmental charges etc. are both sufficient and feasible, and determine the time frame for their introduction. See also Recommendations 7.3, 8.7 and 10.3.

The system of pollution charges has remained basically unchanged, although rates have been raised to reflect past inflation. In spite of some attempts to reconsider the system of pollution charges, going beyond their revenue-raising role and focusing on alleviating environmental pressures, results are still insufficient.

Recommendation 2.2:
The system of ambient standards for pollutants that are most significant for environmental health and ecosystem protection should concentrate on the pollutants that can be monitored and for which the standards can actually be enforced, including those for which Ukraine has assumed international obligations. The standards should be simple, clear and controllable. See also Recommendation 8.5.

The system of ambient standards for pollutants remains unchanged since the first review of Ukraine and is still based on maximum allowable concentrations (MACs) for a large number of pollutants. One important exception is standards for air pollutants based on the Law on Air Protection that came into force in 2001. A new approach is now used for air pollution in existing and new installations. Conditions in permits for air emissions are no longer based on MACs in ambient air since 2003 when the MEP abolished this practice.

Recommendation 2.3:
A special mechanism should be designed to help create a market for secondary products. The waste disposal charges could be increased, and clauses for refunding could be introduced for recycling and reuse.

The rates of waste disposal charges have been increased in line with inflation. A state company, Ukrecocomresources, has been created to operate a system of collection, sorting, transportation, recycling and utilisation of waste. The licensing procedure for the enterprises dealing with the collection of waste for recycling has been established. The centralisation of licensing is an obstacle for the development of private business in this area.

Recommendation 2.4:
The statistics on environmental expenditures should be improved, indicating the source of funding.

The OECD project "Setting of information systems of expenditures for environmental protection in compliance with standards of OECD/Eurostat" is being implemented in Ukraine. The implementation of the project will allow policymakers to plan public environmental expenditures in a more effective way. The Government has to approve the new system of environmental expenditures reporting and enforce it.

Recommendation 2.5:
A national environmental fund and regional environmental funds should be created with clear and transparent management systems. The purpose of the funds would be to improve the difficult funding situation of environmental activities during the transition period.

As of today, environmental funds are in fact earmarked budget accounts and are consolidated into the State budget and budgets of the respective territorial levels. They are not separate legal entities. To improve the system of environmental funds, a Law on National Environmental Fund was drafted. The law would (a) transform three-level environmental funds system into two-level one (1 national and 27 regional funds, including the Autonomous Republic of Crimea, 24 oblasts and the cities of Kyiv and Sevastopol); (b) give the funds an independent legal status; (c) use the funds to help enterprises by reducing the costs of commercial loans for environmental investments. In 2006, the draft law was rejected by Verkhovna Rada (Parliament).

Chapter 3: International cooperation

Recommendation 3.1:
The National Committee for Sustainable Development should intensify its work and meet at regular intervals to make it an effective tool for intersectoral cooperation regarding environmental issues. *See also Recommendation 1.2.*

The National Committee for Sustainable Development under the Cabinet of Ministers of Ukraine was dissolved in 2003 (Resolution No. 1414 of 4 September 2003). The same year the National Council on Sustainable Development under the President of Ukraine was established (Resolution No. 388 of 3 May 2003). The mission of the Council is to improve and coordinate activities in the field of sustainable development. However, the Council remained in fact non-operational, with no meetings of the Council taken place since its inception.

Recommendation 3.2:
Implementation, compliance and enforcement of environmental norms and action plans following existing international commitments should be a priority for all actors in Ukraine's environmental policy. Plans for the ratification of new international legal instrument for environmental protection should include an assessment of the cost of its implementation, and Ukraine should continue to work towards the ratification of all major

international environmental conventions, in accordance with its national priorities. See also Recommendation 7.9.

Ukraine is a party to 20 major environmental conventions and a signatory to two more. It has acceded to nine and signed six protocols to environmental conventions. Compliance with and enforcement of international agreements are weak, mainly due to a lack of financial means clearly dedicated to implementing their provisions.

Recommendation 3.3:
The coordination and cooperation between all institutions involved in the development of policies and the management of internationally funded projects should be improved. A special project management unit for environmental projects receiving foreign financial assistance should be established. A voluntary international task force could also be created, composed of partner countries willing to assist Ukraine in its environmental protection activities. A clear orientation towards market-oriented measures and approaches is needed also for international cooperation.

The Ministry of Economy of Ukraine is a key coordinator of international technical assistance for Ukraine. The Ministry arranges regular meetings involving representatives of governmental institutions as well as representatives of the projects of technical assistance, international financial institutions, foreign companies, etc. In order to coordinate cooperation with international organizations on implementation of environmental programmes and projects, the Unit for Coordination of International Technical Assistance has been established within the Department of International Cooperation of the Ministry of Environmental Protection. But the Unit has no right to financially manage an international project. Several projects have experienced problems during the implementation phase that have caused their temporary suspension or even complete closure, with the work left unfinished.

Recommendation 3.4:
The preparations for the "Environment for Europe" Conference in 2002 should start early, and involve all governmental and non-governmental institutions concerned.

The Fifth Pan-European Conference of Environment Ministers "Environment for Europe" took place on May 21-23, 2003 in Kyiv. Delegations of 51 member states of the UNECE region and 29 international organizations as well as representatives of numerous environmental NGOs and mass media participated in the Conference.

Recommendation 3.5:
Awareness about international environmental conventions and policies and their importance for social and economic issues at the national and regional levels should be raised with special programmes targeting decision makers as well as the public.

In order to raise awareness about international environmental conventions, the administrative and scientific centers for some conventions have been established. Texts of most conventions were translated into Ukrainian, published and disseminated among political, educational, scientific, and NGO communities. Special training programmes, mainly related to the implementation of Aarhus Convention, are arranged by the Aarhus Center.

Recommendation 3.6:
The development of bilateral and multilateral agreements, projects and action plans to conserve threatened species and migratory species should be encouraged; in particular, measures should be taken to prevent the import of alien species and the illegal traffic in wildlife specimens, in particular those covered by CITES in order to prepare for its implementation.

A number of legal acts have been adopted in Ukraine to conserve endangered species and migratory species. *Inter alia*, Ukraine signed the Memorandum of understanding on the conservation of *Otis tarda* in 2002, the Memorandum of understanding on the conservation of *Acrocephalus paludicola* within the Bonn Convention in 2003. Ukraine has signed and ratified the Agreement of the Protection of Bats in Europe. According to the requirements of the CITES, the Rules of issuing permits and certificates for import/export of endangered species of wild flora and fauna have been approved (Order of the Ministry No. 147/110 of 16.04.2002). The

cooperation with Danish and Dutch governments resulted in publication of information materials related to CITES (text of the Convention, species catalogue etc.) The published materials were distributed to all relevant officials (customs officers, ecological inspectors, etc.).

PART II MANAGEMENT OF POLLUTION AND OF NATURAL RESOURCES

Chapter 4: Management of nuclear safety

Recommendation 4.1:
Following ChNPP Units 1 and 2, Unit 3 should also be shut down permanently according to the Memorandum of Understanding. If K2/R4 should start operation, the possible shutdown of other older reactors should be considered. The international community should consider assisting financially in all technical and socio-economic consequences of such decisions, which in some cases may substantially affect entire communities, like the city of Slavutych.

According to the Resolution of the Cabinet of Ministers No. 598 of 29 March 2000 the Unit 3 of Chernobyl NPP was shut down permanently in December 2000. The Energy Strategy of Ukraine for the period until 2030 foresees the extension of the prescribed period of exploitation of Ukrainian nuclear reactors for 15 years.

Recommendation 4.2:
Legal instruments (including the final adoption of licensing procedures for nuclear facilities) and institutional arrangements for nuclear safety should be aligned with the strategic objective of making operators of nuclear facilities responsible for safety. Environmental policy requirements regarding uranium mining, radioactive waste management and plans for the exclusion zone around Chernobyl should also be formulated swiftly.

The Law on Licensing Activity in the Area of Nuclear Energy Use was adopted in 2000 (No. 1370-XIV). Resolution of the Cabinet of Ministers No. 2015 of 25 December 2002 approved the Comprehensive Programme on Radioactive Waste Treatment, which specifies actions and timeframe for their implementation. Interagency Commission on Issues of Implementation of Comprehensive Programme is responsible for coordination of activities under the programme. The State Enterprise "East Mining Complex" in the city of Zhovti Vody is dealing with extraction and processing of uranium ores. The Programme of Social and Radiation Protection of Population of the City of Zhovti Vody for 2003–2012 was adopted by the Resolution of the Cabinet of Ministers No. 656 of 5 May 2003.

Recommendation 4.3:
A realistic scenario for the role of nuclear energy should be developed urgently. The scenario should include (a) a revised projection of the future demand for electricity, (b) an assessment of the long-term capabilities of renewable energy in Ukraine, (c) a programme of energy saving measures and (d) an operational plan to make VVER reactors safer. See also Recommendation 13.5.

The Energy Strategy of Ukraine for the period until 2030 was approved in March 2006 by (Resolution of the Cabinet of Ministers No. 145-r). The Strategy proposes to meet the increasing demand in heat and electricity by constructing 22 new nuclear reactors (total capacity 18.5 GW). Besides nuclear energy the Strategy focuses on conventional fossil fuels, i.e. coal, gas and oil. It briefly mentions renewable energy sources and does not cover new energy technologies. The Strategy includes a set of energy saving measures.

Recommendation 4.4:
The nuclear energy programme should put emphasis on the construction of dry storage facilities, preferably in the vicinity of nuclear power plants, and on the construction of waste-processing, conditioning and final disposal facilities focusing on long-term safety according to international standards.

According to the National Energy Programme (approved by the Resolution of Verkhovna Rada of Ukraine No. 19 of 15 May 1996), the best technical solution to deal with the spent fuel is a construction of the system of dry storage installations available for 50 and more years of exploitation. In September 2001, the dry depository on the territory of Zaporizhzhia NPP was set in operation. National nuclear energy-producing company

"Energoatom" is dealing now with the construction of new dry depository for nuclear waste from Rivne, Khmelnytskyi and South-Ukrainian NPPs.

Recommendation 4.5:
In view of the constantly decreasing stability of the shelter and the fact that nuclear excursions cannot be excluded, the SIP should be implemented without delay.

The project for transformation of the Shelter over the Reactor No. 4 of the Chernobyl NPP into an environmentally safe system was expected to be implemented over the period 1997–2002. However the rate of the implementation of the project is far slower than anticipated. See also implementation of Recommendation 4.6.

Recommendation 4.6:
To ensure a decent future for the exclusion zone, it is paramount that the Chernobyl waste should either be confined safely on site or disposed of in repositories in accordance with the minimum risk principle. The temptation to convert the zone into a large dumping area should be resisted. The status of settlements in the zones should be reconsidered frequently on the basis of realistic scientific analyses, and the change of status towards more normality should be promoted by the authorities wherever justified.

The main flow of nuclear waste is generated in the exclusion zone. State enterprise "Chernobyl NPP" has developed Integrated Programme of Nuclear Waste Management after Decommissioning of Chernobyl NPP and began its implementation in 2003. The Programme includes an optimized scheme of nuclear wastes management, taking into account the complex of measures related to decommissioning of reactors, stabilization of the Shelter, enhancement of reliability and durability of buildings and systems, preparation for construction of new safe confinement including objects for treatment of nuclear waste both on the territory of NPP and in the exclusion zone.

Recommendation 4.7:
A programme to improve the technical layout and equipment of monitoring facilities should be developed and implemented. Sampling, measuring, evaluation and documentation procedures should be standardized so as to facilitate the establishment of a national databank. See also Recommendation 1.5.

The Concept of a State Programme of Natural Environment Monitoring was approved by the Resolution of the Cabinet of Ministers No. 992 of 31 December 2004. The Concept envisages technical modernization of the state system of environmental monitoring, optimization of monitoring network, establishment of databases for multiple users, and increase in the amount of information submitted by the monitored subjects to the state system of environmental monitoring.

