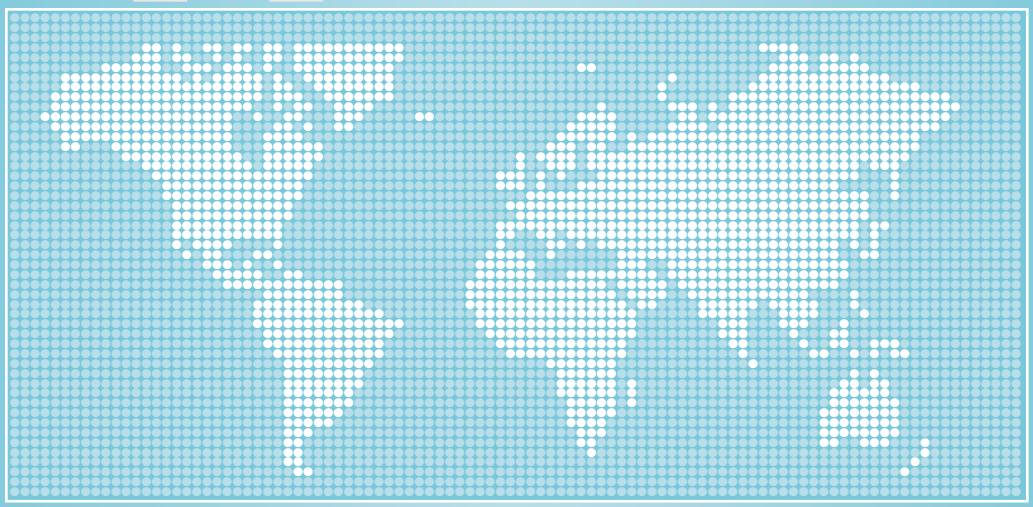
COUNTRY REVIEWS

Environmental Performance Reviews

Hungary

ENVIRONMENT



OECD

ENVIRONMENTAL PERFORMANCE REVIEWS

HUNGARY

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Pursuant to Article 1 of the Convention signed in Paris on 14th December 1960, and which came into force on 30th September 1961, the Organisation for Economic Co-operation and Development (OECD) shall promote policies designed:

- to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;
- to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development; and
- to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.

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EXAMENS DES PERFORMANCES ENVIRONNEMENTALES
HONGRIE

FOREWORD

The principal aim of the OECD's environmental performance reviews is to help *Member countries improve their individual and collective performances in environmental management*. The primary goals of this programme are:

- to help *individual governments* assess progress by establishing baseline conditions, trends, policy commitments, institutional arrangements and routine capabilities for carrying out national evaluations;
- to promote environmental improvements and a continuous policy *dialogue among Member countries*, through a peer review process and by the transfer of information on policies, approaches and experiences of reviewed countries; and
- to stimulate *greater accountability* from Member countries' governments towards public opinion within developed countries and beyond.

Programme efforts are directed at *promoting sustainable development*, with emphasis on developments in domestic and international environmental policy, as well as on the integration of economic and environmental decision-making.

Environmental performance is assessed with regard to the degree of achievement of *domestic objectives and international commitments*. Such objectives and commitments may be broad aims, specific qualitative goals, precise quantitative targets or a commitment to a set of measures to be taken. Assessment of environmental performance is also placed within the context of historical environmental records, the present state of the environment, the physical endowment of the country in natural resources, its economic conditions and demographic trends.

These systematic, independent and periodic reviews are organised and conducted in a way similar to the OECD's economic reviews. The report is peer-reviewed by the Working Party on Environmental Performance, composed of officials from Member countries who have responsibility for national environmental policy development and implementation and a broad competence recognised at national and international levels. The executive summary and recommendations of the report are approved by the Working Party.

This book is published on the responsibility of the Secretary-General of the OECD.

Joke Waller-Hunter
Director,
Environment Directorate

GENERAL INTRODUCTION

This review of Hungary's environmental performance *examines results to date* in the light of domestic objectives and international commitments. Three countries assisted with this review: (Germany, Japan and Poland), as well as the European Commission.

The report is organised in three parts according to the strategic goals identified by OECD Environment Ministers in January 1991:

– Part I is entitled "Pollution Control and Nature Conservation" and focuses on air, water, waste management, and nature conservation, forests and biodiversity;

– Part II is entitled "Integration of Policies" and focuses on institutional aspects and on how policies concerning economics and transport are integrated with environmental policies;

– Part III is entitled "Co-operation with the International Community" and focuses on international environmental topics concerning Hungary.

The OECD extends its most sincere thanks to all those who helped in the course of this review, and especially to the examining countries (Germany, Japan and Poland, and the European Commission) and their experts. The OECD is particularly indebted to the Government of Hungary for its co-operation in expediting the provision of information and the organisation of the experts' mission to Hungary, and in facilitating contacts with many individuals both inside and outside administrative and governmental structures of the country.

The OECD Working Party on Environmental Performance conducted the review at its meeting on 8-10 November 1999 and approved its conclusions and recommendations. This report is published under the authority of the Secretary-General of the OECD.

OUTLINE OF THE REPORT

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Part I

POLLUTION CONTROL AND NATURE CONSERVATION

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ABBREVIATIONS AND SIGNS

AC-IMPEL	Associated Countries – Implementation of Environmental Law
BKV	Budapest Transport Company
BTX	Benzene, toluene, xylene
CEPF	Central Environmental Protection Fund
CFCs	Chlorofluorocarbons
CITES	Convention on International Trade in Endangered Species
CO	Carbon monoxide
CO_2	Carbon dioxide
COMECON	Council for Mutual Economic Assistance
CPI	Consumer Price Index
EBRD	European Bank for Reconstruction and Development
ECMT	European Conference of Ministers of Transport
EIA	Environmental Impact Assessment
EMAs	Eco-management and Audit Scheme (European Union)
EUR	Euro(s)
FAO	UN Food and Agriculture Organisation
FCCC	UN Framework Convention on Climate Change
FDI	Foreign direct investment
GEF	Global Environment Facility
GHG	Greenhouse gas(es)
GRID	Global Resource Information Database
HCFCs	Hydrochlorofluorocarbons
HCSO	Hungarian Central Statistic Office (KSH)
HEO	Hungarian Energy Office
IBRD	International Bank for Reconstruction and Development
IEA	International Energy Agency
IMF	International Monetary Fund
IPPC	Integrated Pollution Prevention and Control
IRF	International Road Federation
ISO	International Organisation for Standardisation
IUCN	World Conservation Union
LPG	Liquified petroleum gas
MÁV	Hungarian National Railways Company
MEH	Prime Minister's Office
MERP	Ministry of Environment and Regional Policy (1994-98) (KTM)
MARD	Ministry of Agriculture and Regional Development (FVM)

MNCH	Ministry of National Cultural Heritage
ME	Ministry for Environment (1998) (KöM)
MEW	Ministry for Environmental Protection and Water Management (1990-94) (KVM)
MOL	National Oil and Gas Company
MTCWM	Ministry of Transport, Communication and Water Management (KHVM)
Mtoe	Million tonnes of oil equivalent
N	Nitrogen
NAAQS	National ambient air quality standards
NCPC	National Cleaner Production Centre
NEAP	National Environmental Action Programme
NEC	National Environment Council (OKT)
NECONET	National Ecological Network
NEHAP	National Environmental Health Action Programme
NEP	National Environmental Programme
NIENC	National Inspectorate for Environment and Nature Conservation (KTFF)
NMVOCs	Non-methane volatile organic compounds
NOENC	National Office for Environmental Protection and Nature Conservation (OKTH)
NONC	National Office for Nature Conservation (KöM TvH)
NOWM	National Office for Water Management (OVH)
NO_x	Nitrogen oxides
NPDs	National Park Directorates
NPHMOS	National Public Health and Medical Officier's Service (ÁNTSZ)
NWM	National Directorate General for Water Management (OVF)
O_3	Ozone
ODS	Ozone depleting substances
OSCE	Organisation for Security and Co-operation in Europe
P	Phosphorous
PAC	Pollution abatement and control
PAH	Polycyclic aromatic hydrocarbons
Phare	Poland and Hungary Assistance for Restructuring of the Economy (European Commission)
PIC	Prior informal consent
PM	Particulate matter
PPP	Polluter Pays Principle
PPPs	Purchasing power parities
PRTR	Pollutant Release and Transfer Register
RCA	Revealed comparative advantages
REC	Regional Environmental Centre for Central and Eastern Europe
REPIs	Regional Environmental Protection Inspectorates (KöFe)
RWMDs	Regional Water Management Directorates (VIZIG)

SO_2	Sulphur dioxide
TFC	Total final energy consumption
TPES	Total primary energy supply
UIC	Union Internationale des Chemins de Fer
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UN-ECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cutural Organisation
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial and Development Organisation
UN-CSD	United Nations Commission on Sustainable Development
USAID	United States Agency for International Development
VAT	Value-added tax
VITUKI	Water Resources Research Centre Plc.
VOCs	Volatile organic compounds
WHO	World Health Organisation
WMF	Water Management Fund

Signs

The following signs are used in Figures and Tables:

..: not available

–: nil or negligible

.: decimal point

Country Aggregates

OECD Europe: All European Member countries of the OECD, i.e. countries of the European Union plus the Czech Republic, Hungary, Iceland, Norway, Poland, Switzerland and Turkey.

OECD: The countries of OECD Europe plus Australia, Canada, Japan, Korea, Mexico, New Zealand and the United States.

Country aggregates may include Secretariat estimates.

The sign * indicates that only western Germany is included.

The sign ** indicates that not all countries are included.

Currency

Monetary unit: forint (HUF)

On average in 1998, HUF 215 = USD 1

Cut-off Date

This report is based on information and data available up to September 1999.

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CONCLUSIONS AND RECOMMENDATIONS*

Hungary has been undergoing a *major economic transition* in the 1990s, marked by a return to democracy and preparation for accession to the European Union. Following the collapse of its traditional export markets, Gross Domestic Product fell nearly 20 per cent. Recovery then began in 1993 and GDP has recently returned to its 1990 level. In 1998, Hungary experienced GDP growth of 5 per cent; 85 per cent of GDP is now generated in the private sector. The macro-economic stabilisation package introduced in 1995 led to reduction of inflation to 14 per cent in 1998. Hungary has received the highest levels of *foreign direct investment* among Central and Eastern European countries.

During this period, *environmental pressures have been substantially reduced*. Air pollutant emissions and pollution loads to water have decreased significantly due to both the fall in industrial production in the early 1990s and investment in pollution abatement and control. Further, Hungary has implemented major legislative and institutional changes concerning the environment and the first National Environmental Programme was adopted by Parliament in 1997. Notwithstanding these achievements, emissions of air pollutants per unit of GDP remain high compared with OECD averages, much of the necessary communal sewerage and sewage treatment *infrastructure* still needs to be created, and waste management remains weak. On several issues, the *road towards environmental convergence* with other European OECD countries will be a long one.

The *challenge* is therefore to: i) implement environmental policies and strengthen environmental infrastructure; ii) better integrate environmental concerns in economic decisions; and iii) further the country's international environmental efforts.

This OECD report establishes a baseline for assessing future environmental progress and examines Hungary's environmental performance, i.e. the extent to which its *domestic objectives and international commitments* are being met, based on environmental sustainability and economic efficiency criteria. A number of recommendations are put forward that could contribute to strengthening the country's environmental performance.

* Conclusions and Recommendations approved by the Working Party on Environmental Performance at its meeting on 8 November 1999.

1. Implementing Environmental Policies

Environmental governance and democracy

Although some *environmental legislation* dates to the mid-1970s, the most important pieces of legislation have been enacted since 1990 and a new set of modern environmental laws was adopted in the mid-1990s. The Ministry for Environment was created in 1987 and is in charge of overall environmental policy planning, as well as co-ordination of environmental policy measures. Other ministries involved in environmental policy implementation are: Transport, Communication and Water Management; Agriculture and Regional Development; Economic Affairs; National Cultural Heritage; Health; and Interior.

The first *National Environmental Programme* (NEP) covers the period 1997 to 2002. The NEP takes into account the Environmental Action Programme for Central and Eastern Europe, the Fifth EU Action Programme and Agenda 21. The Government Programme for 1998 to 2002 has introduced a *legal harmonisation programme* with the aim of achieving, by 2002, complete approximation of Hungarian environmental laws with EU legislation.

Environmental policies implemented in the 1990s have contributed to reductions in pollutant emissions and improvement in air and water quality. These policies are largely based on the use of regulatory and economic instruments, and have been accompanied by sizeable environmental investment. However, inadequate *enforcement* is a major concern. Increasing fines for non-compliance could provide increased resources for inspectorates, while improving compliance with national emission and discharge standards. Hungary's Environmental Impact Assessment (EIA) system has been applied to a range of projects, but there is not yet a comprehensive scheme for the strategic environmental impact assessment of policies, plans and programmes.