Recommendation 4.8:
The planned Information and Emergency Centre should be completed urgently, and the remaining three NPP sites should be equipped with all the automatic monitoring instruments. All attempts by the Ukrainian authorities to obtain the final share of financing as foreseen in the IEC concept should be supported.

The Information Emergency Centre of the state system of environmental monitoring was established in 2005. In 2004 the Ministry of Environmental Protection restored functioning of the GAMMA-1 system after establishing the Interagency Information and Analytical Centre. Further development of the GAMMA-1 system is anticipated with inclusion of the areas around all NPPs into the control subsystems. Consultations with EU countries on continuation of these activities are ongoing.

Chapter 5: Promotion of industrial safety and cleaner production

Recommendation 5.1:
There is an urgent need to develop a coherent legal system on the issue of environmental safety by drawing up all required regulations and ordinances, and so provide clear-cut task sharing and coordination among the responsible bodies. See also Recommendation 10.2.

The EIA procedure in Ukraine (the State Construction Norms DBN A.2.2-1-2003) includes the requirements of risk assessment of the planned activities. The state ecological expertise is compulsory for 22 different types of activities that have been identified as prone to causing higher environmental risks. Eight standards of the ISO 14000 that were introduced at the national level and the Law "On environmental audit" gives enterprises opportunities to implement environmental management systems. In 2002, the Cabinet of Ministers Resolution "On approval of Rules and Measures for Environmental Insurance and Civil Liability for High-risk Installations" (No. 1788 of 16 November 2002) introduced a methodology for calculating damage from accidents and related financial insurance, which is a requirement for granting permits to such industrial enterprises.

Recommendation 5.2:
Ukraine should speed up the adoption of the draft law on high-risk installations based on the EU Seveso II directive and the ECE Convention on Industrial Accidents, and prepare the relevant regulations, ordinances and norms necessary for the implementation of this law.

The Law "On High-risk Objects" was adopted in 2001 (No. 2245-III) and the related by-laws have also been approved.

Recommendation 5.3:
The Ministry of Environmental Protection and Nuclear Safety should effectively coordinate the use, transport and storage of hazardous substances, taking into account the relevant EU practices. The setting-up of a centre for chemical safety should be considered in this connection. This measure should be seen as a first step towards the urgent establishment of a comprehensive national emergency prevention and response system. See also Recommendation 6.6.

The Law "On the Protection of Population and Territories against Emergencies of Natural and Technological Character" was adopted in 2000 (No. 1809-III). The Law includes the provisions on the protection of population and territories against emergencies, on the main objectives of the state prevention and response system on natural and technological emergencies. Transportation of hazardous substances is regulated by the Law "On Transportation of Dangerous Goods" (No. 1644-III, 6 April 2000) and other legal acts and is based on issued licenses and permits. The state prevention and response system on natural and technological emergencies was established according to the Resolution of the Cabinet of Ministers No. 1198 of 3 August 1998.

Recommendation 5.4:
A national cleaner production strategy, including a statement of programmatic policy objectives, management measures, information means, education and training programmes, other provisions for capacity building, institutional arrangements and funding mechanisms for the application of cleaner production, should be developed and adopted. The strategy should include a time schedule for implementation of the measures and should favour integrated approaches to cleaner production. Full cooperation with other ministries as well as industrial representatives should be ensured in the development of the strategy. The administration of cleaner production policies – including that of technological transfers – should be freed of all unnecessary bureaucratic complications.

The Ministry of Environmental Protection has developed the draft Law on the national concept of introduction of cleaner production. The draft law is undergoing a process of consultations with the relevant ministries.

Recommendation 5.5:
Industry should be encouraged to recycle and reuse materials and resources, including water resources, which are currently used in an unsustainable way. See also Recommendation 8.6.

Verkhovna Rada (Parliament) adopted the Resolution "On the state of compliance of the legislation in the area of waste management in Ukraine and ways to improve it" (No. 2967-IV of 6 October 2005). To implement the provisions of the Resolution the Ministry of Environmental Protection developed the draft law "On introducing changes to the Law of Ukraine "On Waste". The draft law intends to encourage recycling and reuse of materials and resources.

Recommendation 5.6:
The Ministry of Environmental Production and Nuclear Safety should consider, at least for a limited period of time, supporting the provision of information on the potential for economic improvements through the introduction of cleaner production in Ukrainian enterprises. Likewise, education and training in this area should be promoted by requesting universities, business schools and other relevant educational establishments to integrate cleaner production and pollution prevention principles into their curricula. If there is not enough national funding for these activities, they would merit priority consideration in any international assistance programme.

Ukraine has introduced state educational standards and mandatory curricula for environmental experts. A number of new environmental curricula have been initiated, that includes cleaner production and pollution prevention principles. The State Ecological Institute of the Ministry of Environmental Protection is a leading institution providing retraining for environmental experts from industrial enterprises. The National Toxic Waste Management Programme (Law No. 1947-III of September 14, 2000) includes Chapter VIII "Staff training and education".

Recommendation 5.7:
Centres for cleaner production should be established in each of the industrialized regions of the country. The centres should participate in the promotion of cleaner production concepts and principles in all possible ways.

At the present time, Cleaner Production Centers are functioning in Dnipropetrovsk and Kyiv. However, these centers have only developed few small-scaled projects.

Recommendation 5.8:
The funding of cleaner production investments should initially be given special consideration. If necessary, and for a limited time, fiscal measures should be taken to complement other sources of funding so as to promote such investments.

The funding of cleaner production in the country has advanced slowly. One of the few investments in the field of cleaner production was the pilot project in the framework of the Tacis/Phare Cross-border Cooperation Programme in Ukraine and Romania. The project was implemented in three Ukrainian wood-processing enterprises in Chernivtsi oblast.

Recommendation 5.9:
Instruments for evaluating the environmental damage caused before privatization should be identified and introduced into the legislation; responsibility and liability sharing between the former and future owners should be clearly stated.

In 2004 the Law on Changes to Different Ukrainian Laws to Meet Ecological Requirements in the Privatization Process was adopted.

Chapter 6: Waste management

Recommendation 6.1:
The current establishment of a modern legal basis for waste management should aim at internal consistency and completeness with regard to management tasks and instruments, but avoid redundancies.

Since adoption of the Law on Waste in 1998, a number of legal acts, including five laws and 23 Resolutions of the Cabinet of Ministers have been adopted to make this law operational. The analysis of the current legislation has been made with the aim of improving the legislation and introducing necessary changes.

Recommendation 6.2:
Industrial generators of waste and NGOs should be associated, on a consultative basis or through pilot projects, with the ongoing development of the legal framework for waste management, as well as with all future activities. Campaigns should be organized to raise public awareness about waste minimization and waste recycling.

The representatives of the Council of Entrepreneurs at the Cabinet of Ministers of Ukraine are involved in the revision and improvement of current legal framework for waste management.

Recommendation 6.3:
The clear definition of administrative responsibilities and efficient coordination between different institutions involved in waste management should be seen as a high priority. In the interest of law enforcement, duplication of mandates has to be avoided. Each institution involved should obtain satisfactory budgetary authority for carrying out its mandate. Internal control mechanisms and external audits are needed to ensure an efficient, transparent and credible system of enforcement.

The Law "On Waste" (No.187/98-VR of 5 March 1998) defines the sphere of competence and responsibilities of central and local government bodies in waste management. The National Toxic Waste Management Programme (Law No. 1947-III of September 14, 2000) and the Programme for Recycling and Reuse of Production and Consumption Waste (CoM Resolution No. 668 of 28 June 1997) as well other legal acts in the area of waste management include division of responsibilities between different institutions involved in waste management.

Recommendation 6.4:
A comprehensive analysis should be undertaken of all realistic funding possibilities for the purposes of creating the waste management facilities required in the country. A distinction between short- and long-term possibilities seems appropriate. The results of the analysis should be applied.

The analysis was conducted of the funding possibilities for the national, regional and local programmes of waste treatment. In the process of implementation of the national, regional and local waste treatment programmes, financing was identified from the following sources: National Environmental Fund, State budget, local budgets, businesses and, in some cases, foreign investors.

Recommendation 6.5:
The establishment of a plan of priority actions to improve waste recovery and treatment operations from an environmental point of view should be considered urgent.

The list of priority actions was prepared and approved by the Cabinet of Ministers within the framework of the National Toxic Waste Management Programme (2000). Other related programmes with corresponding action plans include Programme for Recycling and Reuse of Production and Consumption Waste until 2005 (1997) and the Solid Household Waste Management Programme (2004).

Recommendation 6.6:
The obsolete pesticides should be analysed for their chemical characteristics and the associated human health and environmental risks, stored in an acceptable manner to reduce these risks and finally destroyed as soon as possible. See also Recommendation 5.3.

The National Toxic Waste Management Programme envisages measures for the development of technologies and facilities for the utilization and neutralization of obsolete pesticides. In 2003, integrated inventory of obsolete and forbidden pesticides was completed.

Chapter 7: Air management

Recommendation 7.1:
The adoption of the revised Law on the Protection of Atmospheric Air should give rise to the urgent development of implementing regulations. The creation of an interministerial task force should be considered, to coordinate the rights and responsibilities of all levels of administration in the new air management scheme.

The Law of Ukraine "On introducing changes to the Law of Ukraine "On Air Protection" adopted the new version of the law (No. 2556-III of 21 June 2001). The Cabinet of Ministers has adopted a number of Resolutions to make this law operational. The respective instructions and methodological materials are been developed.

Recommendation 7.2:
A training programme for environmental inspectors should be established to prepare them for their new tasks following the adoption of the new Law on the Protection of the Atmospheric Air. It should benefit from relevant experiences obtained in oblasts with modern air management. The programme should include the necessary funding provisions and should start to be implemented urgently.

Regular trainings are provided for environmental inspectors in the field of air protection. The training curricula include methodology of defining the volume of emissions and procedural issues of issuing permits for air pollutants emissions.

Recommendation 7.3:
The efficiency of existing economic instruments has to be analysed for the purpose of reassessing subsidies, consolidating environmental funds and increasing emission charges when necessary. The polluter-pays principle should be applied in a rigorous way to all emission sources, whether stationary or mobile, and systematically to both physical and legal persons. See also Recommendation 2.1.

The emission charges rates have been raised to reflect inflation. Charges on emissions from road transport apply only to enterprise fleets, and not to private cars, which are a major source of air pollution.

Recommendation 7.4:
The priorities in the NEAP and its present implementation phase should be critically reviewed and focus on designing a realistic medium-term action plan or plans, separately for each city, in order to lower air pollution. See also Recommendation 1.2.

While no review or update of NEAP has been done, local authorities in some cities with increased levels of air pollution have been developing action plans to improve air quality. For example, such plans intended to limit pollution from stationary sources have been adopted in Donetsk and Mariupol by local authorities.

Recommendation 7.5:
The main polluters (i.e. power stations, chemical industries, metal industries etc.) responsible for air pollution in big cities should be subject to environmental auditing to identify their potential for cutting emissions via low-cost measures. See also Recommendations 1.4 and 13.6.

Assessment of air pollution is envisaged by regulation currently in force and is part of materials to be submitted for getting permits for air pollutants emissions.

Recommendation 7.6:
All possible ways should be explored to install modern computing and laboratory equipment as well as data transmission and analysis software at HYDROMET. See also Recommendation 1.5.

35 laboratories for air monitoring (network of State Hydrometeorological service) were equipped with computer technology in 2000 using technical assistance provided by the Ministry of Environment and Territory of Italy. During 2000-2002, the Hydromet monitoring stations were supplied with some new equipment and devices to measure pollutants in the ambient air. Equipment acquisition was mainly funded from the National Environmental Fund.

Recommendation 7.7:
The air pollution monitoring system should be redesigned and integrate existing sectoral air-quality measurement programmes. It should follow modern methodology and use automated equipment.

To improve efficiency of the background network of monitoring for environmental pollution, the Programme of improvement of the quality of background monitoring of natural environment was approved by the Ministry of Environmental Protection. The Programme has been introduced in the Hydromet system. The programme has determined procedure of selection of the sampling points, number and frequency of measurements as well as the list of pollutants in air and surface and sea water.