Access to environmental information has improved (e.g. state of the environment reports are being published regularly), but there is a need to strengthen mechanisms for implementation of the legal guarantees for obtaining environmental information. Further efforts will be needed to fully implement the OECD Recommendation on Implementing Pollutant Release and Transfer Registers (PRTRs). Important efforts have been made regarding *environmental education*. Giving more attention to environmental issues in the media should contribute to raising *public awareness*.

It is *recommended* to:

– strengthen *enforcement of environmental laws and regulations* at national, regional and local levels by developing the capacity of inspectorates, and by improving the effectiveness of the system of non-compliance fines;

– implement the *National Environmental Programme*, with a view to achieving its quantitative targets according to deadlines, and monitor and evaluate implementation progress;

– strengthen the *capacity of the Ministry for Environment*, especially for strategic planning, economic analysis, and for developing the laws and regulations necessary to transpose EU legislation;

– strengthen the *capacity of regional authorities* to improve environmental infrastructure on the basis of the polluter pays and user pays principles;

– develop closer and more sustained relations with local authorities, business and NGOs, as well as with the media, with a view *to raising environmental awareness*;

– continue to develop the system for providing *environmental information*, implement the principles of free and easy access to this type of information, and pursue *environmental education* efforts.

From environmental effectiveness to economic efficiency

In the early 1990s, *extensive efforts were needed* to address the negative environmental impacts of past industrial activities. Large environmental investments have been made in the 1990s, mostly in water pollution abatement, but also in waste management and air pollution abatement. Clean-up of former Soviet Army bases, and landscape rehabilitation at closed mines, have also been given priority. Environmental investment is shared equally between the public and private sectors. Until 1997, *pollution abatement and control expenditure* has remained stable at about *1.5 per cent of GDP*, which is sizeable compared to other OECD countries. Implementing the requirements of EU directives (e.g. waste water treatment, waste management) will require *very significant additional expenditure*, to be sustained over the long term. Financing of this expenditure will reflect sustainable development choices balancing economic, environmental and social objectives. Over the period 1997 to 2002, the overall level of environmental expenditure is planned to increase annually by 15 per cent.

Economic instruments have been implemented, in particular charges on water abstraction, water pollution, municipal waste, land, mineral extraction and products (fuels, packaging materials, tyres, etc.). Economic sanctions may be applied when emission and discharge standards are exceeded. The revenue from charges and fines goes to environmental funds, particularly the Central Environmental Protection Fund (CEPF), and to local authorities, which use the revenue to finance pollution abatement measures. These economic instruments, together with fiscal measures, contribute to the financing of environmental investments. This scheme of earmarked funding should be maintained, even though the CEPF has been inte-

grated into the central budget. The use of economic instruments should be expanded to induce polluters to further reduce emissions in a cost-effective way. In particular, the proposed *introduction of emission charges* for water, air and soil pollutants would create better incentives for industries to invest in cleaner production processes. *Integration of environmental concerns into fiscal policy* also needs to be further developed, and the current system of tax differentiation needs to be adjusted towards EU requirements.

Hungarian legislation has not yet given legal force to the polluter pays principle. Although only 30 per cent of environmental investment overall is not paid for by polluters, there are still many situations in which *subsidies for environmental investments* are provided to private firms. Despite increases in domestic water prices and the introduction of a municipal waste charge, state subsidies continue to be provided to municipalities for domestic water supply and sewage treatment, and for municipal waste collection and treatment services. As considerable investments will be required in order to better protect water and upgrade waste management, it will be necessary to perform cost-benefit analyses of investment options to ensure that money is spent effectively.

It is *recommended* to:

– gradually decrease public *subsidies for environmental investments* in the private sector;

– further develop the *financing strategy for implementing environmental policies*, especially in the areas of waste water treatment and waste management, through greater implementation of the polluter pays and user pays principles;

– introduce *emission charges* for water, air and soil pollutants;

– pursue further *integration of environmental concerns into fiscal policy*, in particular within the framework of the taxation system reform.

Air

Since 1990, Hungary has achieved large *reductions in air pollutant emissions* and significant *improvements in ambient air quality.* The economic slowdown in the early 1990s was an important factor in the reduction of stationary source emissions, as a result of which industrial zones have enjoyed better air quality. Major energy sector reform carried out since 1994 has contributed to decoupling of SO_x and NO_x emissions from economic growth. Since 1995, Hungary has made considerable progress towards privatisation and reducing price distortions in the energy sector. The electricity and natural gas utilities, most of the power stations and the Hungarian National Oil and Gas Company have been privatised. Prices of

oil products, coal and LPG have been deregulated, and related direct government subsidies have been eliminated. Electricity and natural gas prices have been adjusted towards cost-recovery levels, and cross-subsidies between consumer groups have been eliminated. Investment in electrostatic precipitators has greatly reduced particulate emissions from power generation. Strict regulatory measures relating to vehicles and roads, as well as a tightening of fuel quality standards, have also contributed to emissions reductions. Complete phase-out of leaded fuel was achieved in April 1999.

However, about half the country's population is exposed to serious or moderate *air pollution*. Studies have demonstrated positive correlations between ambient air quality and respiratory morbidity and mortality in Hungary. High particulate and tropospheric ozone concentrations are still serious problems in Budapest. Recent increases in ambient concentrations of NO_x and ozone raise the question of whether recent air quality gains will be lasting in the face of sustained economic growth. Regulations concerning stationary source emissions and ambient air quality standards need to be updated, and the system of ambient air quality monitoring should be enhanced. The growing motor vehicle fleet threatens to undermine recent air quality improvements, especially in urban areas. Energy efficiency in the residential and transport sectors is poor and requires attention. Financing energy efficiency improvements remains a challenge.

It is *recommended* to:

– continue to review and upgrade *standards relating to air pollution*, notably those for ambient air quality, with due regard to harmonisation with relevant EU standards;

– reform regulatory measures for *stationary sources*, to increase the incentive function of emissions fines, and implement the EU large combustion plant directive; invest in equipment to reduce SO_x and NO_x emissions from *large coal/lignite-fired power plants*, where such investment is shown to be cost-effective;

– continue efforts to improve energy efficiency in the *industrial sector*;

– modernise *district heating networks* to reduce distributional losses; pursue efforts to reduce price distortions concerning heat supply and distribution for industrial and residential users;

– prepare and implement measures to improve energy efficiency in the *residential sector*, including mandatory building codes, metering systems and incentives for insulation improvement;

– encourage use of *cleaner fuels* and renewable energy sources (e.g. biomass);

– extend the national air quality *monitoring system* and improve data collection and reporting, increasing the number of pollutants measured to include size-fractions of particulate matter (e.g. $PM_{2.5}$ and PM_{10}), toxic substances and heavy metals.

Water

Overall, surface water quality has improved in the 1990s following the decline in industrial production. Measures taken since the early 1970s have been successful in improving water quality at Lake Balaton. *Monitoring of surface water quality* is thorough, and data are published in a timely manner owing to a high quality Regional Environmental Protection Inspectorate network. *Water use intensity* is low. *Flood protection* along major rivers and land drainage networks protect over one-quarter of the country. Most of the population is supplied with *piped water*. Protection zones, where polluting activities are restricted, have been established around *vulnerable water supply areas*.

However, much remains to be done to meet the need for sewerage, and for sewage and waste water treatment. Only 60 per cent of the population is connected to *public sewerage* and only 22 per cent to sewage treatment. Nearly 80 per cent of Budapest's effluents are discharged untreated, directly to the Danube. *Industrial waste water discharge* control is not enforced in a dissuasive or comprehensive way. Bacterial contamination occurs almost all along the Danube and Tisza rivers. Secondary water courses are highly polluted, particularly in the vicinity of major urban centres. Nitrates in shallow groundwater exceed the limit value at many locations, particularly near settlements. *Monitoring of groundwater quality* is inadequate, especially given that it is the source of 90 per cent of Hungary's drinking water. More than half the flood protection levees are in need of either maintenance or upgrading. A decreasing water table remains a problem on the sandy plain between the Danube and Tisza rivers. Major efforts are needed to revise *water legislation* and implement it effectively. Considerable investment will be necessary to comply with the EU 1991 urban waste water treatment directive. Water prices will have to be increased, with appropriate attention to affordability concerns. The required flow of information and co-operation among institutions and users would benefit from a river basin approach to water management, facilitating the establishment and harmonisation of investment priorities. The similar geographical definitions of the regional offices of the Ministry of Transport, Communication and Water Management, and the Ministry for Environment, concerned with water-related issues have helped create the conditions for implementing such an approach.

It is *recommended* to:

– examine priorities for financing, building and managing *municipal sewerage and sewage treatment services* and speed up related efforts to connect a larger share of the population to waste water treatment facilities;

– review and increase *water prices*, with due regard to cost-effectiveness, financing and social objectives;

– strengthen enforcement of legislation on *industrial waste water discharges*, particularly through increasing fine rates and introducing an effluent charge;

– revise *water legislation* in line with requirements of EU directives;

– develop an overall *water resource management strategy by river basin*, addressing both quantity and quality issues, building upon the recently established Regional Water Councils;

– reduce vulnerability to *flood hazards* by upgrading flood defence infrastructure;

– strengthen *monitoring* of groundwater quality;

– pursue efforts targeted at protecting zones around *vulnerable aquifers*.

Waste

Hungary has made relatively recent and piecemeal progress in this area. The greatest attention so far has been paid to *hazardous waste*. A 1996 Government Decree clearly defines the responsibilities of the generator, and licences for handling and disposal of hazardous waste are now systematically reviewed. Results have also been obtained, through the application of the 1995 *Product Charge Act*, to a number of types of waste and the distribution of part of the revenues to support collection of used batteries, old refrigerators and refrigerants, packaging materials and used tyres. The quantity of industrial waste produced annually drastically decreased in the early nineties, following the decline in industrial production, and should now be monitored in view of current industrial growth. The recent creation of the *National Cleaner Production Centre* is helping introduce low-waste technologies in production processes.

The *lack of comprehensive waste management legislation* that clearly defines responsibilities, establishes the waste management hierarchy, and emphasises prevention and recovery has so far prevented the realisation of the objectives restated on several occasions in government declarations since 1991. Hungary faces very serious waste management problems. *Municipal waste* collection does not cover 15 per cent of the population; most of the collected waste is landfilled in small communal facilities which, for the most part, do not conform to environmental regulations. Separate collection of municipal solid waste does not exist, apart from

some sporadic and experimental attempts. Large amounts of *industrial hazardous waste* have accumulated over the last decades awaiting treatment. Treatment capacity is still largely insufficient. The list of wastes considered hazardous should be revised to make it consistent with international regulations: the 1996 Decree embodies the principles and implementation rules of the Basel Convention but does not recognise the OECD "green" list, thus restricting movements of wastes destined for recovery. As part of a special remediation programme adopted in 1996, a survey *of sites contaminated by past military and industrial activities* was launched and clean-up measures are being taken in the most urgent cases, especially regarding abandoned Soviet Army facilities. The resources devoted to the programme will need to be increased to cope with the magnitude of the problem within a reasonable period of time.

It is *recommended* to:

- adopt as soon as possible comprehensive *waste management legislation*, firmly establishing the preference for waste reduction and recovery over disposal, and clearly defining the responsibilities of the various parties concerned, including local authorities; develop a *detailed action plan*, based on the polluter pays principle;
- promote *prevention and minimisation of waste generation*, as well as separate collection and recycling of municipal solid waste (paper, glass, green waste, hazardous materials, etc.);
- close down unsatisfactory *communal landfills* and replace them with a modern network of larger treatment and disposal facilities for municipal waste, to be developed on a regional or county basis;
- increase the present incineration and treatment capacity for *hazardous waste*, and establish regional facilities for safe disposal of accumulated and recently generated hazardous waste, sewage sludge and hospital waste;
- revise the *classification and list of hazardous wastes* in conformity with relevant international conventions and regulations; adopt and implement the OECD "green" list of wastes destined for recovery;
- accelerate the implementation of environmental clean-up programmes on the basis of risk assessment for *contaminated sites* and for *decommissioned communal landfills* and dumpsites.

Nature

For many years, Hungary has made substantial efforts to increase the extent of both *forest cover and areas under legal protection*. These efforts culminated with the adoption in 1996 of legislation on the protection of forests and on nature

conservation. About 20 per cent of the national territory is covered by forests (with the aim of reaching 25 per cent in the longer term) and around 9 per cent is under various forms of legal protection. Four new national parks were established in 1997. All bogs, caves and grave mounds are now protected. Several previously threatened species have been reintroduced. Hungary is an *active party to many international agreements and conventions* on nature and biodiversity conservation. The work of personnel employed in nature conservation is well co-ordinated among scientific institutions, local governments and NGOs.