Recommendation 7.8:
The existing inventory and related reporting system should be redesigned and expanded to cover the most important polluters and concentrate on classic as well as the most hazardous pollutants. The inventory methodology should be in line with the EMEP inventory guidebook. The public should be informed of the results.

New forms of statistical reporting were developed and introduced in 2003. Methods of determination of integral emissions of pollutants in ambient air were developed and harmonized with the CORINAIR/EMEP Guidelines of inventory of pollutants emissions.

Recommendation 7.9:
Ukraine should accelerate its ratification of the environmentally relevant ECE conventions and protocols that it has already signed and develop appropriate strategies for their implementation. It should also envisage acceding to those that it has not signed and sign new instruments that could be instrumental in redesigning policies and strategies for air pollution abatement and implementation of urgent control measures within the NEAP. See also Recommendation 3.2.

Ukraine has ratified UNECE environmental conventions and some of their protocols and is undertaking efforts to sign and ratify other protocols to some conventions and strengthen mechanisms of the implementation of their provisions.

Chapter 8: Water management

Recommendation 8.1:
The institutional responsibilities for water management and standard-setting should be streamlined. Clear responsibility for coordination should be assigned and a coordination mechanism should be created.

Ukraine is in the process of administrative reform of the state bodies responsible for environmental protection and natural resource use, which anticipates, in particular, clear division of functions and responsibilities in the area of water resource management.

Recommendation 8.2:
The establishment of a national agency responsible for unifying the standard system and methods, i.e. a standardization agency, should be considered. See also Recommendation 1.5.

Technical Committee (TC) 82 "Environmental Protection and Rational Use of Natural Resource" was reorganized in TC 82 "Environmental Protection" at the State Ecological Institute. This step was aimed at the improvement of environmental protection activity in accordance with the Law of Ukraine "On Standardization" (No. 2408 of 17 May 2001).

Recommendation 8.3:
Basin (or catchment) structures and committees should be created for each significant river basin, and integrated water management principles introduced at basin level. All affected national, regional and local authorities should participate, possibly together with international partners (i.e. the Republic of Moldova in the case of the Dniester). The institutional responsibilities of the basin structure should be matched by sufficient funding provisions, so that the (local) water management objectives can be achieved, in particular with regard to waste water. Financial resources from water charges collected at the basin level should be reallocated to improving the water management situation on the same territory. See also Recommendation 9.6.

The Water Code (Article 13) establishes the basin principle of state management of water resources. State management in the area of use, protection and restoration of water resources is to be implemented in accordance with the basin principle on the basis of state, international and regional programmes. The principle is taken into account in the process of the implementation of the National Programme for the Protection and Rehabilitation of the Environment of the Black Sea and Sea of Azov, the State Programme of Water Management Development, UNDP-GEF Project "Environmental Rehabilitation of the Dnipro River Basin". The Cabinet of Ministers has approved the Concept of Environmental Rehabilitation of the Siverskyi Donets River (Resolution

No. 224-p of 23 April 2003), which is also based on the basin management principle. However, state bodies for basin water management have not been established, as no financing from the State budget has been allocated for this purpose.

Recommendation 8.4:
The Ministry of Environmental Protection and Nuclear Safety should coordinate monitoring activities as foreseen in Resolution No. 391 of 1998. See also Recommendations 1.5 and 9.5.

The Ministry of Environmental Protection has been developing the State programme of environmental monitoring. The draft programme envisages technical modernization of units of the state environmental monitoring system, optimization of monitoring network, establishment of the databases for multiple users. The draft programme is based on the proposals of the subjects of state monitoring system at regional and national levels.

Recommendation 8.5:
The number of water-quality standards should be reduced and they should be set at realistic levels, making enforcement possible. See also Recommendation 2.2.

There are two standards of drinking water currently in force in Ukraine: GOST 2874-82 "Drinking water. Hygienic requirements and quality control" and GOST 2761-82 "Sources of centralized water supply for household and drinking purposes". "Generalized list of maximum allowable concentrations and approximately safe impact levels of harmful substances for fishery water bodies" is used for quality control of surface water bodies.

Recommendation 8.6:
The best available technologies not entailing excessive costs and/or technology-based emission standards should be at the heart of abatement strategies. See also Recommendations 5.5 and 10.1.

The list of best available technologies in the area of water resources management is not established so far.

Recommendation 8.7:
The cost of water should be transparent and realistic. Metering should be introduced for all users and payments made proportional to the water quantity really consumed. Water prices should cover the full cost of investing, operating and maintaining the water and waste-water infrastructure. Provisions should be made for those people who cannot afford it. See also Recommendation 2.1.

The Cabinet of Ministers Resolution "On approval of the Charges for Special Water Use" (No. 836 of 18 May 1999) has been amended twice in 2005 (No. 44 of 15 January 2005 and No. 541 of 4 July 2005) in order to make the charge rates more realistic. But water prices are still below the cost recovery levels. Water metering has been widely introduced in Ukraine for all users. Support to the poorest households takes the form of reduced bills.

Recommendation 8.8:
To improve the efficiency of waste-water treatment, the staff should be trained further in plant operation, process control and instrument operation.

The State Ecological Institute is the main institution providing post-graduate education, training and upgrading of skills for specialists in the field of environmental protection. However it is not responsible for training of specialists in the field of wastewater treatment. This is a responsibility of the Ministry of Construction, Architecture and Housing and Communal Services. There is a need for continuous training of specialists in wastewater treatment and improvement of their skills, including in new methods and processes, which is not fully met by existing institutions.

Recommendation 8.9:
There must be clear responsibility for the urban waste-water management and sewage sludge disposal. The preferred use of the sludge should be as fertilizer. The European Directives on urban waste water and on use of sludge in agriculture should serve as guidance.

The problem of disposal and/or utilization of sewage sludge is still unresolved in Ukraine because high level of heavy metals in sludge precludes its utilization in agriculture. Another problem is large volumes of sludge. Mechanical dehydration of sludge widely used in Western European countries is a process with high energy consumption and has not been introduced in Ukraine. In addition, Ukraine does not manufacture domestically most of the chemicals necessary for this process, and their import requires additional financing.

Recommendation 8.10:
Supplying the population with sufficient quantities of drinking water that meets hygiene standards should be seen as a priority. The public should have access to information on the quality of drinking water. The use of suitable groundwater sources should be increased and drinking-water resources should be protected accordingly. See also Recommendation 14.1.

Legislative and policy framework for water supply is provided by the Law on Drinking Water and the Drinking water Supply and the State Programme "Drinking Water of Ukraine" (2005). However, problems with water supply remain. Only two-thirds of the population have access to centralized water supply and one-half – to centralized wastewater disposal. Over 30 per cent of those do not have water supply round the clock. Up to 10-30% of supplied water does not comply with sanitary norms. Situation in the rural areas is particularly difficult. Several factors contribute to these problems, among them low rates for water supply and wastewater disposal for households, which are not at the cost recovery levels; old and obsolete equipment and facilities; lack of financing for renovation of infrastructure; unclear division of responsibilities between national, oblast and local authorities involved in the water management; and managerial problems at the water utilities.

Chapter 9: Management of the environment of the Black Sea and the Sea of Azov

Recommendation 9.1:
To improve marine environment management based on the principles set out in the 'Principal Directions', clear environmental policy objectives should be set and included in the national programme for the protection and rehabilitation of the Black Sea and the Sea of Azov.

The National Programme for the Protection and Rehabilitation of the Environment of the Black Sea and the Sea of Azov adopted in 2001 provides the framework for protection and sustainable use of marine environment. The Programme determines legal, organizational, scientific, and financial basis for the implementation of national policy in the area of marine protection. The Ministry of Environmental Protection is responsible for coordination of all activities under the Programme.

Recommendation 9.2:
To better coordinate the efforts of the numerous institutions and to make marine environmental protection more effective, the Ministry of Environmental Protection and Nuclear Safety should set up a special unit for the protection of the Sea of Azov and the Black Sea.

The Intersectoral Commission on Environmental Issues of the Black Sea and the Sea of Azov has been established by the Ministry of Environmental Protection (Order of the Ministry No. 47 of 10 February 2004) to coordinate efforts and facilitate actions related to protection and rehabilitation of the marine environment. The Commission comprises representatives of the relevant governmental bodies, academic institutions and other organizations.

Recommendation 9.3:
The specific needs of the marine environment should be reflected in special legislation on marine environmental protection. It should go hand in hand with all relevant national regulations and internationally accepted norms and include new mechanisms for raising and allocating funds.

A number of legal acts have been adopted to provide legislative framework for the protection of marine environment. Among them are the Law "On approval of the National Programme for the Protection and Rehabilitation of the Black Sea and the Sea of Azov" (No. 2333-III of 22 March 2001) and the Law "On ratification of the Agreement on the Conservation of Small Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area" (No. 1067-IV of 9 July 2003).

Recommendation 9.4:
The Ministry of Environmental Protection and Nuclear Safety, together with all other relevant authorities and with the participation of all stakeholders, should explicitly make integrated coastal zone management a full part of its new policy. This should also entail the creation of adequate instruments for institutional cooperation and involvement of the scientific community, local business and the general public, especially through NGOs, in the implementation of integrated coastal zone management.

A draft of the Law on Sea Coastal Zones has been developed. The draft law envisions integrated coastal zones management.

Recommendation 9.5:
The Ministry of Environmental Protection and Nuclear Safety should strengthen its role as the coordinating governmental agency for marine environmental monitoring. It should, for instance, develop a mandatory common national programme for sea monitoring and should participate in the budgeting of all monitoring entities. It should also look for other sources of funding and organization mechanisms. See also Recommendations 1.5 and 8.4.

The National Programme for the Protection and Rehabilitation of the Environment of the Black Sea and the Sea of Azov envisages a set of measures on the monitoring of marine environment, and the Ministry of Environmental Protection is responsible for financial arrangements for the implementation of these measures. The Ministry is responsible as well for the implementation of the GEF Project "Biodiversity conservation in the Azov-Black Seas ecological corridor".

Recommendation 9.6:
A new funding mechanism for the construction and maintenance of the sewerage networks and waste-water treatment plants should be developed, which should clearly specify the responsibilities of polluters in this regard. See also Recommendation 8.3.

Funding of the construction and operation of sewerage networks and water treatment facilities in the Azov - Black Sea region is provided in accordance with the National Programme for the Protection and Rehabilitation of the Environment of the Black Sea and the Sea of Azov. The funds are allocated from the budget programme "Wastewater Treatment" of the National Environmental Protection Fund, as well as local budgets.

Recommendation 9.7:
Ukraine should participate in the further development and enforcement of a harmonized Port State Control system in the Black Sea region and in the development of a regional emergency response action plan, in order to establish new effective instruments for marine environmental management.

Ukraine initiated the process of drafting and signing the Black Sea Contingency Action Plan. Development of such plan was envisaged by the Convention on the Protection of the Black Sea against Pollution (1992) and its Protocol on Cooperation in Combating Pollution of the Black Sea Marine Environment by Oil and Other Harmful Substances in Emergency Situations. The Action Plan has not been signed yet.

Recommendation 9.8:
Ukraine should consider initiating a basin-wide programme and/or seeking close cooperation between the Black Sea Environmental Programme and all existing or planned programmes for the rivers flowing into these two Seas, in order to promote basin-wide coordination of environmental management affecting the Black Sea and the Sea of Azov. Adequate coordination mechanisms should also be developed for the drainage area of the Baltic Sea in the country.

The basin management principle is taken into account in the process of the implementation of the National Programme for the Protection and Rehabilitation of the Environment of the Black Sea and the Sea of Azov, the State Programme on Water Management Development, UNDP-GEF Project "Environmental Rehabilitation of the Dnipro River Basin". The Cabinet of Ministers approved the Concept of Environmental Rehabilitation of the Siverskyi Donets River (Resolution No. 224-p of 23 April 2003), which is also based on the basin management principle. See also response to Recommendation 8.3.