Despite these undeniable achievements of the 1990s, further efforts are needed to improve nature conservation in Hungary. The ongoing land privatisation process has been accompanied by conflicts between nature conservation objectives and the interests of farmers and hunters. The proportion of protected areas under strict protection should be increased, and management of protected areas further improved. A comprehensive network of protected areas remains to be created. Outside protected areas, *better integration of nature conservation objectives in agricultural, regional development, transport and tourism policies* should be set as a top priority.

It is *recommended* to:

– put in place *the National Biodiversity Strategy* (and associated Action Plan), to provide a comprehensive framework for ecosystem and species conservation at both the national and local levels;

– establish a *national ecological network*, in relation with the Pan-European Ecological Network;

– continue efforts to *increase the share of the national territory* designated as protected areas, especially the proportion under strict protection, and adopt management plans;

– improve the integration of *nature conservation objectives in sectoral policies*, primarily agriculture, regional development, transport and tourism;

– make wider use of *Environmental Impact Assessments*, extending their scope to encourage nature conservation objectives, particularly in relation to tourism, afforestation, water infrastructure and land consolidation programmes;

– expand *educational efforts concerning nature conservation* by addressing professional and social groups, particularly farmers and hunters; develop visitors centres and nature trails.

2. Integrating Environmental Concerns in Economic Decisions

Economic forces and changes in such major sectors as industry, energy, agriculture and transport strongly influence environmental conditions and trends, and hence either enhance or diminish the benefits of environmental policies and technical progress. *Further integration of environmental concerns in economic, sectoral and social policies is needed* to achieve cost-effective environmental protection and sustainable development in Hungary.

Decoupling and sustainable development

In the period 1990 to 1993, GDP, industrial output and agricultural production all declined markedly; this contributed to a significant reduction of air and water pollution and a sharp decrease in the use of agricultural chemicals. GDP then recovered to its 1990 level. There are good indications that the increase in industrial production has not been accompanied by a similar increase in pollution. This *decoupling* is the result of both the modernisation of industry and the implementation of new environmental legislation. In particular, the rapidly developing privatisation process, combined with a high share of foreign direct investment, has led in many cases to the introduction of cleaner production processes and to cleaner products. However, waste management remains a problem.

To follow up on the Rio process, an interministerial commission on *sustainable development* was created and local Agenda 21 activities have been launched with the support of NGOs. However, there is a lack of local and regional environmental co-ordination other than at the initiative of municipalities. Efforts have been made to *integrate environmental concerns into sectoral policies* in the context of sustainable development. EIA applies to a range of projects and plays an important integrative role. These efforts should be strengthened in order to develop long-term sectoral policies that take environmental considerations fully into account. Self-responsibility is developing in industry (e.g. environmental management systems, eco-auditing). A national voluntary eco-labelling programme has been introduced under the supervision of the Ministry for Environment. Re-use and recycling should be strengthened at all levels of consumption, to save resources and raise public awareness.

Production patterns have significantly improved in industry, with reduced pollutant emissions and less intensive use of natural resources. Nevertheless, energy intensity per unit of GDP is still 20 per cent above the OECD average. Concerning *consumption patterns*, the use of economic signals such as progressive pricing in previously subsidised sectors has had a very positive impact on water use by households. There are still significant water subsidies for households. Continuing its move towards *full pricing of natural resources* would enable Hungary to further

reduce pollution and natural resource use; however, social constraints (affordability) must be taken into account in setting prices. Problems such as deterioration of public transportation, increasing energy use by households and increasing municipal waste persist.

It is *recommended* to:

– pursue efforts to integrate *environmental concerns into sectoral policies and practices*, in particular energy, industry, agriculture, transport and other services;

– start discussion of a new *sustainable development strategy*, building on the National Environmental Programme and with participation by local stakeholders;

– extend the application of *Environmental Impact Assessment* to the strategic dimensions of sectoral programmes and policies;

– continue to promote the use of *cleaner technologies, energy-saving devices* and the use of renewable energy sources;

– promote wider use of *eco-labelling* and energy efficiency labelling;

– stimulate re-use and recycling at all levels of consumption.

Transport and environment

The transport sector plays an important role in the Hungarian economy, contributing to regional development and to European integration. The 1996 *Hungarian Transport Policy* establishes environmental sustainability as an objective in transport sector development. Concerning *road vehicles*, Hungary has implemented stringent vehicle emissions standards and an in-use vehicle emissions inspection programme is in place. Differentiated import duties, excise taxes and VATs are all used to favour the purchase of newer, more energy-efficient and cleaner vehicles. A differentiated annual vehicle tax further strengthens the incentive to buy less-polluting vehicles. A vehicle-scrapping programme has been used to reduce the number of vehicles with two-stroke engines. Concerning *fuel quality*, Hungary has adopted stringent standards and major improvements have been made. Concerning traffic, significant fuel price adjustments have served to moderate demand for road transport, some improvements to public transport systems have been made, particularly in Budapest, and the development of combined transport has helped offset some air emissions from transit traffic.

However, transport is a major and growing source of *air pollution* in Hungary, particularly road transport. The rates of *accidents and deaths* from road transport are very high. Poorly maintained road surfaces contribute to safety and noise problems. Over 50 per cent of the population lives in dwellings exposed to high noise

levels (greater than 65 dBA). Measures to renew the vehicle fleet, such as inspection and maintenance programmes and vehicle-scrapping schemes, should be further used. Parking regulation is weakly enforced. Tax rebates encourage use of private cars. Infrastructure investment policy does not adequately consider long-term demand management and sustainability goals for the transport sector. Investment in public transport has been inadequate in recent years, making the sector less competitive with road transport. Major investments are needed in order to upgrade inland navigation and railway systems to meet international standards.

It is *recommended* to**:**

– review the Hungarian Transport Policy, giving special attention to the setting of *investment priorities* on the basis of economic analysis, covering environmental impact and energy efficiency of transport modes;

– improve enforcement of *vehicle inspection* programmes and develop incentives for *scrapping* old motor vehicles;

– review the *mix of economic instruments* influencing modal choice for passenger transport, and reassess the present system of income *tax rebates* for commuting by passenger car;

– review *public transport fares* (e.g. in Budapest), taking into account the pricing of other transport modes and seeking to create financial incentives to use public transport;

– develop a *sustainable transport plan for Budapest*, incorporating public transport, car-free zones, parking management, two-wheel vehicle lanes, spatial planning and other measures;

– give comprehensive consideration to project alternatives throughout the *EIA process*, including during stages of public consultation and participation;

– carry out *noise abatement* along major roads and railways, and improve enforcement of emissions limits for motor vehicles;

– develop and monitor *indicators of environmental impacts of transport*, including air, noise and solid waste emissions as well as impacts on nature and the landscape.

3. International Co-operation

Overall, Hungary's *achievements* in the area of international co-operation are *very good*: it was able to meet nearly all its international commitments while undergoing a rapid change from a centrally planned to a market economy. This achievement has been facilitated by strong reorganisation of the economy, with GDP decreasing until 1993 and subsequently rebounding.

On a bilateral basis, Hungary has established *new environmental relations* with its seven neighbouring countries. A few far-reaching bilateral agreements have been signed and others are pending. Positive steps have been taken to improve nature protection in border areas. A bilateral dispute concerning water management and nature protection came before the International Court of Justice, and subsequent to a decision of the Court, the two countries endeavoured to solve the issue on a bilateral basis. The *targets set* in multilateral agreements for *emissions of SO_2, NO_x, VOCs, CFCs and halons* have all been met and some have been surpassed. The pollution load on the Danube basin from Hungary has been drastically reduced. Emissions of greenhouse gases have been reduced. Emissions of CO_2 in 2000 will be lower than in 1990. The target set under the Kyoto Protocol is likely to be reached despite new economic growth. The Aarhus principles on access to environmental information and public participation have been adopted; Hungary has signed all UN-ECE agreements on environmental issues. Hungary joined the OECD in 1996 and is seeking to accede to the European Union. As a result, there is a strong effort to harmonise its environmental legislation with the legislation of EU countries, which are also members of the OECD.

Although Hungary's performance concerning international relations is excellent, the *transposition of some international commitments* into domestic law may be a source of concern. Hungary is faced with the very large task of changing its laws, regulations and approaches to environmental protection, while at the same time having to adapt to new economic and political circumstances. A number of laws and regulations needed to implement OECD Decisions and Recommendations which Hungary has accepted are still at the drafting stage. Means to prepare new environmental laws, and to implement and enforce existing ones, are not being increased, casting some doubt on the possibility of meeting the self-imposed deadline for approximation of the EU acquis, and of ensuring that Hungary's environmental infrastructure is comparable with that of its EU partners. Apart from issues directly related to environmental legislation, there are serious difficulties in implementing an integrated approach to pollution prevention and control and introducing the sustainable development concepts adopted at Rio.

It is *recommended* to:

– ratify and implement relevant *international environmental agreements* which Hungary has negotiated or signed (Annex III);

– speed up the process of *revising and adapting domestic environmental* legislation to meet international commitments;

– *strengthen the approximation* effort to adopt EU acquis in the field of environment, in order to meet Hungary's self-imposed target of 2002;

– adopt *new legislation on waste* and further regulations on *chemicals safety and industrial accidents* to enable Hungary to meet its obligations under OECD Acts;
– *increase resources* to prepare for EU accession and to enforce new legislation approximating that of the EU;
– undertake a *full analysis of the cost of implementing and enforcing EU legislation* in areas such as water, air and waste, with a view to preparing a long-term plan for financing these outlays;
– strengthen regional co-operation concerning the *Upper Tisza* area, and implement the Sofia *Danube* Convention;
– implement cost-effective measures to *improve energy efficiency*, with a view to improving the country's energy balance while participating in the global effort to address *climate change*.

1

THE CONTEXT

1. The Physical Context

Located in Central Europe, *the Republic of Hungary* shares borders with Austria, Croatia Romania, the Federal Republic of Yugoslavia, Slovakia, Slovenia and Ukraine (Figure 1.1). This landlocked country of 93 030 km^2 lies between the Carpathian Mountains and the Alps. Its widest extensions are 268 kilometres north-south and 526 kilometres east-west. Hungary can be broadly divided into *four geographical regions*: the Great Plain (nearly half its territory) and the Northern Mountains, both east of the Danube; and Transdanubia (a third of its territory) and the Small Plain, both west of the Danube.

Hungary is a *lowland country*: 84 per cent of its territory lies less than 200 metres above sea level. A chain of mountains of medium height runs across it. The Transdanubian Mountains west of the Danube are 400 to 700 metres high, while the Northern Mountains to the east rise from 500 to 1 000 metres. The country's highest point is Mount Kékes (1 015 metres). Transdanubia is a hilly region. The *climate* is temperate continental, with cold winter and warm summer. Annual average rainfall is 500 to 550 mm on the plains, and 600 to 800 mm at higher altitudes.

Scarcely 5 per cent of Hungary's surface waters have their origins in the country itself (Chapter 3). The two most important *rivers*, the Danube (with a 417 kilometre stretch within Hungary) and the Tisza (598 kilometres), cross the country from north to south. The Danube, flowing through Budapest, links Hungary to the Black Sea; it joins the North Sea via the Rhine-Main-Danube canal. There are 1 200 natural and artificial *lakes* in Hungary. Lake Balaton is the largest freshwater lake in Central Europe and an important international tourist attraction. Hungary has long been known for its abundance of thermal waters.

Arable and permanent cropland covers nearly 58 per cent of the total land area, permanent grassland 13 per cent and forest and other wooded land 19 per

Figure 1.1 **Map of Hungary**

cent. The main crops are wheat and maize; pig meat is the main livestock product. About 320 000 hectares are irrigable. Over the last three decades there has been a 10 per cent decrease in the amount of agricultural land (including grassland) and a 20 per cent increase in forested area.

Hungary is not well endowed with *natural resources*. Its fertile soil is the most important asset. Around half its primary energy requirements must be imported, mainly oil and gas from Russia. There are brown coal and open-cast lignite mines in the Northern and Transdanubian ranges. Natural gas is exploited in the southern part of the Great Plain.

2. The Human Context

With a total population of 10.1 million, Hungary's population density averages 109 inhabitants per km^2. Following moderate growth in the 1960s and 1970s, Hungary is the only OECD country in which *population decreased* between 1980 and 1998 (by 5 per cent). This can be explained by a fall in the fertility rate (from 2

to 1.5) and persistent high mortality (above 140 000 deaths per year). The share of the population living in urban versus rural areas has remained stable; almost two-thirds is in urban areas. Budapest, the capital, has a population of 1.9 million. The second largest city, Debrecen, has 207 000; seven other cities have between 100 000 and 200 000 inhabitants. Only 30 per cent of the population lives in cities of 100 000 or greater. Population density is lower in the southern part of the country (Table 1.1).