Chapter 10: Management of mineral resources

Recommendation 10.1:
A programme to improve the environmental performance in mining and mineral processing should be developed and implemented. It should focus on the introduction of best available techniques for waste-water treatment and tailing management, as well as on the training of staff at all levels of mineral resources management. See also Recommendation 8.6.

A draft of the Strategy of Development and Reforming of the Mineral Resources Management System in Ukraine has been prepared. The draft Strategy envisages improvement of the extraction of mineral resources, prevention of negative environmental impact, inspections of tailing dumps and burrows aimed at recycling of mining wastes, as well as elaboration and introduction of the wastewater treatment systems at the mining enterprises.

Recommendation 10.2:
Environmental management should be adopted as a requisite for the issuing of licences to mining companies. This plan should include a system of environmental funds for mine rehabilitation according to world mining standards. Special payments for this purpose should be established after the cost-benefit of such rehabilitation is analysed as part of the environmental impact assessment of mining companies. See also Recommendation 5.1.

Agreements on the exploitation of mineral resources deposits are part of special permits (licenses). Such agreements envisage number of measures aimed at environmental protection:

- The projects of exploitation of mineral resources deposits should include environmental impact assessment documentation as well the measures to minimise the impact. Oil and gas extraction, coal mining, mineral resources industries, extraction of peat and organic soil belong to the types of activities that have been identified as having a potential for higher environmental risks, for which state ecological expertise is compulsory;
- According to the item 22 of the Procedure of granting permits (licenses) for exploitation of deposits (Resolution of the Cabinet of Ministers No. 1540 of 2 October 2003), validity of the permits (licenses) should be suspended or cancelled in the case of violation of environmental legislation.

The Programme "Ukrainian Coal" (2001) makes provisions for solving the environmental problems in the field.

Recommendation 10.3:
The current regulatory system for the management of mineral resources should continue to be developed. Particular attention needs to be paid to the development and implementation of differentiated charges in accordance with (a) geological particularities, (b) scarcity of the resource, and (c) exploitation conditions. Furthermore, charges for environmental pollution should be increased and regularly adjusted to inflation. See also Recommendation 2.1.

Draft new version of the Code of Ukraine on Mineral Resources has been prepared and is aimed at the improvement of the regulation and control system for exploitation of mineral resources. The draft Code was adopted by the Cabinet of Ministers and submitted to Verkhovna Rada (Parliament) for consideration and approval (registration № 5471 of 30 April 2004). Differentiated charges for the extraction of mineral waters, gold-containing minerals, amber, titan and zircon minerals, and uranium were developed. Development of differentiated charges for the extraction of salt and stones for construction is to be completed soon. Additionally, differentiated charges for the extraction of decorative stones, coal, manganese ores and other minerals are in the process of development. The pollution charges rates have been raised to reflect inflation.

Recommendation 10.4:
The restructuring of the State Committee of Geology and Mineral Deposits and the creation of a national geological survey should be seen as a top priority. The existing restructuring plan should be implemented as soon as possible.

The activities of the State Geological Service have been defined by Resolution of the Cabinet of Ministers No. 980 of 24 September 2005.

Recommendation 10.5:
The current monitoring system run by the State Committee of Geology and Mineral Deposits needs to be (a) reduced overall, and (b) more concentrated in the most relevant areas (e.g. Donbass). The introduction of a plan aiming to reduce and redistribute the monitoring network, modernize laboratories and develop environmental monitoring standards should be envisaged.

The state monitoring system of groundwater of national importance has been developed and set up. The monitoring system provides reliable information regarding the state of groundwater on the territory of Ukraine. The monitoring system control the changes in the conditions of groundwater in regions of mining and other intensive economic activities, which may cause impact on waters. Some efforts were undertaken to optimize the monitoring of exogenous geological processes as well as monitoring of geochemical conditions of landscapes of national importance. 17 laboratories passed accreditation procedure. These laboratories are dealing with measurements of composition and properties of rocks, soils, wastes of mining enterprises, underground water, and wastewater and reused water of geological enterprises. Some modernization of the laboratories, including supply with new equipment has been done although financing for this purpose remains insufficient.

Recommendation 10.6:
To reduce the environmental impact of the coal industry and the large subsidies from the national budget to the coal sector, and to give profitable mines a chance to succeed, the Government should implement the coal sector restructuring project after the necessary environmental investigations for each individual mine have been undertaken, and the corresponding environmental mitigation measures are determined, included in the closure plans, and financed.

The Cabinet of Ministers of Ukraine approved the Programme "Ukrainian Coal" (Resolution No. 1205 of 19 September 2001). The Programme's measures are annually updated by the Cabinet of Ministers. The Programme envisages liquidation of the unprofitable coal enterprises and construction of new ones. All these measures are being implemented according to the project documentation that is based on the engineering and ecological investigations and is subject to compulsory state ecological expertise. Ministry of Fuel and Energy of Ukraine introduced the Sectoral Standard of Ukraine "The procedure of setting up of the regime monitoring network in the areas of location of mining enterprises to be phased out. Requirements for the process of monitoring of groundwater regime and exploitation" (2003). The Decree of the President of Ukraine "On increasing effectiveness of management of coal industry and its development" (No. 752 of 6 July 2004) envisages additional measures aimed at restructuring and development of coal industry including establishment of National Joint Stock Company "Coal of Ukraine".

Chapter 11: Management of bioresources and nature conservation

Recommendation 11.1:
It is necessary to set up national, regional and sectoral programmes for the restoration of rare plants and animal species as well as for the management of introduced alien species especially where they adversely affect local biodiversity

Facilitation of increase in population of rare and endangered species of plants and animals, as well as decrease in quantity and impact of introduced alien species are among the main tasks of environmental management in the specially protected natural territories. However funding for these activities is insufficient. In 2003, Institute of Zoology made analysis and developed recommendations regarding alien fish species in Ukrainian water bodies and possible actions to minimize their negative impact. Monitoring of marine mammals' population is conducted on a permanent basis, in particular along the Crimean coast. The Programme of research, protection

and reproduction of marine mammals of the Black Sea and the Sea of Azov "Delfin" ("Dolphin") has been under implementation since 1999.

Recommendation 11.2:
The draft national action programme for biological diversity protection and sustainable use should be adopted urgently.

The Concept (Outline) of the State Programme on Biodiversity Conservation has been approved by the Cabinet of Ministers (Resolution No. 675-r of 22 September 2004). The draft Programme has been developed and is awaiting approval by Verkhovna Rada (Parliament).

Recommendation 11.3:
Training and capacity building should be introduced as a regular component of any EECONET project to make Ukrainian specialists acquire the skills necessary for managing biodiversity and nature protection projects. To this end, the creation of an international centre in Ukraine to give training in nature conservation and EECONET development would be an excellent opportunity for meeting the needs of Ukraine and of its neighbours in eastern Europe and the newly independent States. The centre could benefit from western partner experience.

An international centre for training in nature conservation and EECONET development has not been established.

Recommendation 11.4:
The creation of new protected areas preferably as regional landscape parks under the responsibility of regions (oblasts or groups of rayons) should be considered. A limited but controlled use of these zones and their assets could be authorized subject to the payment of a fee. Local people and communities should be better involved in this process of nature conservation, and their specific interests and needs better taken into account.

In 2002-2003 the area of the specially protected natural territories (territories of the Nature Reserve Fund, NRF) was extended by more than 180 thousand hectares, number of objects (protected areas) was increased by 110 units. Regional Landscape Parks (RLP) and National Nature Parks (NNP) are key form of newly established protected areas: 75 per cent of new protected areas belong to RLPs and 18 per cent to NNPs. In 2004, Ichnianskyi NNP in Chernihiv Region was established. The territory of Luhansk Nature Reserve was extended. In total, the NRF includes 7120 territories and objects and covers the territory of 2738.1 thousand hectares or 4.5 per cent of the territory of Ukraine. The percentage of the total territory of protected areas still remains low.

Recommendation 11.5:
Biodiversity conservation and nature protection components should be included into all decision-making processes of regional and sectoral development programmes (e.g. the Dnieper programme).

Biodiversity conservation and nature protection are key objectives of a number of policy documents, such as Programme for the long-term Development of Nature Reserves in Ukraine (1994), State Programme for the Creation of a National Ecological Network for 2000-2015 (2000), and National Programme for the Environmental Rehabilitation of the Dnipro River Basin and Improvement of Drinking Water Quality (1997). The Ministry of Environmental Protection coordinates development of the draft state programmes of environmental rehabilitation of basins of Siverskyi Donets, Dniester and Southern Bug rivers. Biodiversity conservation and nature protection at national and regional levels are important parts of these documents.

Recommendation 11.6:
The existing special unit (i.e. Central Board for National Natural Parks and Reserve Management) may be improved to ensure the harmonized implementation of protection regimes and rules for different protected areas, including the balancing of funding in the different protected areas. All institutions of the Nature Reserve Fund of national importance should be subordinated to the Central Board. See also Recommendation 1.5.

The Central Board for National Natural Parks and Reserve Management has been re-organized into the State Natural Reserves Service (Resolution of the Cabinet of Ministers No. 1000 of 9 August 2001). The idea to

subordinate all objects of Nature Protection Fund to the Ministry of Environmental Protection is being discussed.

Recommendation 11.7:
The monitoring of species and ecosystems, the compiling of a species cadastre and the mapping of habitats should be seen as prerequisites for any management policy, and should therefore be pursued in spite of the economic difficulties. National surveys on threatened or rare species and habitats (in particular those which fall under international agreements) should be carried out or updated.

The Ministry of Environmental Protection approved "Methodological guidelines on formation and maintenance of the state cadastre of territories and objects of Nature Protection Fund of Ukraine". There are plans to issue a regulation on the development of species inventories (cadastres). The inventory of the objects of NPF is one of the objectives of the State Programme for the Creation of a National Ecological Network in Ukraine for 2000-2015.

Recommendation 11.8:
The biological monitoring strategy should be pursued and completed. It should be well-funded, result-oriented and cost-effective. The legal framework should be adjusted accordingly, making it clear what information should be collected, by whom and how.

Setting up the biological monitoring system is being carried out within the framework of the budget programme "Development of National Ecological Network". This activity has been financed by the National Environmental Fund.

PART III: ECONOMIC AND SECTORAL INTEGRATION

Chapter 12: Environmental concerns in agriculture

Recommendation 12.1:
Designated land uses should be monitored and periodically re-evaluated, in order to adapt them to changing socio-economic conditions. The existing command-and-control system of land use should in the long run be replaced by partnership arrangements between the public administrations and the farmers.

The 2001 Land Code legalized private ownership of agricultural land. The Laws "On Land Protection (No. 962-IV of 19 June 2003), "On Land Management (No. 858-IV of 22 May 2003) and "On State Control of the Use and Protection of Land (No. 963-IV of 19 June 2003) include provisions to restrict improper use of land. The State Inspection for control of land use and protection was established within the State Committee for Land Resources (Resolution of the Cabinet of Ministers No. 1958 of 25 December 2002). The Cabinet of Ministers has approved "List of measures for implementation of the main direction of land reform in Ukraine for 2001-2005", which includes development and implementation of the procedure of economic incentives for rational use and protection of land resources.

Recommendation 12.2:
It should be recognized that more environmentally friendly and ultimately sustainable agricultural practices must be promoted and developed urgently. To this end, adequate training programmes for both private and collective farmers should be set up. The training should be undertaken by a suitably equipped extension service. Any revision of the existing national guide for good agricultural practice should include a realistic agricultural production strategy.

So far the efforts to set up training programmes and extension (advisory) services were not sufficient, even though the National Association of Agricultural Advisory Services includes centers in 24 oblasts and the Autonomous Republic of Crimea.

Recommendation 12.3:
An inter-ministerial/inter-agency unit should be created to monitor, analyse and control the environmental impacts of agriculture, and of genetically modified organisms. A system of indicators to analyse these impacts would be useful.

Environmental impact of agricultural sector is an issue for Interdepartmental Commission on Environmental Monitoring (according to the Resolution of the Cabinet of Ministers No. 1551 of 17 November 2001). Ministry of Environmental Protection performs duties of the National Coordination Center for communication with the Secretariat of Cartagena Protocol as well as Administrative Body on Biosafety of Genetically Modified Organisms (GMOs).

Recommendation 12.4:
The improvement of the Land Code and the adoption of the Law on Land Protection should be accelerated, as should the adoption of the National Programme for Land Protection till 2010. International financial assistance for the implementation of the Programme should be sought, possibly in particular in the framework of the GEF.

New version of the Land Code of Ukraine (No. 2768 of 25 October 2001) and the Law "On Land Protection" (No. 962-IV of 19 June 2003) have been adopted. The draft State Programme of the Use and Protection of Land and draft National Programme of the Protection of Soil Fertility have been submitted by the Cabinet of Ministers to Verkhovna Rada (Parliament) for consideration and approval. Verkhovna Rada sent back both draft Programmes to the Cabinet of Ministers (Resolution No. 2133-IV of 2 November 2004) with the instruction to merge them and resubmit the revised Programme to Verkhovna Rada for a new first reading.

Recommendation 12.5:
Environmental rehabilitation programmes of contaminated agricultural land at oblast level should be initiated, based on satisfactory monitoring information as well as innovative methodologies, which could even attract international assistance.

Authorities in a number of oblasts and cities have developed, approved and started implementation of local programmes of land use and protection (including land for agricultural use). Among them are:

- Land reform programmes;
- Programmes of land protection against wind and water erosion and other factors of land degradation;
- Integrated programmes of land amelioration and improvement of environmental conditions of irrigated and drained lands;
- Programmes of environmental protection, rational use of natural resources and environmental safety;
- Programmes of protection of human settlements and agricultural lands against erosion processes; and
- Programmes of protection against floods.

Chapter 13: Environmental concerns in energy

Recommendation 13.1:
A stable legal, regulatory and institutional framework for investments in the energy sector should be created and implemented, in order to strengthen further the efforts undertaken so far for a long-term market-oriented energy policy. It should recognize the particular features of investment projects in this sector together with the obvious need for large-scale investment. Investments favouring the development of renewable forms of energy should be given priority.

A stable legal, regulatory and institutional framework for investments in the energy sector has not been created in Ukraine. The privatization process and attraction of large-scale investments in the energy sector in general and in the development of renewable energy sources in particular, have been going very slowly.

Recommendation 13.2:
The Government's role in the energy sector is to be redefined. The large number of government ministries, agencies, bodies and State enterprises currently involved in controlling energy production, distribution and prices should be streamlined as a result.

The frequent changes in the institutional structure and legislation in the energy sector weaken human capacity and hamper the development and implementation of long-term comprehensive energy and environmental policies and attraction of investments.

Recommendation 13.3:
A sustainable, market-oriented and coherent policy aiming at energy savings so as to reduce import dependency and promote energy conservation should be developed as a matter of urgency. It should specify the need to liberalize markets and take fiscal measures and technical measures like the introduction of modern metering equipment for individual users. Social concerns should increasingly be transferred to well-targeted social security programmes and not remain part of energy policies.

The Energy Strategy of Ukraine for the period until 2030 was approved in March 2006 (Resolution of the Cabinet of Ministers No. 145-r of 15 March 2006). Reducing import dependency and promotion of energy saving are among the Strategy's main objectives. The National Agency for Efficient Use of Energy Resources has been established by the Resolution of the Cabinet of Ministers No. 412 of 3 April 2006. The Agency has developed a draft Law on Energy Efficiency aiming at encouraging energy efficiency in Ukrainian enterprises.

Recommendation 13.4:
The establishment and publication of a time schedule for the introduction of market prices for all forms of energy should be seen as an urgent requirement for the success of the energy sector's restructuring and modernization.

Action Plan to implement long-term tariff policy for wholesale market of electric energy of Ukraine has been approved by the Cabinet of Ministers (Resolution No. 451 of 26 September 2001). The Plan envisages introduction of market prices for electricity. However the Plan has not been implemented to full extent and cross-subsidization of households' and public institutions' energy consumption by industrial customers is still the case.

Recommendation 13.5:
The transition of the electricity supply system should, first, concentrate on reducing air emissions from existing thermal power stations, and on organizing an integrated and interconnected grid system inside the country and with its neighbours. See also Recommendation 4.3.

The EU TACIS project "Ukrainian integration into EU energy network" (budget Euro 3 million) started in 2005. The project is intended to provide the programme of technical and organizational actions needed for the electricity interconnection of Ukraine with the UCTE (Union for the Co-ordination of Transmission of Electricity) synchronous network. The programme includes also the environmental issues related to harmonization of requirements for pollution reduction. A new technology-oriented approach to permitting of pollutant emissions into the air was declared in the new version of the Law "On Air Protection" (2001), followed by a number of implementing Resolutions by the Cabinet of Ministers. The Ministry of Environmental Protection has prepared the draft order on approval of maximum allowable concentrations of pollutants in flue gases for stationary combustion sources. The standards will be gradually strengthened to achieve EU requirements implemented by Large Combustion Plants (LCP) and Sulfur Directives.

Recommendation 13.6:
Environmental audits in thermal power plants should be considered. See also Recommendations 1.4 and 7.5.

The conditions for application of the provisions of the Law "On Environmental Audit" (2004) are being established by the Ministry of Environmental Protection. Methodology of certification of environmental auditors has been developed. Availability of the certified auditors in the country makes it possible to arrange

mandatory environmental audits of the enterprises, installations and types of activities that represent an increased danger for the environment in the cases foreseen by the Law.

Chapter 14: Human health and the environment

Recommendation 14.1:
The public health sector should pay more attention to the effects of water pollution and to preventing water-borne diseases. Ukraine should ratify the Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes. A system of monitoring bathing waters should be set up, and collected information should be disseminated to the public. See Recommendation 8.10.

State Sanitary-epidemiology Service (SSES) is dealing with water pollution and prevention of water borne diseases. SSES is responsible for monitoring of water quality of surface water bodies (water quality often remains unsatisfactory). The subject of great concern is water quality of the Dnipro River basin supplying drinking water for 75 per cent (about 35 million) of population. Ukraine has ratified the Protocol on Water and Health (London, 1999) to the Convention on Transboundary Watercourses and International Lakes (Law on Ratification No. 1066-IV of 9 July 2003).

Recommendation 14.2:
The following food protection measures should be considered for urgent implementation:
- *local needs assessments and inter-sectoral collaboration for implementing food safety activities should be included in local food protection programmes*
- *a code of hygienic practices should be distributed to all district food industries and local authorities*
- *the implementation of the Hazard Analysis and Critical Control Point (HACCP) system should be ensured*
- *regular assessment of food technologies that prevent food-borne diseases and reduce post-harvest losses should be ensured by the responsible institutions*
- *education in the principles of food safety and hygienic handling of food should be organized for all those handling food*
- *the districts should promote food safety in tourism by raising the awareness of the travel industry about possible food-borne hazards*
- *information gathering and dissemination among the public should be strengthened, including surveillance of food-borne diseases*
- *information campaigns to combat mushroom poisoning and botulism deaths should be improved*
- *food quality control on street markets should be ensured.*

Intersectoral cooperation in the field of food safety is included in the requirements of the Laws "On quality and safety of food and food stuff", "On fish, other water living resources and food products from them", "On beekeeping", "On milk and milk products" and other legislative acts regulating competencies and responsibilities of various governmental agencies. Compliance with this legislation is mandatory for regional and local units of the State Sanitary-epidemiology Service (SSES) of the Ministry of Health. Sanitary norms and regulations are mandatory for all companies involved in production, transportation and marketing of food and food products. Company managers are personally responsible for compliance with these requirements of this regulation. Local units of SSES conduct regular inspections to check the implementation of sanitary requirements. Training on hygiene issues for staff at food companies is mandatory; without such training personnel does not get a permission to work at a food facility. The SSES is responsible for collection and dissemination of information relevant to sanitary safety. Statistical reporting and operational information are subject to annual analysis. There are regular meetings at the *oblast* level on implementation of sanitary oversight of objects of higher epidemiological risk. The SSES conducts regular information and awareness raising campaigns to prevent, in particular, mushroom poisoning, botulism and other food-related diseases. For these purposes, automatic system of information collection and analysis is used. Illegal street markets that still exist in many cities are subject to closure by police. The SSES is responsible for control of the quality of food products at the established legal farmer markets.

Recommendation 14.3:
The public health sector should take measures to prevent injuries and violence in cooperation with the other institutions involved. Public information campaigns in this respect should be undertaken in cooperation with other involved institutions.

The Cabinet of Ministers adopted Resolution on approval of comprehensive measures to prevent non-work-related injuries for 2001-2005 (No. 391-r of 21 August 2001) and the Action Plan to decrease the number of non-work-related injuries (Resolution No. 8554 of 4 April 2004). Ministry of Health and Ministry of Social Policy are responsible for implementation of these Resolutions.

Recommendation 14.4:
Data are needed on the most important sources of indoor air pollution, including gas cookers and indoor smoking. Information on the associated health risks, together with recommendations on how to minimize them, should be included in health advice packages given to families as part of health promotion campaigns.

The SSES is dealing with the indoor air quality. The information is made available to the general public. In 2003, the SSES inspected the indoor air quality at 298,634 objects (communal, food industry, educational, and other premises) including 9.2% with laboratory analysis. Maximum allowable concentrations (MAC) of pollutants were exceeded in 981 objects (3.6%). Analysis of 152,400 samples on steam and gases, and 44,200 samples on dust and aerosol revealed that MACs were exceeded in 3.7 % and 3.0 % of cases respectively.

Recommendation 14.5:
To reduce occupational morbidity:
- *individual protective measures should be reintroduced and workers should be adequately informed about their health risks*
- *economic instruments should be applied to encourage enterprises to observe health and safety standards, as well as to report all occupational disease*
- *adequate monitoring of occupational disease in all economic sectors, including uranium mines, should be ensured.*

The State Committee on Occupational Safety has overall responsibility for occupational safety. Each manufacturing company must have a unit for occupational safety or an instructor for occupational safety. Inspectors of the State Committee on Occupational Safety and specialists of the SSES conduct joint inspections to check compliance with requirements of the Law "On Occupational Safety" and sanitary legislation. To improve occupational safety, the Ministry of Health issued Order "On strengthening control and responsibility for registration and analysis of occupational deceases (No. 77 of 18 February 2003). Violations of sanitary legislation resulted in various sanctions: operation of 9,802 manufacturing enterprises was suspended until implementation of required amendments, 305 cases were subject to prosecution, and 18,030 fines were imposed. Monitoring of occupational diseases is being implemented on the basis of the Order of the Ministry of Health "On improvement of automatized system of registration and analysis of occupational diseases in Ukraine" (No. 31 of 10 February 1998). State register of occupational diseases is being established.

Recommendation 14.6:
A strategy and programmes to abate the psychosocial effects of the Chernobyl accident should be developed, and programmes to identify the long-term health consequences of long-term exposure to low-dose radiation should be supported. A programme should be planned and implemented to monitor the children of parents affected by the Chernobyl accident.

Main Sanitary Regulations for Ensuring Radiation Safety of Ukraine (OSPU-2004) have been approved (the Order of the Ministry of Health No. 54 of 2 February 2005). A number of additional rules and regulations have been developed in accordance with this regulatory document. Research on developing and substantiating State hygienic regulations to protect population from potential sources of radiation has been completed. In 2002, State Sanitary-Ecological Rules and Norms of Radiation Safety for Scrap Metal Processing (DSPN 6.61.-079/211.3.9001-02) were approved and entered into force. A joint Order of the Ministry of Health and Ministry of Emergencies "On organization of reporting on and oversight of the health status of persons affected by the Chornobyl catastrophe and functioning of the State Register" has been drafted.

Recommendation 14.7:
Indoor radon should continue to be assessed, in order to investigate areas not yet examined and to monitor trends and results from action to reduce radon in high-risk homes. Information on behavioural measures such as ventilation practices should be made available to households in high-risk areas. Building codes and environmental impact assessments should include sections designed to ensure that radon levels do not exceed 100 Bq/m^3 in new buildings.