Almost 98 per cent of the population is Hungarian. The remaining 2 per cent comprises small minorities of German, Croatian, Romanian and Slovak speakers, as well as Gypsies (around 150 000 according to 1990 census data), a distinct ethnic group of which half live in the north-east, where they constitute 8 to 10 per cent of the population. Hungary's *population is gradually ageing*, as shown by a doubling of the ageing index (over 60 years/under 14 years) since 1960. People over 60 currently make up 20 per cent of the population.

The level of *education* is high by EU standards. Less than 1 per cent of those over ten years of age have had no formal education, while more than 85 per cent of those over 15 have had at least a primary school education. There are no significant differences in educational levels between men and women.

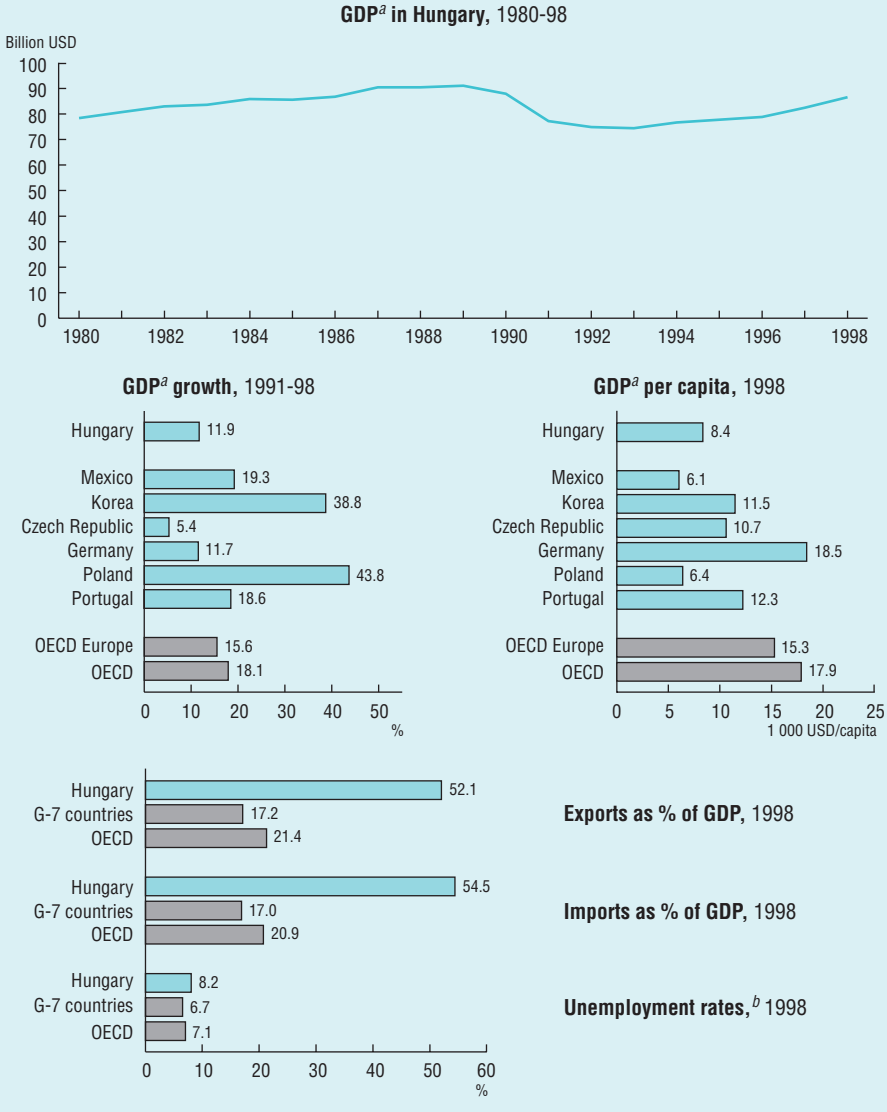
The *health* of the Hungarian population appears to be the worst in the OECD. Life expectancy is the lowest among OECD countries: it is relatively low for all

Table 1.1 **Regional distribution of population and GDP,**[a] 1997

Region	Share of total population (%)	Number of counties	Share of total land area (%)	Population density (inhabitants/km^2)	GDP per capita (thousand HUF)	National investment per capita (thousand HUF)
Central Hungary	28	1[b]	7	416	773	183
Northern Great Plain	15	3	19	87	390	61
Southern Great Plain	14	3	20	75	453	50
Northern Hungary	13	3	15	96	401	52
Central Transdanubia	10	3	12	99	499	78
Southern Transdanubia	10	3	15	70	463	87
Western Transdanubia	10	3	12	89	559	106
Total/average	**100**	**19**	**100**	**109**	**544**	**102**

a) 1995 prices.
b) Including Budapest.
Source: HCSO.

Figure 1.2 **Economic structure and trends**



a) GDP at 1991 price levels and purchasing power parities.
b) Per cent of total labour force.
Source: HCSO; OECD.

age-sex groups, but especially for males between 40 and 60: (69 years, or seven years below the OECD average). Between 1960 and 1990, it increased by 1.3 years (compared with 8.7 years in the OECD); male life expectancy declined over the same period. Overwork, a high-fat, high-sugar diet, high alcohol and tobacco consumption and decreasing relative income are the principal causes of high prime-age male mortality.

The *GDP per capita* of Hungary is less than half the OECD average (as expressed in purchasing power parities) (Figure 1.2). Minimum and maximum national *wage* increases in the business sector (i.e. both private and State-owned enterprises) are agreed each year among employee, employer and government representatives, taking inflation into account. Following two years of steep declines, real wages rose in 1997 and 1998 due to increases in centrally bargained wage levels along with fiscal changes. However, wages are relatively low by OECD standards. Wage inequality, which existed before political liberalisation, is widening as increases in high wages have been greater than those in lower ones. Among OECD countries, Hungary ranks at the low end in terms of minimum wage relative to median full-time earnings (the minimum wage fell to only 30 per cent of average wages in 1997), and about in the middle with respect to earnings dispersion. Per capita income in Budapest is 80 per cent above the national average.

Before 1990, Hungary had very low *unemployment*. The transition to a market economy has led to the closure or restructuring of a large number of enterprises, particularly in the manufacturing, agriculture and mining industries. Unemployment rose from 1 per cent in 1990 to 13 per cent in 1993; subsequently it has been falling, mainly reflecting early retirement and disability programmes and, since 1998, job-creating economic activity. Unemployment reached 8.2 per cent in 1998 (Figure 1.2). Unemployment rates are lowest (6 to 8 per cent) near Budapest and in the regions sharing a border with Austria; they are highest (13 to 19 per cent) in the north-east, particularly among the Roma (Gypsy) population. Services absorb almost 60 per cent of the labour force, and industry a third.

3. The Economic Context

In the early 1990s, Hungary experienced a rapid *transition to a market economy* and the collapse of its trading relationships with former COMECON countries. GDP decreased by 15 per cent in the period 1990 to 1993; it began to stabilise in 1993 and improved in 1994, with rising domestic demand. However, inflation was high and variable, and fiscal and current account imbalances were increasing.

The *macro-economic stabilisation package introduced in 1995* (i.e. the "Bokros package", combining devaluation with fiscal restraint and reduction in real wages) together with the deepening of structural reforms created the conditions for the Hungarian economy's remarkable progress since. The Bokros package initially brought about a collapse in domestic demand (in 1995 and 1996) and a sharp slowdown of GDP growth. The economy began to pick up in 1997 following strongly increased investment, which progressively translated into higher incomes and more private consumption. Domestic demand continued to grow in 1998, with consumer expenditure playing an increasingly important role. In 1998, Hungary experienced a growth in GDP of 5 per cent; similar growth was expected in 1999.

Hungary's *GDP* reached HUF 10 197 billion (USD 47 billion) in 1998 (at current prices). Converted using 1991 price levels and purchasing power parities, GDP per capita is USD 8 400, in the middle range of transition countries (Table 1.2). Hungary joined the OECD in May 1996.

The share of *industry* and construction in GDP has declined, but still accounts for 31 per cent. Within industry, metallurgy has been more strongly affected than food processing and electricity production. Since 1989, along with changes in ownership, the number of firms (especially small ones) has increased enormously. Overall industrial output stopped declining in 1992, and several major industries'output has started to

Table 1.2 **Economic trends in transition countries**

	Change in GDP 1989-98 (%)	Cumulative fall in GDP before recovery (%)	Consumer price index 1989-98 (%)	Foreign direct investment mean 1991-97 (% of GDP)	GDP/capita[a] 1994 (USD 1 000)
Hungary	–5.6	–18.1	564	5.4	6.3
Czech Republic	–6.7	–20.7	263	3.1	9.9
Poland	18.2	–17.8	5 727	1.1	5.0
Slovakia	–1.3	–25.0	255	0.7	6.7
Romania	–16.2	–25.0	51 567	0.9	3.9
Bulgaria	–34.6	–37.2	201 182	1.3	4.4
Slovenia	3.2	–17.1	9 786	1.0	9.9
Russian Federation	–46.6	–43.1	629 250	0.3	7.3
Ukraine	–59.7	–60.0	14 002 995	0.2	..

a) GDP at 1994 price levels and purchasing power parities.
Note: Data include preliminary (1997) and projected (1998) figures.
Source: OECD; IMF.

increase. The largest industrial branches are chemicals, engineering and food processing. Revenues from *tourism* doubled between 1990 and 1997, to USD 2 billion.

Agriculture's share of GDP has fallen by two-thirds since 1980, but still accounts for 6 per cent. In the past, agriculture was dominated by collective farming, which produced half of agricultural output (mostly cereals). The other half was produced on private farms and privately farmed plots (over one-third of output, mostly devoted to pigs, poultry, horticulture and wine) and by a few large State farms (one-sixth of output, mostly livestock). By the official deadline for transformation at the end of 1992, over 90 per cent of collective farms had been re-established as new co-operatives, with few farmers opting to farm independently. Of the 1.8 million private landowners, 57 per cent own plots of less than 0.2 hectare and only 0.3 per cent own more than 50 hectares. State farm privatisation has been slow, in particular due to delays in the compensation process.

Economic transition has been fairly rapid and smooth compared to that experienced in other transition countries (Table 1.2). Hungary's progress in *privatisation* stands out not only among Central and Eastern European countries, but also in relation to OECD countries in general: as much as 85 per cent of GDP is now generated in the private sector. The government is by law holding on to a number of sectors, most notably electricity, water supply, transportation, and the postal service and telecommunications.

In absolute terms and on a per capita basis, Hungary has received the greatest *foreign direct investment* among Eastern European countries (Table 1.2). Since 1989, more than USD 18 billion has been invested through privatisation or greenfield investments. This is equivalent to over USD 1 800 per person, almost twice the per capita share in the Czech Republic and nine times that in Poland. Exports of foreign-owned firms are increasingly concentrated in high-tech and high value-added products. Initially, investments were mainly made by large multinationals, including automotive companies setting up assembly plants to service Western European markets. Companies with foreign participation produce 32 per cent of Hungarian GDP and 72 per cent of gross exports.

Since the beginning of the transition, Hungary has sought to reduce the State's role in the economy. The authorities have had considerable success controlling and reducing expenditure. One of the most fundamental problems concerns tax compliance and *tax policy*. The effective tax rates applying to different economic agents, or different economic activities and sectors, vary considerably because of numerous special allowances and exemptions. One consequence is that many tax rates are very high, and it is difficult to ensure a broad-based tax system with high compliance. As much as 30 per cent of economic activity may be escaping taxation. The share in GDP of *general government revenues* declined from 52 per cent

in 1991 to 41 per cent in 1997, and that of government expenditure from 55 to 46 per cent. General government tax revenue fell from 42 per cent of GDP in 1991 to 36 per cent in 1997, while local government revenue rose from 6 to 8 per cent in the same period.

Following a nearly balanced budget in 1990, the *budget deficit* increased to 8 per cent of GDP in 1994. Budgetary tightening occurred after the Bokros reforms, which entailed draconian spending cuts, principally in the form of public sector wage restraint and delayed government investment. This resulted in the budget deficit falling to 5 per cent in 1998, with a 4 per cent deficit targeted in 1999. The extent of the spending cuts is somewhat understated by these figures, as interest payments on the government debt increased over the same period. *External debt* fell to a more manageable level as convertible currency exports and FDI rose. In net terms, foreign debt decreased from 48 per cent of GDP in 1990 to 32 per cent in 1996, while debt service increased from 13 to 19 per cent.