In accordance with the "Comprehensive Programme of Conducting State Sanitary Inspections in the Area of Radiation Safety Sphere of Ukraine, Radiation Control of Environmental Objects and Individual Radiation Monitoring by State Sanitary-Epidemiology Service Establishments under the Ministry of Health of Ukraine and Scientific-Research Institutes under the Academy of Medical Sciences of Ukraine for 2000-2005", and the oblast "Programmes of Protecting Population from the Impact of Ionizing Radiation", the presence of radon in the indoor air of production facilities and residential buildings is controlled and analyzed when they are first put into operation.

Recommendation 14.8:
More effective cooperation and coordination mechanisms should be established between the Ministry of Health Protection, the Ministry of Environmental Protection and Nuclear Safety and other relevant ministries and State committees, focusing on health promotion and environmental protection around specific issues, such as traffic, agriculture and foodstuffs, mining and industry, water quality and waste. It should particularly aim at the implementation of the National Environmental Health Action Plan, closely coordinated with the National Environmental Action Plan. It should also relate to coordination between national, regional and local levels of public administration.

"The National Environmental Health Action Plan for 2000-2005" was approved by the Resolution of the Cabinet of Ministers No. 1556 of 13 October 2000. The Plan is aimed at the improvement of public health by means of preventing diseases and worsening of the health conditions, appearance and development of which are related to the impact of environmental factors. The cooperation and coordination mechanisms between the Ministry of Health, Ministry of Environmental Protection and other relevant ministries and State committees on the implementation of the National Environmental Health Action Plan have not been satisfactory.

Annex II

SELECTED REGIONAL AND GLOBAL ENVIRONMENTAL AGREEMENTS

Worldwide agreements		Ukraine	
Year		Year	Status
1958	(GENEVA) Convention on the Continental Shelf	12.01.1961	Ra
1958	(GENEVA) Convention on the Territorial Sea and the Contiguous Zone	12.01.1961	Ra
1958	(GENEVA) Convention on the High Seas	12.01.1961	Ra
1961	(PARIS) International Convention for the Protection of New Varieties of Plants	02.06.1995	Ac
1963	(VIENNA) Convention on Civil Liability for Nuclear Damage	20.09.1996	Ac
	1997 (VIENNA) Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage	29.09.1997	Si
1971	(RAMSAR) Convention on Wetlands of International Importance especially as Waterfowl Habitat	01.12.1991	Su
	1982 (PARIS) Amendment		
	1987 (REGINA) Amendments		
1971	(GENEVA) Convention on Protection against Hazards from Benzene (ILO 136)		
1971	(BRUSSELS) Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage		
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	11.02.1971	Ac
1972	(PARIS) Convention Concerning the Protection of the World Cultural and Natural Heritage	12.10.1988	Ra
1972	(LONDON) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other	05.02.1976	Ra
	1978 (TORREMOLINOS) Amendments (incineration)		
	1980 Amendments (list of substances)		
1972	(LONDON, MOSCOW, WASHINGTON) Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons, and their Destruction	10.04.1972	Si
1972	(LONDON) International Convention on the International Regulations for Preventing Collision at Sea	05.03.1993	Ac
1972	(GENEVA) International Convention for Safe Containers	06.09.1976	Ra
1973	(WASHINGTON) Convention on International Trade in Endangered Species of Wild Fauna and Flora	30.12.1999	Ac
	1979 (BONN) Amendment	30.12.1999	At
	1983 (GABORONE) Amendment		
1973	(LONDON) Convention for the Prevention of Pollution from Ships (MARPOL)	25.10.1993	Ac
	1978 (LONDON) Protocol (segregated ballast)	25.10.1993	Ac
	1978 (LONDON) Annex III on Hazardous Substances carried in packaged form	25.10.1993	Ac
	1978 (LONDON) Annex IV on Sewage	25.10.1993	Ac
	1978 (LONDON) Annex V on Garbage	25.10.1993	Ac
1977	(GENEVA) Convention on Protection of Workers against Occupational Hazards from Air Pollution, Noise and Vibration (ILO 148)	03.06.1988	Ac
1979	(BONN) Convention on the Conservation of Migratory Species of Wild Animals	19.03.1999	Ra
	1991 (LONDON) Agreement Conservation of Bats in Europe	14.05.1999	Ra
	1992 (NEW YORK) Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS)		
	1995 (THE HAGUE) African/Eurasian Migratory Waterbird Agreement (AEWA)	04.07.2002	Ra
	1996 (MONACO) Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)	01.11.1999	Ra
1980	(NEW YORK, VIENNA) Convention on the Physical Protection of Nuclear Material	06.07.1993	Ac
1981	(GENEVA) Convention Concerning Occupational Safety and Health and the Working Environment		

Worldwide agreements (continued)		Ukraine	
Year		Year	Status
1982	(MONTEGO BAY) Convention on the Law of the Sea	26.07.1999	Ra
	1994 (NEW YORK) Agreement Related to the Implementation of Part XI of the Convention	26.07.1999	Ra
	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	27.02.2003	Ra
1985	(GENEVA) Convention Concerning Occupational Health Services		
1985	(VIENNA) Convention for the Protection of the Ozone Layer	18.06.1986	At
	1987 (MONTREAL) Protocol on Substances that Deplete the Ozone Layer	20.09.1988	At
	1990 (LONDON) Amendment to Protocol	06.02.1997	Ra
	1992 (COPENHAGEN) Amendment to Protocol	04.04.2002	Ra
	1997 (MONTREAL) Amendment to Protocol		
	1999 (BEIJING) Amendment to Protocol		
1986	Convention Concerning Safety in the Use of Asbestos		
	(VIENNA) Convention on Early Notification of a Nuclear Accident	26.01.1987	Ra
	(VIENNA) Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	26.01.1987	Ra
1989	(BASEL) Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	08.10.1999	Ac
	1995 Ban Amendment		
	1999 (BASEL) Protocol on Liability and Compensation		
1990	(LONDON) Convention on Oil Pollution Preparedness, Response and Cooperation		
1992	(RIO) Convention on Biological Diversity	07.02.1995	Ra
	2000 (CARTAGENA) Protocol on Biosafety	06.12.2002	Ac
1992	(NEW YORK) United Nations Framework Convention on Climate Change	13.05.1997	Ra
	1997 (KYOTO) Protocol	12.04.2004	Ra
1993	(PARIS) Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction	16.10.1998	Ra
1994	(VIENNA) Convention on Nuclear Safety	08.04.1998	Ra
1994	(PARIS) Convention to Combat Desertification	27.08.2002	Ac
1997	(VIENNA) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	24.07.2000	Ra
1997	(VIENNA) Convention on Supplementary Compensation for Nuclear Damage	29.09.1997	Si
1998	(ROTTERDAM) Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	06.12.2002	Ac
2001	(STOCKHOLM) Convention on Persistent Organic Pollutants	23.05.2001	Si

Ac = Accession; Ad = Adherence; At = Acceptance; De = Denounced; Si = Signed; Su = Succession; Ra = Ratification.

Regional and subregional agreements		Ukraine	
Year		Year	Status
1950	(PARIS) International Convention for the Protection of Birds		
1957	(GENEVA) European Agreement - International Carriage of Dangerous Goods by Road (ADR)	01.05.2000	Ac
	European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) Annex A Provisions Concerning Dangerous Substances and Articles Annex B Provisions Concerning Transport Equipment and Transport Operations		
1958	(GENEVA) Agreement - Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts.	10.02.2000	Ra
1968	(PARIS) European Convention - Protection of Animals during International Transport		
	1979 (STRASBOURG) Additional Protocol		
(1969)	(LONDON) European Convention - Protection of the Archeological Heritage (revised)	26.02.2004	Ra
1974	(HELSINKI) Convention on the Protection of the Marine Environment of the Baltic Sea Area		
1976	(STRASBOURG) European Convention for the Protection of Animals Kept for Farming Purposes		
1979	(BERN) Convention on the Conservation of European Wildlife and Natural Habitats	05.01.1999	Ra
1979	(GENEVA) Convention on Long-range Transboundary Air Pollution	05.06.1980	Ra
	1984 (GENEVA) Protocol - Financing of Co-operative Programme (EMEP)	30.08.1985	At
	1985 (HELSINKI) Protocol - Reduction of Sulphur Emissions by 30%	02.10.1986	At
	1988 (SOFIA) Protocol - Control of Emissions of Nitrogen Oxides	24.07.1989	At
	1991 (GENEVA) Protocol - Volatile Organic Compounds	19.11.1991	Si
	1994 (OSLO) Protocol - Further Reduction of Sulphur Emissions	14.06.1994	Si
	1998 (AARHUS) Protocol on Heavy Metals	24.06.1998	Si
	1998 (AARHUS) Protocol on Persistent Organic Pollutants	24.06.1998	Si
	1999 (GOTHENBURG) Protocol to Abate Acidification, Eutrophication and Ground-level Ozone		
1991	(ESPOO) Convention on Environmental Impact Assessment in a Transboundary Context	20.07.1999	Ra
	2003 (KIEV) Protocol on Strategic Environmental Assessment	21.05.2003	Si
1992	(BUCHAREST) Convention on the Protection of the Black Sea Against Pollution	14.04.1994	Ra
1992	(HELSINKI) Convention on the Protection and Use of Transboundary Waters and International Lakes	08.10.1999	Ra
	1999 (LONDON) Protocol on Water and Health	26.09.2003	Ra
	2003 (KIEV) Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters	21.05.2003	Si
1992	(HELSINKI) Convention on the Transboundary Effects of Industrial Accidents		
1992	(HELSINKI) Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992		
1993	(OSLO and LUGANO) Convention - Civil Liability for Damage from Activities Dangerous for the Environment		
1994	(LISBON) Energy Charter Treaty	29.10.1998	Ra
	1994 (LISBON) Protocol on Energy Efficiency and Related Aspects	29.10.1998	Ra
	1998 Amendment to the Trade-Related Provisions of the Energy Charter Treaty	Ukraine is applying Trade Amendment provisionally	
1998	(AARHUS) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters	18.11.1999	Ra
	2003 (KIEV) Protocol on Pollutant Release and Transfer Register	21.05.2003	Si
1998	(STRASBOURG) Convention on the Protection of Environment through Criminal Law	24.01.2006	Si
2000	(FLORENCE) European Landscape Convention	17.06.2004	Si
2003	(KIEV) Framework convention on the protection and sustainable development of the Carpathians	11.05.2004	Ra

Ac = Accession; Ad = Adherence; At = Acceptance; De = Denounced; Si = Signed; Su = Succession; Ra = Ratification.

Annex III

SELECTED ECONOMIC AND ENVIRONMENTAL INDICATORS

	1998	1999	2000	2001	2002	2003	2004	2005
Air pollution								
Emissions of SO_2								
- Total (tons)	1,022,993.3	1,026,103.5	976,568.6	983,589.9	1,023,857.2	1,034,150.7	986,758.2	1,119,510.8
- by sector (tons)								
Energy	..	..	729,187.5	745,180.1	746,125.3	760,893.9	747,783.6	900,748.8
Industry	..	..	219,907.5	212,921.6	211,708.1	194,659.1	203,880.1	197,852.2
Transport	..	..	8,246.4	8,676.8	8,439.9	7,364.9	7,189.0	6,814.0
Other	..	..	19,227.2	16,811.4	57,583.9	71,232.8	27,905.5	14,095.8
- per capita (kg/capita)	20.4	20.7	19.7	20.2	21.2	21.6	20.8	23.8
- per unit of GDP (kg/ 1,000 Hrv)	10.0	7.9	5.7	4.8	4.5	3.9	2.9	2.6
Emissions of NO_X (converted to NO_2)								
- Total (tons)	332,853.3	331,668.0	319,951.5	328,089.4	309,414.4	306,015.6	291,747.5	314,550.7
- by sector (tons)								
Energy	..	..	186,605.4	184,463.1	160,312.1	143,927.6	128,334.7	141,297.9
Industry (Manufacturing)	..	..	110,681.9	120,000.8	118,739.9	125,303.0	126,367.6	133,936.2
Transport	..	..	16,652.6	16,759.8	18,307.7	22,329.9	33,257.6	35,563.6
Other	..	..	6,011.6	6,865.7	12,054.8	14,455.1	3,787.6	3,753.0
- per capita (kg/capita)	6.6	6.7	6.5	6.7	6.4	6.4	6.1	6.7
- per unit of GDP (kg/ 1,000 Hrv)	3.2	25.0	1.9	1.6	1.4	1.1	0.8	0.7
Emissions of ammonia NH_3								
- Total (tons)	8,983.5	8,815.8	8,309.8	8,262.2	8,053.2	8,353.5	14,632.8	17,949.2
- by sector (tons)								
Energy	..	..	..	..	..	..	314.4	320.6
Industry	..	..	..	..	..	..	7,232.6	7,013.8
Transport	..	..	..	..	..	..	13.6	31.8
Other	..	..	..	..	..	..	7,072.2	10,583.0
Emissions of particulate matter (PM_{10}, $PM_{2.5}$ and TSP)								
- Total (tons)	749,108.1	781,824.1	729,566.4	763,906.9	708,846.9	693,185.0	625,549.3	697,938.6
- by sector (tons)								
Energy	..	..	406,372.6	427,899.5	338,372.5	316,425.5	322,795.1	323,866.5
Industry	..	..	293,273.3	306,164.5	292,341.7	296,046.7	278,292.9	340,397.4
Transport	..	..	7,331.8	8,175.5	8,005.7	8,155.5	8,902.1	8,862.9
Other	..	..	22,588.7	21,667.4	70,127.0	72,557.4	15,559.2	24,811.8

Emissions of non-methane volatile organic compounds (NMVOC)	1998	1999	2000	2001	2002	2003	2004	2005
- Total (tons)	247,732.8	269,010.3	263,832.6	232,534.2	284,542.5	223,148.5	91,682.1 [1)]	91,050.6 [1)]
- by sector (tons)								
Energy	..	..	486.5	539.8	..	1,279.6	1,321.2	1,506.7
Industry	..	..	255,290.2	225,662.1	..	214,289.6	76,991.9	74,698.0
Transport	..	..	1,580.5	1,704.0	..	1,817.9	4,658.1	4,976.2
Other	..	..	6,475.5	4,628.3	..	5,761.5	8,710.9	9,869.7
Emissions of persistent organic pollutant (PCBs, dioxin/furan and								
- Total	..	..	..	..	..	..	1,555.2	1,556.1
- by sector								
Energy	..	..	..	..	..	..	20.8	23.7
Industry	..	..	..	..	..	..	1,424.5	1,455.1
Transport	..	..	..	..	..	..	39.4	23.6
Other	..	..	..	..	..	..	70.5	53.7
Emissions of heavy metals (cadmium, lead and mercury)								
- Total (tons)	33.9	36.1	48.7	39.3	89.6	107.6	169.0	260.8
- by sector (tons)								
Energy	..	..	..	..	..	..	50.5	51.2
Industry	..	..	..	..	..	..	113.6	188.8
Transport	..	..	..	..	..	..	1.4	1.5
Other	..	..	..	..	..	..	3.5	19.3
Greenhouse gas emissions (CO_2, CH_4, N_2O, CFC, etc.) (tons)								
- Total (tons)	..	..	..	..	..	..	130,321,100.0	155,672,001.5
- by sector (tons)								
Energy	..	..	..	..	..	..	73,399,767.5	91,818,281.4
Industry	..	..	..	..	..	..	48,411,219.6	51,673,019.6
Transport	..	..	..	..	..	..	6,085,757.9	9,129,866.9
Agriculture	..	..	..	..	..	..	393,834.0	275,682.2
Waste	..	..	..	..	..	..	13,931.1	16,200.2
Other	..	..	..	..	..	..	66,906,244.5	82,396,532.1
Emissions of CO_2								
- Total (tons)	..	..	..	..	..	..	..	..
- by sector (tons)	..	..	..	..	..	..	..	..
Energy	..	..	..	..	..	..	72,461,125.3	90,703,420.8
Industry	..	..	..	..	..	..	46,124,470.1	49,359,278.8
Transport	..	..	..	..	..	..	5,941,212.4	8,988,497.1
Agriculture							374,781.1	244,947.7
Waste							130,647.0	155,235.0
- per capita (kg/capita)	..	..	..	..	..	..	2,673.9	3,227.0
- per unit of GDP (kg/ 1,000 Hrv)	..	..	..	..	..	..	368.0	357.9
Greenhouse gas (GHG) emissions vs. targets (if established)	0.44	0.43	0.43	0.46	0.46	0.50	..	..
Energy-related particulate emissions (tons)	..	..	..	..	..	..	..	..
Urban population exposed to air quality exceedances	..	..	..	..	..	..	..	..
- (e.g. multiplicity of maximum allowable concentration (MAC)	..	..	..	..	..	..	..	..
Consumption of ozone-depleting substances (ODS) (tons)	..	..	..	..	..	..	..	..

Note: [1)] Number of substances subject to reporting decreased in accordance with international requirements

Water	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Freshwater resources (surface and groundwater) (million m^3)	..	..	..	..	..	..	..	..
- Surface	..	..	..	..	..	..	..	..
small rivers	..	..	..	..	..	..	..	..
big rivers	..	..	..	..	..	..	..	..
- Groundwater	..	..	..	..	..	..	..	..
Water abstraction	..	..	..	..	..	..	..	..
- total (million m^3/year)	19,027.0	19,748.0	18,282.0	17,577.0	16,299.0	15,039.0	14,694.0	15,083.0
Intensity of water usage (abstraction/accessible sources)	..	..	..	..	..	..	..	..
Total water consumption by sectors (households, industry, agriculture)	13,935.0	14,468.0	13,222.0	12,482.0	11,901.0	11,403.0	9,827.0	9,874.0
- Households	3,481.0	3,459.0	3,300.0	3,421.0	3,350.0	3,250.0	3,082.0	3,036.0
- Industry	7,652.0	7,100.0	6,726.0	6,489.0	6,054.0	5,528.0	5,107.0	5,127.0
- Agriculture	3,702.0	3,909.0	3,196.0	2,577.0	2,497.0	2,625.0	1,638.0	1,711.0
Household water consumption index (per capita)	..	..	..	..	..	..	..	..
Nutrient and organic water pollution in rivers (thousand tons)	..	..	..	..	..	..	..	..
- BOD	61.0	56.0	52.0	53.0	55.0	56.0	57.0	55.0
- Ammonium	16.0	14.0	14.0	13.0	12.0	11.0	13.0	11.0
- Nitrates	67.0	70.0	72.0	70.0	72.0	67.0	69.0	68.0
- Phosphates	8.0	8.0	7.0	8.0	8.0	9.0	9.0	9.0
Nitrates in the groundwater	..	..	..	..	..	..	..	..
Untreated and insufficiently treated wastewater (%)	38.0	34.0	30.0	28.0	29.0	31.0	37.0	39.0
Hazardous substances in coastal and marine waters	..	..	..	..	..	..	..	..
Accidental and illegal discharges of oil at sea (tons)	..	..	..	..	..	..	..	..
Biodiversity and living resources	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Protected areas								
- Total area (km^2)	7,685.0	8,771.0	8,875.0	9,708.0	10,136.0	10,138.0	10,525.0	10,565.0
- % of national territory	1.3	1.5	1.5	1.6	1.7	1.7	1.7	1.8
- by categories (IUCN Red list)	..	..	..	..	..	..	..	..
Forests								
- Total area (km^2)	..	..	..	..	..	..	..	..
- % of land area	..	..	..	..	..	..	..	..
- structure (area of species)	..	..	..	..	..	..	..	..
- naturalness (in 1,000 ha) of forest replanting	36.7	38.6	37.8	42.6	45.9	48.3	53.9	58.6
- volume of the wood (thousand m^3)	10,549.0	10,309.0	11,262.0	12,022.0	12,827.0	14,266.0	15,432.0	15,244.0
- harvesting intensity (harvest/growth)	..	..	..	..	..	..	..	..
Flora and fauna species richness in proportion to surface area of the								
Number of threatened species	..	..	..	..	..	..	..	..
Industrial fish catch (tons)	386,097.0	341,977.0	350,087.0	333,363.0	293,205.0	248,177.0	225,905.0	265,585.0
- fish farming (tons)	27,807.0	27,530.0	24,970.0	25,381.0	25,845.0	26,029.0	23,995.0	24,343.0
- natural water bodies (tons)	40,736.0	42,523.0	38,210.0	38,257.0	38,011.0	37,703.0	35,365.0	37,396.0

Land resources and soil	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Arable land (thousand ha)	32,396.6	32,135.4	31,409.5	31,359.4	31,313.9	31,160.8	31,015.7	30,883.1
Cultivated areas (thousand ha)	28,790.0	28,312.6	27,173.3	27,927.8	27,539.0	25,081.4	26,752.1	26,043.6
Soil erosion								
- % of total land area	..	..	..	..	..	..	..	57.5
- % of agricultural land	..	..	..	..	..	..	..	..
Agricultural land (thousand ha)	41,522.9	41,396.4	39,028.4	38,691.4	38,369.1	38,083.0	37,717.0	37,407.8
Fertiliser use per ha of cultivated land (in agricultural and other								
- Mineral fertilizers (kg)	21.0	18.0	13.0	19.0	21.0	22.0	29.0	32.0
- Organic fertilizers (ton)	1.9	1.7	1.3	1.3	1.2	1.0	0.8	0.8

Energy [2)]	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Total energy consumption (Mtoe)	142.9	148.4	139.5	141.6	132.0	132.6	140.3	..
Total final energy consumption TFC (Mtoe)	89.2	88.5	85.9	87.0	76.7	74.0	84.6	..
- by fuel								
Coal	13.7	14.7	13.2	13.5	8.4	9.1	11.1	..
Petroleum products	14.9	14.5	11.0	11.9	12.7	12.7	14.6	..
Gas	40.4	39.6	42.3	42.3	33.1	29.4	35.9	..
Electricity	10.2	9.9	9.8	9.4	9.3	9.8	10.3	..
Heat	9.8	9.5	9.5	9.7	12.9	12.8	12.5	..
Other	0.3	0.3	0.3	0.3	0.3	0.3	0.3	..
- by sector								
Industry	39.1	39.2	37.0	31.2	31.3	30.8	33.5	..
Transport	6.9	6.9	6.8	7.4	7.8	7.4	12.7	..
Other	42.2	41.6	41.1	35.5	35.4	33.4	30.4	..
Non-enegy use in all above	1.0	0.9	1.0	1.6	1.9	2.1	8.0	..
Energy intensity TPES/GDP (PPP) (toe/thousand US$ (2000) PPP)	..	..	0.64	0.59	0.57	0.53	0.50	..
Energy productivity (GDP/ton of oil equivalent)	..	..	..	..	..	..	..	..
TPES/Population (toe per capita)	..	..	2.63	2.65	2.71	2.74	2.96	..