During the transition period, annual *inflation* peaked at 35 per cent in 1991, reflecting sharp energy price increases and depreciation of the forint. After a period of decline until 1994, inflation rose again to 28 per cent in 1995, following increases in regulated prices and pressures caused by the further depreciation of the currency. The process of disinflation that began in 1996 continued through 1998 and was projected to continue in 1999, though to a lesser extent due to continued wage drift. The average CPI increase fell to 14 per cent in 1998, still substantially above the OECD average. The 1999 budget proposal assumes 10 to 11 per cent inflation. Consumer prices increased by 564 per cent between 1989 and 1998, a smaller increase than that experienced by most other transition countries (Table 1.2).

The previous *exchange rate regime* of discretionary devaluations was replaced in March 1995 by a pre-announced crawling peg, and the forint has become increasingly attractive to financial investors. In August 1998, following the Russian crisis and the collapse of the Budapest stock exchange, capital outflows intensified and the forint was pushed to the depreciation limit of its fluctuation band. Since then, the stock market has recovered some of its losses. The value of the forint has fallen substantially against the dollar: in 1991, HUF 75 bought USD 1, compared with HUF 215 in 1998.

The share of trade with the former COMECON countries has dropped (from 60 per cent of total trade in the early 1980s to 23 per cent in 1998) at the same time as trade with market economies, particularly the EU countries, has been growing. Germany is Hungary's main *trading partner* (29 per cent of total exports and 24 per cent of total imports). Other key partners include Austria, Italy, and (as a source of oil and gas) Russia. Russia is the destination of only 6 per cent of Hungarian exports.

The *trade balance* has become negative since 1992, due to higher growth of imports than of exports (in USD terms). Exports recovered following the 1995 stabilisation measures and the introduction of the new exchange rate regime, lowering the trade deficit. Imports continue to expand rapidly in response to rising consumption. However, the tradable sector's overall contribution to GDP declined in 1997 and began to be negative in 1998. Exports are dominated by manufactured goods (one-half of total value), machinery (one-quarter) and food products (18 per cent). Hungary mainly imports manufactured goods (one-half of total value), machinery (one-third) and energy (14 per cent).

4. The Institutional Context

Hungary has existed with its current boundaries since 1920. The Trianon Peace Treaty reduced its territory to 28 per cent and its population to 40 per cent of what they had been before the end of the First World War. Millions of Hungarians still live beyond the present borders of Hungary in Romania, the Federal Republic of Yugoslavia, the Czech Republic, Slovakia, Ukraine and Austria. Communism was established in Hungary between 1948 and 1949**.** The *Republic of Hungary* was created following amendment of the Constitution in October 1989. In March 1990, free multi-party elections were won by a coalition, which initiated the transition to a market economy.

Hungary is now a *parliamentary democracy* headed by the President of the Republic. The Prime Minister is the Head of Government. The Parliament is unicameral and has 386 members. Hungary is divided into 19 counties and the capital. There are nearly 3 200 municipalities.

It is proposed under the 1996 Act on Regional Development and Physical Planning to divide the country into seven *regional entities* (Table 1.1).

Central environmental administration

In 1987, the National Office for Environmental Protection and Nature Conservation (NOENC) and the National Office for Water Management (NOWM) were merged to form the Ministry for Environmental Protection and Water Management (MEW). In 1990, MEW was renamed the Ministry of Environment and Regional Policy (MERP) and its responsibility was extended to regional policy, construction and the protection of monuments. In 1998, these responsibilities were transferred to the Ministry of Agriculture and Regional Development and the Ministry of National Cultural Heritage. MERP became the *Ministry for Environment* (ME).

The Ministry for Environment is in charge of overall environmental strategic planning in the short, medium and long terms, as well as the setting of environmental

policy targets and co-ordination of national and international environmental activities. Its main areas of responsibility are *environmental protection* (air, water), *waste management* and *nature conservation*. The work of the Ministry for Environment itself (300 employees) is supported by the Institute for Environment Management (250 employees) and the National Inspectorate for Environment Protection and Nature Conservation (26 employees), which exercises second order environmental and nature conservation jurisdiction. There are also regional authorities dealing with environmental protection and nature conservation (1 060 and 500 employees respectively) which exercise first order jurisdiction. The Ministry for Environment further supervises the National Meteorological Service (300 employees).

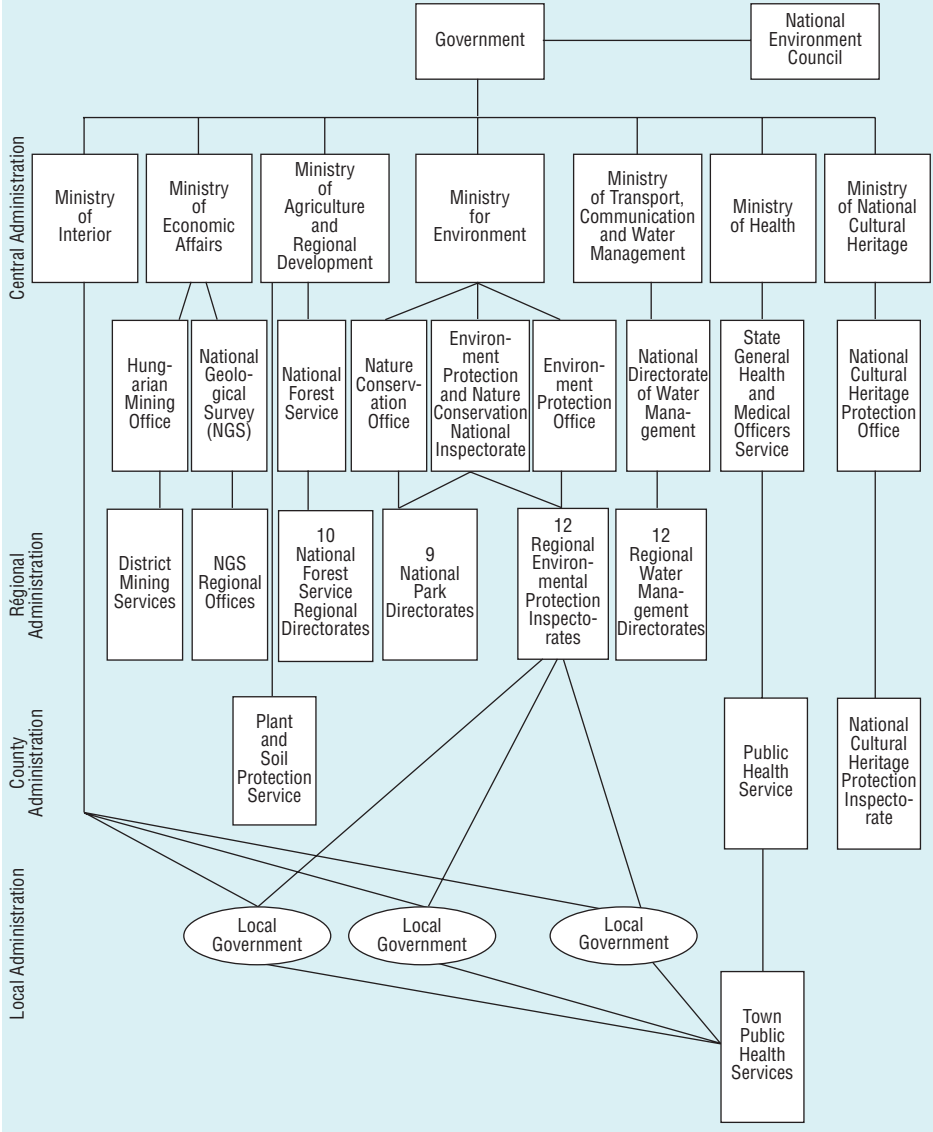
Many *other ministries* have environmental protection responsibilities (Figure 1.3): the Ministry of Transport, Communication and Water Management (MTCWM) is responsible for water resource management and flood protection and for the control of air pollution from mobile sources; the Ministry of Health is in charge of environmental health issues and ambient air quality protection and monitoring; the Ministry of Agriculture and Regional Development (MARD) is responsible for soil protection and forest management, regional development and construction regulation; the Ministry of Interior is in charge of civil protection and supervises municipalities, including the carrying out of environmental activities at the local level; the Ministry of Economic Affairs is responsible for managing mineral resources and mining; the Ministry of National Cultural Heritage is in charge of the protection of monuments; and the Ministry of Education is responsible for environmental education and awareness raising.

The *National Environment Council*, a government advisory body established in 1996, is made up of scientists and representatives of business and environmental NGOs. It gives opinions on various environmental issues, programmes, legislation and decisions. An Environment Committee was created within the Parliament in 1986. Integration of environmental concerns in economic and sectoral policies is promoted by the *National Commission on Sustainable Development* (set up in 1993). This is an advisory body to the government and a forum for discussion: each Ministry is represented, as well as NGOs and the scientific, press and business sectors.

National environmental administration at regional level

During most of the 1980s, municipalities or county councils were vested with certain responsibilities; 12 Regional Water Management Directorates were established under the NOWM, and seven Inspectorates for Environmental Protection and Nature Conservation under the NOENC. When the new national environmental administration was created, they were merged into 12 Directorates for Environmental Protection and Water Management, organised according to *water catchment areas*,

Figure 1.3 **Administrative structure of environmental protection in Hungary**



Source: ME.

and took over new functions that had previously been performed by special local or county councils.

From 1990, 12 *Regional Environmental Protection Inspectorates* (REPIs) were established separately from 12 Regional Water Management Directorates. The REPIs have first order jurisdiction in regard to a range of environmental issues, including control of air pollution from stationary sources, water quality, noise and vibration and harmful impacts of waste. They are equipped with laboratories and their responsibilities include: controlling compliance with environmental standards and regulations; monitoring the state of the environment and forecasting significant environmental impacts; maintaining a regional environmental information system, in co-operation with other regional bodies; carrying out and co-ordinating environmental activities; and preparing proposals for environmental investment.

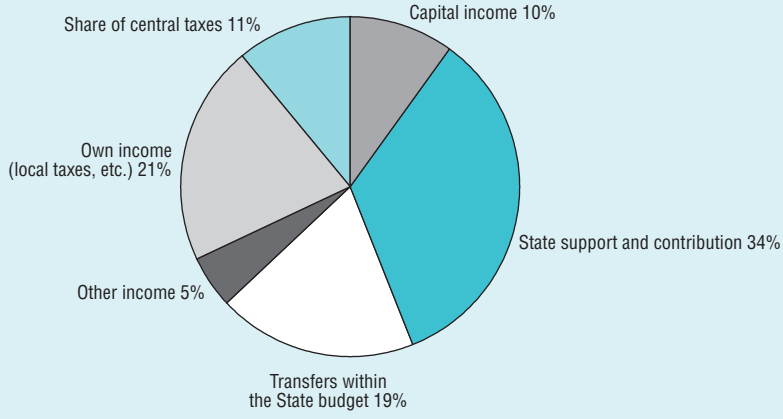
The nine *National Park Directorates* (NPDs) are responsible for managing national parks and other protected areas in their region, as well as promoting nature conservation outside protected areas. Other ministries with environmental responsibilities also have decentralised bodies at the regional or county level (Figure 1.3).

Environmental responsibilities of municipalities

As part of the devolution process initiated by the end of the 1980s, the Local Governments Act has given more responsibilities (including for environmental protection and nature conservation) to the almost 3 200 municipalities. The *environmental responsibilities of municipalities* include operation and maintenance of the drinking water supply and sewerage system, as well as municipal waste collection and treatment. Municipalities are also responsible for the delineation and protection of natural areas of local significance, and for establishing and enforcing local noise, vibration and air quality protection regulations.

Overall, *municipal revenues* come one-third from local taxes and income on their own capital, and two-thirds from central budget support (Figure 1.4). Central government transfers to local governments account for around 15 per cent of central budget expenditure. There are three types of state support to *finance environmental protection activities by municipalities*: earmarked support (mainly for water management purposes); targeted support (for municipal investments such as in waste water collection and treatment and solid waste management); and programme support (for development of sewage collection and treatment in large cities). Municipalities can also establish a municipal environmental fund.

Figure 1.4 **Revenues of local governments,** 1996



Source: OECD.

5. Environmental Legislation

The Constitution of Hungary explicitly refers to the *right to a healthy environment*. Hungary's first environmental legislation, the Forestry Act, dates to 1791. In 1935, nature conservation was given greater prominence and the Parliament passed the Forest and Nature Conservation Act. The first protected area dates to 1939 (the Woods of Debrecen). Additional natural areas were given some degree of protection in the 1960s, and environmental legislation was expanded to address soil and water management in the Act on the Protection of Agricultural Land (1961) and the Water Management Act (1964).

In the 1970s, Hungarians began to be concerned about increasing municipal and industrial pollution. The 1973 Conference on Environmental Protection, organised by the Patriotic People's Front, can be considered as a landmark in the development of Hungarian environmental policy. Thereafter a process of codification began, resulting in the first comprehensive environmental law, the *1976 Act on the Protection of the Human Environment*. Fundamental principles of environmental

Table 1.3 **Selected legislation relating to the environment**

1972	Public Health Act (1994)[a]
1976	Act on the Protection of the Human Environment (cancelled 1995)
1983	Government Decree on Noise and Vibration Protection (1992)
1986	Government Decree on Protection of Air Quality (1995)
1987	Government Decree on Imports of Hazardous Substances (1994)
1988	Law Decree on Plant Protection
1990	Act on Local Governments
1992	Act on Environmental Product Charge on Fuel (cancelled 1995)
1992	Act on the Protection of Personal Data and Release of Data of Public Interest (1995)
1992	Act on the Separate State Funds (1995)
1993	Government Decree on the Environmental Impact Assessment of Certain Activities (cancelled 1995)
1994	Act on the Association of Forest Owners
1994	Agricultural Land Act
1995	Act on General Rules of Environmental Protection (replaces the 1976 Act on the Protection of the Human Environment)
1995	Act on the Compulsory Use of Certain Local Public Services
1995	Act on Environmental Product Charges (1998)
1995	Water Management Act
1995	Act on Restoration of Nature Conservation Areas
1995	Government Decree on Drinking Water Supply and Sewage Disposal by Public Utilities
1995	Government Decree on the Co-ordination of Governmental Tasks concerning Lake Balaton
1995	Government Decree on Environment and Nature Conservation Consequences of Liquidation
1995	Government Decree on the Scope of Activities Subject to Environmental Impact Assessment and the Related Detailed Regulation of Official Procedure (1997)
1996	Act on Regional Development and Physical Planning
1996	Nature Conservation Act
1996	Act on Forests and Forest Protection
1996	Act on Protection of Game, Game Management and Hunting (1998)
1996	Act on Civil Protection
1996	Act on Nuclear Energy
1996	Government Decree on Hazardous Waste (1997)
1996	Government Decree on the Regulation of Procedures for Hazardous Substances and Products
1997	Act on the Protection of Monuments
1997	Act on the Protection and Development of the Built Environment
1997	Government Decree on Rules to Levy Nature Protection Fines
1997	Government Decree on the Information System concerning Regional Policy and Development and the System of Compulsory Information Supply
1998	Genetic Engineering Act
1998	Act on the Protection of Animals
1999	Act on Disaster Prevention and Relief

a) Data in parenthesis refer to the year of legislation amendment.
Source: ME.

policy are set out in Chapter 1 of the Act; Chapter 2 deals with enforcement of regulations, including penalties corresponding to the extent of the damage or harm caused. The Council of Ministers ordered that all existing rules be revised and harmonised with the provisions of the 1976 Act. However, not all areas of environmental protection were covered by a responsible agency. This is why rules relating to the discharge of hazardous waste, for instance, were not enacted until 1981 and legislation on combating noise pollution until 1983. Legislation concerning various environmental issues has been updated: fines for pollution of rivers and lakes (1978 and 1984), those for sewage water pollution exceeding specified limits (1984), protection of natural areas (1982) and air protection (1986).

In the 1990s, the Parliament has approved a number of pieces of legislation relating to the environment (Table 1.3). Most environmental legislation as such has followed the *1995 Act on General Rules of Environmental Protection*, which replaced the 1976 environmental protection act. The 1995 Act provides a comprehensive legal framework covering all aspects of environmental protection. It introduces the basic principle that preventing environmental damage should have priority over pollution control. Some regulatory instruments initiated by governmental decree, such as environmental impact assessments, are regulated by the Environmental Protection Act. An act on waste management is in preparation.

Part I

POLLUTION CONTROL AND NATURE CONSERVATION

2

AIR MANAGEMENT

1. Air Pollution Situation and Trends

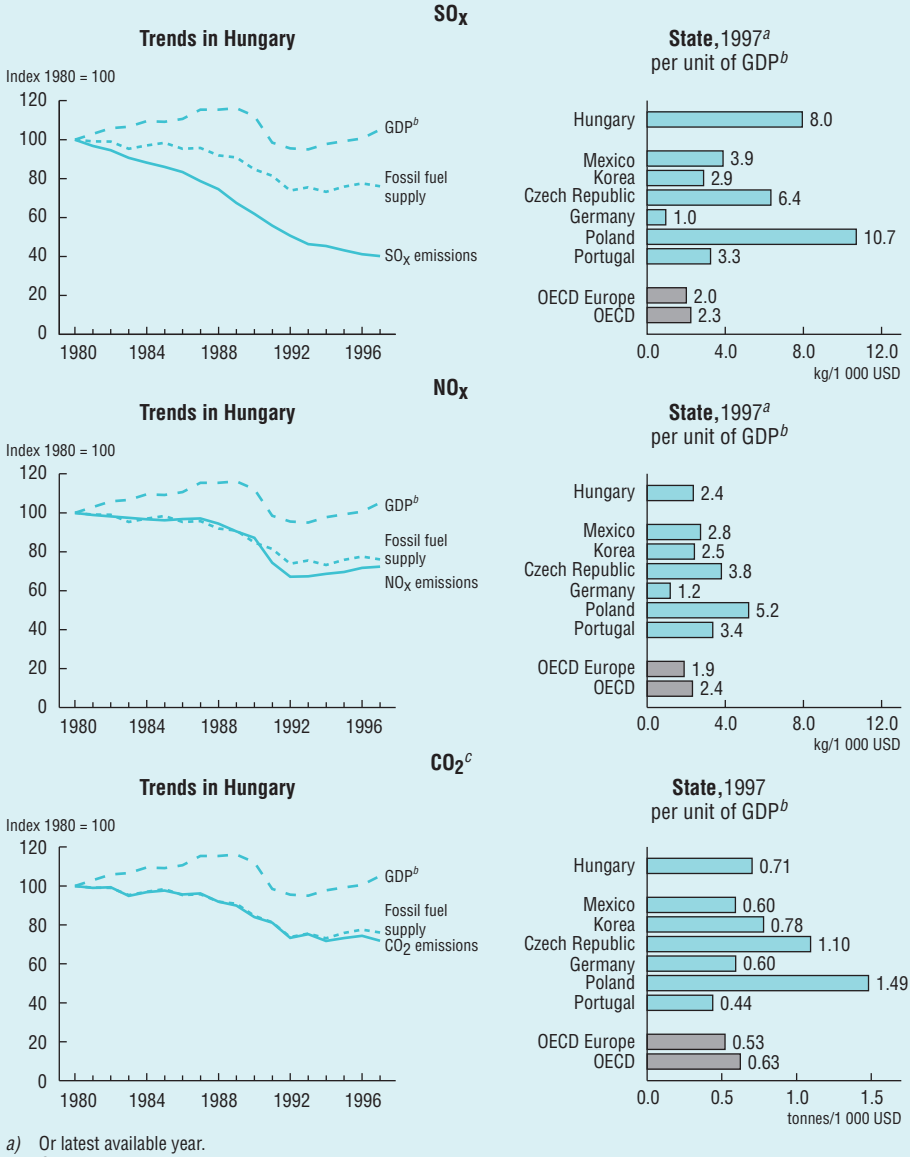
Emissions of atmospheric pollutants

Sulphur dioxide (SO_2) emissions in Hungary totalled 657 kt in 1997, a 35 per cent decrease from their 1990 level. On a per capita basis, SO_2 emissions in Hungary in 1997 were 1.6 times higher than the OECD average (64.5 kg versus 39.2 kg/inhabitant). Hungary's emissions of SO_x per unit of GDP (8.0 kg/USD 1 000) were over three times the OECD average (Figure 2.1). The *main sources of SO_x emissions* in 1997 were power plants (71 per cent of total emissions), industry (13 per cent) and households (13 per cent).

Emissions of nitrogen oxides (NO_x) totalled 197 kt in 1997, a 17 per cent decrease from their 1990 level. Per capita emissions of NO_x (19.4 kg) were one-half the average for OECD countries. Per unit of GDP, however, Hungary's NO_x emissions (2.4 kg/USD 1 000) were equivalent to the OECD average (Figure 2.1). Having fallen by 33 per cent between 1980 and 1992, NO_x emissions increased by 8 per cent between 1992 and 1997. Transport is the main *source of NO_x emissions* (55 per cent), followed by power plants (25 per cent), industry (11 per cent) and residential heating (9 per cent).

Emissions of particulate matter (measured as dust) totalled 136 kt in 1997, a 34 per cent decrease compared with 1990. In 1997, *major sources of particulate emissions* were industry (43 per cent), residential heating (28 per cent), public power plants (14 per cent) and transport (13 per cent). Between 1990 and 1997, large reductions were achieved in the residential sector (49 per cent decrease), public power plants (44 per cent decrease) and industry (30 per cent decrease). The decrease in household emissions was mainly due to fuel switching (from coal to natural gas); power plant emissions decreased for the most part following the introduction of dust collectors; and the decrease in industrial emissions was largely

Figure 2.1 **Air pollutant emissions**



a) Or latest available year.
b) GDP at 1991 prices and purchasing power parities.
c) Emissions from energy use only; excludes international marine bunkers.
Source: HCSO; IEA-OECD.

attributable to economic factors. Transport emissions from diesel engines increased by 25 to 30 per cent during the same period.

Emissions of non-methane volatile organic compounds (NMVOCs) totalled 145 kt in 1997, roughly equivalent (3 per cent decrease) to their 1991 level. In 1997, the main anthropogenic sources of NMVOCs were transport (49 per cent), use of solvents (24 per cent), communal heating (17 per cent) and industrial combustion and processing (7 per cent). Although total NMVOCs emissions did not change much during the period examined, *source contributions* changed considerably. Emissions from solvent use decreased by 21 per cent from 1991 to 1997, while those from industrial combustion and processing increased by 63 and 32 per cent, respectively.

Emissions of carbon monoxide (CO) in 1997 (721 kt/y) were 21 per cent lower than in 1991. In 1997, the main sources of CO emissions were transport (61 per cent), industry (30 per cent) and household heating (7 per cent). Between 1991 and 1997, there were significant reductions in each of the source categories: emissions from transport decreased by 10 per cent, those from industry by 19 per cent, those from household heating by 64 per cent, and those from power stations by 25 per cent.

Since 1990, *emissions of heavy metals* have decreased significantly. Overall, emissions of arsenic, zinc, mercury, cadmium, chromium, nickel, lead, copper, selenium and vanadium have decreased by 65 per cent. Lead emissions from transport in 1996 (126 tonnes) represented an 82 per cent decrease from 1990 levels, reflecting the active phasing-out of leaded gasoline.

Consumption of several chemicals that contribute to *depletion of the ozone layer* (CFCs and halons) has effectively ceased. CFCs consumption decreased by 87 per cent between 1990 (4 410 tonnes) and 1995 (565 tonnes) and was completely banned in 1996. Consumption of halons decreased by 81 per cent between 1990 (345 tonnes) and 1993 (65 tonnes), ceasing entirely in 1994 (Chapter 8).

Emissions of carbon dioxide (CO_2) in 1997 were 58 236 kt, a 14 per cent decrease from 1990 levels. In 1997, per capita emissions of CO_2 were 5.7 tonnes, three-quarters of the OECD Europe average. Emissions per unit of GDP in 1997 (0.71 tonnes/USD 1 000) were well above the OECD Europe average (0.53 tonnes/USD 1 000) (Figure 2.1).

Emissions of methane (CH_4) totalled 1.13 million tonnes in 1996; it is estimated that over 30 per cent of these emissions are from the waste sector (landfills and wastewater), about 10 per cent from agriculture (livestock and rice cultivation), and the rest are believed to represent fugitive emissions. Emissions of *nitrous oxide (N_2O)* totalled 5 000 tonnes in 1996; emissions from agriculture are estimated to

represent about 15 per cent of these emissions, relatively low compared to other OECD Europe countries owing to the low use of fertilisers.

Ambient air quality

According to the National Public Health and Medical Officers'Service (NPHMOS), *13 per cent of the national territory has poor ambient air quality.* Based on the frequency of exceedance of national ambient air quality standards (NAAQS) for NO_x, SO_x and particulates, in 1994 the NMPHO classified 3.9 per cent (3 590 km^2) of the national territory as "seriously polluted" and 9.3 per cent (8 674 km^2) as "moderately polluted". "Seriously polluted" indicates that the 24-hour NAAQS are exceeded at least 10 per cent of the time, and "moderately polluted" that exceedances occur less than 10 per cent of the time (for particulates, 30 per cent is the point of differentiation). In the period of 1994-98, the extent of "seriously polluted" regions significantly diminished.