Note : [2)] Source for all energy data is IEA

Transportation	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Number of transport accidents, fatalities and injured (land, air and	36,299.0	34,554.0	33,339.0	34,541.0	34,488.0	42,409.0	45,593.0	46,485.0
In which								
Died	5,522.0	5,269.0	5,185.0	5,984.0	5,982.0	7,149.0	6,966.0	7,229.0
Injured	40,174.0	38,277.0	36,636.0	38,196.0	37,916.0	47,458.0	53,638.0	55,999.0
Size and composition of vehicle fleet								
Freight vehicle fleet (thousand vehicles)								
- Trucks state owned	900.3	880.4	837.5	808.6	937.6	939.5	917.4	888.5
- Trucks private	243.8	271.9	290.7	310.1	272.4	322.2	356.7	349.7
Passenger vehicle fleet (thousand vehicles)								
- Buses	141.8	144.4	140.2	143.5	159.3	174.1	175.9	167.9
- Cars	5,127.3	5,210.8	5,250.1	5,312.6	5,400.0	5,524.5	5,445.8	5,539.0
- Private cars	4,877.8	5,068.6	5,109.6	5,168.9	5,159.1	4,987.4	5,125.9	5,260.1
Passenger transportation (million passenger kilometres)	109,868.9	108,105.2	113,064.2	112,795.0	117,189.1	121,254.6	128,625.0	135,840.1
Freight transport demand (million ton kilometres)	391,682.4	388,034.8	394,165.5	393,965.1	411,314.7	457,497.0	480,178.3	473,598.3

Waste	1998	1999	2000	2001	2002	2003	2004	2005
Generation of waste								
- Total waste generation (tons)	..	..	..	..	..	..	..	..
- Hazardous waste (classes of hazard I-III) (tons)	2,454,114.7	2,820,412.4	2,613,225.7	2,543,349.9	1,728,782.7	2,436,889.4	2,420,297.1	2,411,759.3
- Industrial waste (tons)	..	..	..	..	..	..	..	..
- Municipal waste (tons)	513,800.0	765,500.0	1,459,100.0	2,301,100.0	2,920,300.0	2,821,700.0	3,235,300.0	3,527,000.0
- Radioactive (nuclear) waste (tons)	..	..	..	..	..	..	..	..
Transboundary movements of hazardous waste (tons)	..	..	..	..	..	..	..	..
Waste intensity (total waste generated per unit of GDP)	..	..	..	..	..	..	..	..
Waste recycling and reuse (hazardous waste I-III classes only) (tons)	1,497,810.3	1,070,461.3	1,280,924.2	2,170,048.0	1,310,756.9	802,010.4	689,364.8	811,305.0

Health and Demography	1998	1999	2000	2001	2002	2003	2004	2005
Drinking water quality (proportion of samples failing the standard)	..	..	..	..	..	..	..	..
Proportion of samples failing the standards on sanitary-chemical	..	..	14.0	14.0	15.0	15.0	16.0	17.0
Proportion of samples failing the standards on micro-biological indicators	..	..	8.0	8.0	8.0	8.0	8.0	8.0
Population with access to safe drinking water (%)	..	..	..	..	..	..	..	..
Population with access to improved sanitation (%)	..	..	..	..	..	..	..	..
Incidence of typhoid, paratyphoid infections (per 100,000 population)	0.3	0.1	0.2	0.1	0.1	0.1	0.1	0.2
Salmonella infections (per 100,000 population)	22.8	21.3	16.2	16.1	17.6	16.9	14.4	15.9
Morbidity rates for selected causes (per 100,000 population)	..	..	..	..	..	..	..	..
Active tuberculosis incidence rate (per 100,000 population)	55.5	54.6	60.4	69.5	76.0	77.8	81.2	84.4
population)	83.0	60.4	78.3	108.3	95.6	86.0	66.8	57.3
Health expenditure (% of GDP)	3.5	2.9	2.9	3.1	3.3	3.6	3,5	3.6
Birth rate (per 1000)	8.4	7.8	7.8	7.7	8.1	8.5	9.0	9.0
Fertility rate	1.2	1.2	1.2	1.1	..	1.2	..	..
Mortality rate (per 1000)	14.4	14.9	15.4	15.3	15.7	16.0	16.0	16.6
Infant mortality rate (deaths/1000 live births)	12.8	12.8	11.9	11.3	10.3	9.6	9.5	10.0
Female life expectancy at birth, (years)	73.5	73.7	73.6	74.1	74.1	74.1	74.1	74.0
Male life expectancy at birth (years)	62.7	63.0	62.4	62.8	62.7	62.6	62.6	62.2
Life expectancy at birth (years)	68.1	68.3	67.9	68.3	68.3	68.2	68.2	68.0
Population aged 0-14 years (%)	18.6	17.9	17.2	16.5	15.8	15.3	14.8	14.7
Population aged 65 years or over (%)	13.9	13.9	14.1	14.4	15.0	15.5	16.0	16.1
Ageing index (over 65 / under 15)	74.7	77.7	82.0	87.3	94.9	101.3	108.1	109.5
Total population (million inhabitants)	49.9	49.4	48.9	48.5 *	48.0	47.6	47.3	46.9
- % change (annual)	-0.9	-1.0	-1.0	-1.0	-0.9	-0.8	-0.7	-0.7
- Population density (inhabitants/km^2)	83.0	83.0	82.0	81 *	80.0	80.0	79.0	77.8

Note: * Census on 5 December 2001.

Socio-economic issues	1998	1999	2000	2001	2002	2003	2004	2005
GDP								
- (change, 1990=100)	40.9	40.8	43.2	47.2	49.7	54.4	61.0	63.0
- (% change over previous year)	-1.90	-0.2	5.9	9.2	5.2	9.6	12.1	3.0
- in current prices (million Hrv)	102,593.0	130,442.0	170,070.0	204,190.0	225,810.0	267,344.0	345,113.0	424,741.0
- in current prices (million US$)	41,883.0	31,581.0	31,262.0	38,009.0	42,393.0	50,133.0	64,881.0	82,881.0
- per capita (US$)	833.0	633.0	632.0	781.0	879.0	1,049.0	1,367.0	1,760.0
- per capita (US$ PPP per capita)	..	..	..	..	..	..	..	..

Socio-economic issues	1998	1999	2000	2001	2002	2003	2004	2005
Industrial output (annual 1989=100)	49.1	51.1	57.8	66.0	70.6	81.8	92.0	94.9
Industrial output (% change over previous year)	99.0	104.0	113.2	114.2	107.0	115.8	112.5	103.1
Agricultural output (% change over previous year)	90.4	93.1	109.8	110.2	101.2	89.0	119.9	100.0
Share of agriculture in GDP (%)	..	..	..	..	..	..	..	..
Labour productivity in industry (% change over previous year)	103.9	109.6	116.8	118.6	111.8	119.8	112.3	104.0
CPI (% change over the preceding year, annual average)	10.6	22.7	28.2	12.0	0.8	5.2	9.0	..
PPI (% change over the preceding year, annual average)	13.0	31.1	20.8	8.7	3.0	7.6	20.5	..
Registered unemployment (% of labour force, end of period)	3.6	4.2	4.1	3.6	3.7	3.5	3.5	3.1
Labour force participation rate (% 15-64 year-old)	70.2	64.7	64.5	64.1	64.4	64.5	64.6	65.4
Employment in agriculture (%)	..	21.2	21.1	20.8	20.6	20.4	19.7	19.4
Current account balance								
- Total (million US$)	-1,296.0	1,658.0	1,481.0	1,402.0	3,173.0	2,891.0	6,804.0	..
- (as % of GDP)	..	..	..	..	..	..	..	..
Balance of trade in goods and non-factor services (million US$)	..	..	..	..	..	..	..	..
Net FDI inflows (million US$)	747.0	489.0	594.0	769.0	698.0	1,411.0	1,711.0	..
Net FDI flows (as % of GDP)	1.8	1.5	1.9	2.0	1.6	2.8	2.6	..
Cumulative FDI (million US$)	2,063.6	2,810.7	3,281.8	3,875.0	4,555.3	5,471.8	6,794.4	9,047.0
Foreign exchange reserves								
- Total reserves (million US$)	761.3	1,046.4	1,352.7	2,955.3	4,241.4	6,730.7	9,302.4	..
- (as months of imports)	0.6	1.0	1.1	2.1	2.8	3.5	3.8	..
Exports of goods (million US$)	12,637.4	11,581.6	14,572.5	16,264.7	17,957.1	23,066.8	32,666.1	34,228.4
Imports of goods (million US$)	14,675.6	11,846.1	13,956.0	15,775.1	16,976.8	23,020.1	28,996.8	36,136.3
Net external debt (million US$)	11,638.7	12,471.6	10,519.3	9,193.7	8,466.6	17,080.3	..	..
Ratio of net debt to exports (%)	85.0	94.6	66.9	53.8	45.4	72.0	..	..
Ratio of net debt to GDP (%)	27.8	39.5	33.6	24.2	20.0	34.1	..	..
Exchange rate: annual averages (Hrv / US$)	2.5	4.1	5.4	5.4	5.3	5.3	5.3	..
Income and poverty	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
GDP per capita (1,000 US$/Capita)	2,040.0	2,614.0	3,436.0	4,195.0	4,685.0	5,591.0	7,273.0	9,017.0
Poverty (% of pop. below 50% of median income)	..	..	13.8	15.4	14.6	14.0	14.3	15.3
Inequality (gini levels)	..	0.28	0.29	0.30	0.29	0.29	0.29	0.30
wage)	..	..	..	..	..	..	..	..
Education expenditure (%)	..	..	..	..	..	..	..	..
Communications	..	..	..	..	..	..	..	..
- Telephone lines per 100 population	13.5	14.3	15.0	15.7	16.5	17.4	19.2	25.4
- Cellular subscribers per 100 population	..	0.6	1.8	4.6	7.6	13.6	29.2	64.2
- Personal computer in use per 100 population (without home PCs)	0.8	1.0	1.4	1,58	1.9	2.4	3.0	3.9
- Internet users per 100 population	..	..	..	..	0.3	0.7	1.0	..
Education	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Literacy rate (percent)	..	..	..	99.8 *	..	..	..	..

Note: * Census on 5 December 2001.
Source: State Committee on Statistics, 1 Sepember 2006.

Annex IV

LIST OF MAJOR ENVIRONMENT-RELATED LEGISLATION IN UKRAINE

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94.	Ministry of Environmental Protection of Ukraine	http://www.menr.gov.ua/index.php?lng=eng
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96.	Report of the Accounting Chamber of Ukraine for the Year 2003	http://www.ac-rada.gov.ua/achamber/control/en/publish/article/main?art_id=255682&cat_id=32832
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98.	Web addresses of Governmental bodies	http://www.ukrstat.gov.ua/work/gov2e.html

Other sites:

99.	Atlapedia	http://www.atlapedia.com/online/countries/ukraine.htm
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108.	EIA Energy Information Administration. Country analysis	http://www.eia.doe.gov/emeu/cabs/ukraine.html
109.	EIA Energy Information Administration. Environmental Issues	http://www.eia.doe.gov/emeu/cabs/ukrenv.html
110.	Electionworld	http://www.electionworld.org/ukraine.htm
111.	Environment and Natural Resources Information Network	http://www.grida.no/enrin/index.htm
112.	EU Commission: European Neighbourhood Action Plan	http://europa.eu.int/comm/world/enp/pdf/action_plans/Proposed_Action_Plan_EU-Ukraine.pdf
113.	EU. EU's relations with Ukraine	http://europa.eu.int/comm/external_relations/ukraine/intro/index.htm
114.	EU. European Neighbourhood Policy	http://europa.eu.int/comm/world/enp/document_en.htm
115.	European Bank for Reconstruction and Development (EBRD): Projects and Investments	http://www.ebrd.com
116.	European Investment Bank (EIB): Financing activities of EIB	http://www.eib.org/loans.htm
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121.	Grida. State of the Environment	http://enrin.grida.no/soe.cfm?country=UA
122.	Human Rights Watch	http://hrw.org/doc/?t=europe&c=ukrain
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135.	Statistics Ukraine	http://www.ukrstat.gov.ua/
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137.	The EU's relations with Ukraine - Country Strategy Paper 2002-2006	http://ec.europa.eu/comm/external_relations/ukraine/csp/index_csp_old.htm
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Conventions and programmes:

161.	Convention on Migratory Species (Bonn Convention)	http://www.cms.int/
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164.	CITES	http://www.cites.org/
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166.	Convention on Biological Diversity	http://www.biodiv.org/
167.	RAMSAR Convention	http://www.ramsar.org/
168.	REC – The Regional Environmental Center for Central and Eastern Europe	http://www.rec.org
169.	REReP - The Regional Environmental Reconstruction Program for South Eastern Europe	http://www.rec.org/REC/Programs/REREP/
170.	SEERECON - Economic Reconstruction and Development in South East Europe	http://www.seerecon.org/
171.	Stability Pact	http://www.stabilitypact.org/