In the period 1980 to 1997 *ambient air quality* was measured in 110 settlements by NPHMOS, inter alia in five cities: Budapest (population 1.9 million), Debrecen (207 000), Miskolc (176 000), Pécs (159 000), and Györ (124 000). Budapest is a pole for population and industry; Miskolc and Pécs are industrial cities, while Debrecen and Györ are predominantly residential and service-oriented. The data show large improvements since 1980 in most urban areas, though tropospheric ozone has emerged as a growing air pollution problem. Particulate concentrations continue to exceed NAAQS in some urban areas, including Budapest. Data on toxic substances and size-fractionated particulates are insufficient.

In the period 1980 to 1997, *ambient sulphur dioxide (SO_2) concentrations* fell between 25 and 60 per cent in each of the five cities for which time series data are available. In 1997, annual ambient SO_2 concentrations in each city averaged less than half the NAAQS for SO_2 (70 $\mu g/m^3$), well below the EU guideline value (40 to 60 $\mu g/m^3$). Since 1990, concentrations have continued to decrease gradually in most cities, but in Budapest they have stabilised at about 20 $\mu g/m^3$. In general, SO_2 concentrations are two to three times higher in the winter heating period than in the summer.

Nitrogen dioxide (NO_2) concentrations in urban areas are generally about one-half to two-thirds the annual NAAQS (70 $\mu g/m^3$). Compared to their levels in the late 1980s, overall urban NO_2 concentrations decreased by about 10 per cent during the early 1990s; since 1995, they have stagnated or begun slightly increasing. In 1997 for the first time, the average annual ambient concentration in Györ exceeded the NAAQS, reaching an average of 78.3 $\mu g/m^3$. In all urban areas, exceedances of the short-term (24-hour and 30-minute) NAAQS are twice as frequent in the winter heating period than in summer.

Concentrations of suspended particles have decreased significantly in most urban areas. Since 1992, concentrations decreased by 23 per cent in Budapest, and by 35 to 40 per cent in Miskolc, Pécs and Györ. Despite this marked improvement, from 1995 to 1997 the annual average ambient concentration of particulate matter in Budapest (66 $\mu g/m^3$) exceeded the NAAQS (50 $\mu g/m^3$). The other urban areas conformed with the NAAQS. Data on size fractions of particulates are unavailable.

Since 1990, annual average *tropospheric ozone (O_3) concentrations* have increased slightly in both urban and rural areas. The 30-minute NAAQS for O_3 (110 $\mu g/m^3$) is often exceeded in summer, with 30-minute peak measurements in July and August ranging between 150 and 300 $\mu g/m^3$ at urban monitoring stations and between 120 and 200 $\mu g/m^3$ at regional background stations.

Acidity of precipitation, measured at regional background air quality monitoring sites, has decreased in recent years. The Meteorological Service reports that the average pH is 6, acceptably close to the neutral point. Predictably, peaks in the concentration of nitrate and sulphate ions occur in January and February during the peak heating period. According to national scale studies, Hungary is a net exporter of sulphate ions but a net importer of nitrate ions, relative to neighbouring countries (Chapter 8).

Human exposure to air pollution

About half the population is exposed to *moderate or high levels* of ambient air pollution, according to the National Medical and Public Health Office. Areas classified as “seriously” or “moderately” polluted are of particular concern. Effects of long-term exposure in industrial regions traditionally known as air pollution “hot spots”, such as Transdanubia and Baranya, are also of national concern.

A 1995 NPHMOS study which analysed the age-adjusted mortality rate due to bronchial cancer and chronic obstructive pulmonary disease (COPD) found a *positive correlation between ambient air pollution levels and death from respiratory disease*. The COPD-associated mortality rate among men was higher than normal (by 54 to 288 per cent) in all cities classified as “seriously polluted” and in the majority of cities classified as “moderately polluted”. Moreover, male mortality due to bronchial cancer was elevated (by 86 to 276 per cent) in all cities classified as seriously or moderately polluted.

From 1995 to 1997, the National Institute for Environmental Health of the National Public Health centre conducted several studies on respiratory disease among some 10 000 *children*. Each study demonstrated a positive correlation between ambient air pollution levels and the *prevalence of chronic respiratory disease*. NIPH also investigated *lead exposure* of kindergarten children in Budapest

in the late 1990s. Among the 400 children tested, 8 per cent were found to have blood lead levels above the limit value (10 μg/dl).

2. Responses

Since the economic transition, Hungary's responses to air quality management issues have continued to function in the *framework of air quality regulations* dating from the mid-1980s. A range of measures have been initiated, however, mainly aimed at reducing emissions from the energy and transport sectors. Since 1991, Hungary has ratified several Protocols to the Convention on Long-Range Transboundary Air Pollution setting control targets for NO_x, SO_x and VOCs (Annex 4). Adoption of the Cross-Sectoral Clean Air Action Plan (1994-98) signalled the government's recognition of the need to improve national air quality, in close co-ordination with energy and transport policies. Hungary plans to implement new air quality legislation by the year 2000, harmonising ambient air quality criteria and emission limit values with those of the EU and strengthening regulatory measures.

Objectives

Hungary implemented a *Cross-Sectoral Air Pollution Control Programme* between 1994 and 1998. Its primary objective was to improve air quality in settlements and regions classified as "seriously polluted" by reducing urban emissions from industrial, communal and mobile sources. Secondary objectives were to preserve the air quality of unpolluted regions (to protect sensitive ecosystems) and meet the air management requirements of international agreements.

The National Environmental Health Action Programme 1997-2000 (NEHAP) includes several objectives related to air quality management. It aims to carry out continuous monitoring of the public health risks of air pollution, strengthen the air quality monitoring system and initiate monitoring of size-fractions of particulate matter (e.g. $PM_{2.5}$ and PM_{10}) as well as polycyclic aromatic hydrocarbons (PAHs) and benzene, toluene and xylene (BTX).

The *National Environmental Programme 1997-2002* sets eight objectives relating to air quality:

– improve air quality of areas classified as "seriously polluted", so that the *24-hour NAAQS* for all pollutants are exceeded less than 10 per cent of the time;

– decrease by 20 per cent the average ambient concentrations of *particulate matter and toxic substances* in all areas classified as having "seriously polluted" air quality;

– take measures to reduce emissions from *transport*, so that by the year 2002: i) at least 50 per cent of the motor vehicle fleet is equipped with emission control devices; and ii) use of lead additives in motor vehicle fuels is discontinued;
– elaborate and implement a system of legal, technical and economic incentives to encourage the use of modern low-energy technologies in *industries and power plants*;
– reduce atmospheric emissions from *district heating* through fuel quality improvements and demand management;
– establish 40 additional urban/municipal, rural and background air quality *monitoring* stations;
– promote the use of *renewable energy sources*;
– carry out actions mandated by *international agreements*, thus meeting targets for SO_2, NO_x, VOCs, ODS and GHG (Chapter 8), including:
  • reducing *SO_2 emissions* to less than 898 kt by 2000, less than 816 kt by 2005 and less than 653 kt by 2010 (45, 50, and 60 per cent reductions relative to 1980 levels);
  • maintaining annual *NO_x emissions* at less than 265 kt (the 1987 emissions level);
  • limiting *emissions of VOCs* to less than 205 kt/year (the 1988 level) until at least the end of 1999.

Hungary has adopted a *national target of stabilising CO_2 emissions* by 2000. As a signatory to the UN Framework Convention on Climate Change, it is committed to reducing greenhouse gas emissions so that average emissions in the period 2008 to 2012 are at least 6 per cent below those in the period 1985 to 1987 (Chapter 8).

Measures to prevent and control air pollution

Legislation and regulation

The *1976 Act on the Protection of the Human Environment* (superseded in 1995 by the Act on General Rules of Environmental Protection) provided the initial framework for regulating air quality and atmospheric emissions. A number of legal instruments have come into effect since 1986 and constitute the legal basis for air quality management in Hungary (Table 2.1).

Emission limits from stationary sources are established on a case-by-case basis (OKTH Regulation 4/1986). If these limits are not respected, the authority of first instance may impose an *air pollution fine*. The initial fine is calculated as a function of the magnitude of excess of the established emission limit. If the source does not take the necessary control measures, the fine is increased by 20 per cent

each year for up to five years (thereafter the maximum fine is imposed year after year). The basic fine level was established in 1986 (OKTH Regulation 4/1986) and has never been updated; as a result of inflation, even maximum fines are so low that they fail to act as incentives for investment in air pollution control (or as disincentives for non-compliance). The government grants moratoria from air pollution fines to large stationary sources that are installing air pollution control equipment during the installation period.

National ambient air quality standards (NAAQS) exist for SO_2, $NO_{2,}$, CO, O_3, suspended particles (measured as dust) and lead. Although the one-year limit for

Table 2.1 **Major legal instruments related to air quality management**

1986	Order No. 21/1986(VI.2) issued by the Council of Ministers on the subject of protection of clean air (last amended 1995)	Establishes framework for developing regulations on ambient air quality and stationary source emissions; Establishes framework for imposing air pollution fines for stationary sources; Assigns responsibility for implementing the National Office for Environmental Protection and Nature Conservation (OKTH) and the Ministries of Health, Transport, Agriculture and Food, in consultation with municipal or county administrations.
1986	Regulation 4/1986(VI.2) on the execution of Order No. 21/1986(VI.2)MT regarding the protection of clean air	Establishes procedures for determining emission limit values for stationary sources, based on annual reports from the operator or results of an inspection performed on site; Establishes system for imposing financial penalties on stationary sources which do not respect emission limit values.
1993	Government Resolution No. 1079/1993 on the improvement of air quality in highly endangered geographical regions for the period 1994 to 1998	Approves the Cross-Sectoral Clean Air Action Plan (1994 to 1998) to improve air quality in regions classified as seriously polluted; Orders ministries and local governments involved in implementing the Cross-Sectoral Clean Air Action Plan to allocate the necessary budget; Orders Ministry of Environment to provide mid-term and concluding progress reports on implementation of the Plan.
1997	Resolution 83/1997(IX.26) of the National Assembly on the National Environmental Programme	Adopts the National Environmental Programme and the National Environmental Health Action Programme, and makes provisions for their implementation.
1998	Regulation 22/1998(VI.26) on emission limit values for large combustion plants with rated thermal input equal to or greater than 50 MW.	Adopts requirements of 88/609/EC on emission limit values for large combustion plants.

Source: ME.

SO_2 (70 μg/m^3) is more lenient than the EU guideline value (40 to 60 μg/m^3), *the majority of Hungary's NAAQS are very stringent compared with international standards* (Table 2.2). For example, the Hungarian one-year limit for NO_2 (70 μg/m^3) is much stricter than that of the United States (100 μg/m^3) and the Hungarian 24-hour NO_2 limit (85 μg/m^3) is almost twice as strict as the WHO's 24-hour guideline (150 μg/m^3). Hungary's 30-minute limit for CO (10 mg/m^3) is six times stricter than the WHO's 30-minute guideline for CO (60 mg/m^3).

New legislation on air quality management is under development; its finalisation is scheduled for the year 2000. The planned legislation will set new NAAQS, and differentiate between health-related and ecosystem-related standards (so-called primary and secondary criteria). It will also reform the system for setting emission limits for stationary sources, establishing technological emission limit values which take into account the mass flow and toxicity of the air stream as well as the best available techniques (BATs) for control. These new norms, which will conform to the standards of the EU's large combustion plant directive, will be applied to newly constructed units immediately and to existing ones after 2004.

Institutions

The *Ministry for Environment* (ME) has broad responsibilities for the regulation of emissions from stationary sources. The ME shares responsibility for developing regulations and emergency measures (e.g. smog alerts) for air management with the Ministry of Health. The *National Meteorological Service* is responsible for monitoring and measuring background ambient air quality, as well as measuring relevant meteorological variables. *Regional authorities ("REPIs")* have the authority to perform inspections of stationary sources, and to impose fines if the emission limits are not respected (Chapter 6).

Table 2.2 **Current ambient air quality limit values**
(μg/m^3)

Substance	One year	24 hours	30 minutes
Sulphur dioxide (SO_2)	70	150	250
Nitrogen dioxide (NO_2)	70	85	100
Carbon monoxide (CO)	2 000	5 000	10 000
Ozone (O_3)		100	110
Suspended particles	50	100	200
Lead		0.3	

Source: NPHMOS.

The *Ministry of Health* and the ME are jointly responsible for establishing air quality criteria and regulations for the control and measurement of ambient air pollution. It also co-ordinates studies of human exposure to air pollution. The *Ministry of Transport, Communication and Water Management* (MTCWM) is responsible for establishing limit values for emissions from mobile sources, and for establishing norms for the measurement of mobile source emissions.

Economic instruments

Several *taxes and other fiscal measures* provide incentives to help achieve transport- and energy-related environmental objectives (Table 6.7). Excise taxes levied on gasoline and diesel fuel help to encourage energy efficiency. Import duties for passenger cars less than four years old are reduced by 60 per cent to encourage the purchase of those equipped with pollution control devices. The vehicle tax is reduced by at least 50 per cent for owners of electric and natural gas vehicles, cars with catalytic converters and trucks meeting EUR1 norms. To encourage retrofitting, the VAT on catalytic converters is also reduced by 50 per cent. Companies that purchase new equipment for environmental protection may apply an *accelerated depreciation rate*.

The 1992 Act on Environmental *Product Charges on Fuels* defines charges for transport fuels and oils. For gasoline, diesel fuel and lubricating oil, they are calculated on a per-unit-volume basis, providing an incentive for efficient use.

Privatisation of the energy sector has been carried out with the aim of contributing to greater energy efficiency by liberalising prices. To date, six of Hungary's eight power plant companies and all six of its electricity distribution and supply companies have been privatised. Seventy-five per cent of the national oil and gas company (MOL) is also now privately held. Oil prices were liberalised in 1991, but electricity and natural gas prices are still regulated by the Hungarian Energy Office (HEO). The HEO regularly reviews prices and proposes changes, but the Ministry of Economic Affairs can veto proposed price changes. In accordance with recent energy legislation, prices for electricity and natural gas have been adjusted, reaching cost-recovery levels in 1999.

Monitoring and reporting

Industries and major stationary sources are required to submit *annual reports of air pollutant emissions*, based on actual measurements or estimations. Emissions from households and mobile sources are estimated by the Ministry of Environment using mathematical models.

Air quality is regularly measured in 110 municipalities by NPHMOS. The air quality monitoring system is composed of two networks, one off-line and the other

on-line. The extensive off-line network has 330 measuring points for gases, 654 for settling dust and 47 for flying dust. Off-line stations use semi-automatic devices to sample gases and collecting dishes to sample particulates; the data produced are 24-hour averages for ambient pollutant concentrations (30-day averages for settling dust). The more modern on-line network consists of 29 continuous monitoring stations, where 30-minute averages are calculated for SO_2, NO_x, dust, O_3 and CO. Budapest has an eight-station on-line network which continuously samples SO_2, NO_x, particulates and CO.

The National Meteorological Service monitors *regional background air pollution* at five sites (K-puszta, Hortobágy, Farkasfa, Nyírjes and Fertó-Hanság). Ambient concentrations of SO_2, NO_2 and tropospheric O_3 are measured, as well as several aerosol particles (e.g. sulphate, nitrate, ammonium). The K-puszta station has been operational since the early 1970s; the others were initiated in 1996.

Expenditure on air pollution prevention and control

In 1997, *0.06 per cent of GDP (HUF 4.8 billion) was invested in air management*, representing 5 per cent of total environmental expenditure for the year. About half of this amount went towards end-of-pipe control technologies (Table 6.2). The implementation cost for the Cross-Sectoral Clean Air Action Plan (1994-98) was approximately USD 625 million (at 1994 rates).

The EU's *PHARE environmental programme* dedicated USD 67.5 million over the period 1990 to 1998 to Hungary. About 14 per cent was allocated to activities oriented towards controlling air pollution and traffic noise (USD 9.5 million) and 7 per cent towards promotion of energy conservation (USD 4.7 million).

Since 1990, the National Oil and Gas Company (MOL), which is now 75 per cent privately owned, has spent HUF 27 billion to upgrade its three *refineries to meet new fuel standards*, as well as to carry out soil remediation and groundwater quality projects at the Duna Oil Refinery Company.

Air management and energy policy

Structure and trends of the energy sector

Total primary energy supply (TPES) in 1997 was 25.3 million tonnes of oil equivalent (Mtoe). It shrank during the economic slowdown between 1987 (30.8 Mtoe) and 1993 (25.1 Mtoe), but has started to grow again. Hungary's *energy intensity* per unit of GDP (energy consumption per unit of economic output) is 30 per cent higher than the OECD average. This is partially due to inefficient energy production and distribution, as well as historical price distortions that encourage over-use. *Energy transformation losses* (31 per cent of TPES) are

higher than the OECD average (28 per cent). In addition, *distributional losses* from Budapest's district heating network are estimated at 30 per cent. Hungary's residential sector is particularly energy-consuming. Energy efficiency for household heating (24.2 toe per 1 000 m^2 heated) is 29 per cent lower than in the United States (18.7 toe/1 000 m^2) and 14 per cent lower than in Sweden (21.3 toe/ 1 000 m^2). Poor building insulation is partially explained by the fact that building codes are not clear and, in any case, are not mandatory (they became "voluntary" in 1994). Individual metering of energy use is not yet in place.

Energy sources in 1997 were natural gas (39 per cent of TPES), oil (28 per cent), coal and lignite (17 per cent), nuclear power (14 per cent), renewables and wastes (2 per cent) and hydro-power (0.1 per cent). Since 1990, the residential sector has largely switched its energy supply from coal to natural gas, with household coal consumption decreasing by 79 per cent and natural gas consumption increasing by 91 per cent.

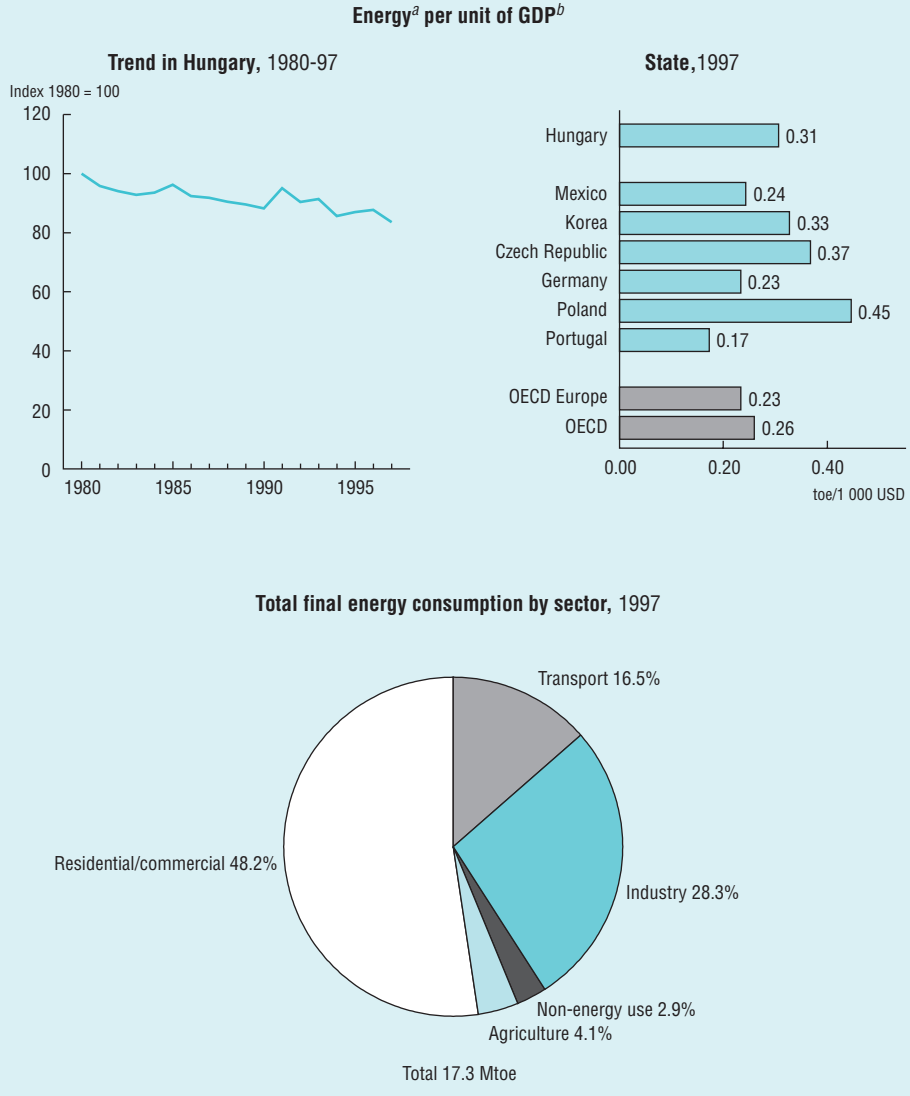
The structure of end-use of energy in Hungary is quite different from that of the average country in OECD Europe. Heat, delivered as hot water and process steam to industry and supplied to residential consumers via district heating systems, represents 17 per cent of total final energy consumption (TFC), compared to 2 per cent in OECD Europe. Overall, residential and commercial energy consumption accounts for 48 per cent of TFC, which is high compared to the OECD Europe average (34 per cent). Transport's approximately 17 per cent share of final energy consumption is low compared to the OECD average of 33 per cent (Figure 2.2).

The *installed capacity* of Hungary's power system is 7 500 MW. Its single nuclear power plant generates over 40 per cent of electricity. Large decreases in national SO_x emissions accompanied the start-up of the plant's four pressurised-water units (VVER-440) in 1982, 1984, 1986 and 1987, as nuclear slowly offset coal-fired power. Coal-fired plants account for 27 per cent (2 000 MW) of Hungary's installed capacity, and most burn high-sulphur domestic lignite. Nearly every power plant in Hungary supplies heat in addition to electricity, meeting two-thirds of the country's heat demand. Since 1985, all thermal power plants have been outfitted with electrostatic precipitators; only one power plant (Mátra) has begun investing in desulphurisation equipment in 1999. Since most coal-fired plants are due for replacement by 2010, the cost-effectiveness of investing in this equipment would need to be ascertained for other plants.

Energy policy objectives relating to air quality management

Energy policy objectives are set forth in the *Hungarian Energy Policy (1993*). Several energy objectives reinforce air quality management objectives, in particular promoting energy conservation, further developing the use of renewable fuels and promoting the uptake of more energy-efficient technologies and techniques. The

Figure 2.2 **Energy structure and intensity**



a) Total primary energy supply.
b) GDP at 1991 prices and purchasing power parities.
Source: IEA-OECD.

Energy Conservation Action Plan (1996) establishes four specific policy objectives: doubling the use of renewable energy sources (to 5 to 6 per cent of TPES); promotion of energy-efficient improvements (e.g. enforcement of building regulations); energy labelling (efficiency standards for household appliances); and initiation of information programmes for consumers and training programmes for decision-makers. On the basis of the Action Plan, an Energy Saving Soft Loan Programme was established in 1996 to support the adoption of energy-efficient technologies.

Several environment-related objectives are listed in the *energy policy chapter of the 1998 government programme*. Planned actions include establishment of an "environmentally oriented tariff system" with stricter energy price control, application of market-based demand-side management and the promotion of renewable fuels. Preparations are also being made to liberalise the electricity and gas markets in accordance with EU directives. Harmonisation of Hungarian energy policies with those of the EU is under way and is expected to further strengthen such environmentally conscious energy objectives.

Hungarian oil product standards, significantly tightened in the 1990s, conform with EU standards in every respect. The sulphur content of heating oil is limited to 0.5 per cent; that of diesel fuel for motor vehicles is limited to 0.05 per cent. Motor vehicle fuels conform to EU standards, and leaded fuel was completely phased out in 1999 (Chapter 7).

Energy pricing

Energy pricing has undergone drastic changes in recent years. In 1991, *oil product prices* were liberalised; LPG and coal prices ceased to be regulated in 1992. Concurrently, regulation of prices for district heating companies was transferred from central to local government control. Natural gas and electricity prices are still regulated by the Ministry of Economic Affairs. Since 1994, when the government set the goal of adjusting energy prices to recover costs (Act on the Production, Transport and Supply of Electric Energy; Act on Gas Supply), Hungary has actively phased out cross-subsidies between residential and industrial consumers. Reforms implemented in 1995 raised end-use gas prices by 53 per cent for households and 9 per cent for industry. Likewise, electricity price increases were smaller for industry (18 per cent) than for households (65 per cent), reducing cross-subsidisation. Much progress towards cost recovery has been made; 1998 prices for household electricity, after purchasing power parity adjustment, are relatively high compared to other OECD countries (Table 2.3). For Hungarian industry, electricity and natural gas prices are 15 to 25 per cent lower than the OECD Europe average.

All *energy prices are subject to a value-added tax (VAT)* set at 12 per cent for all oil products except gasoline and automotive diesel, which are subject to a 25 per cent VAT. Motor vehicle fuel consumer prices include VAT (25 per cent) and various

other taxes (50 per cent), including an excise duty, an environment fee, a stockpiling fee and a road fund contribution (Table 6.7).

Table 2.3 **Energy prices in selected OECD countries,** 1998

	Electricity		Natural gas		Premium unleaded gasoline (USD[b]/litre)
	Industry (USD[a]/toe)	Households (USD[b]/kWh)	Industry (USD[a]/toe)	Households (USD[b]/10^7 kcal)	
Hungary	649.5	0.1558	130.3	366.6	1.614
Mexico	496.6	0.0998	104.0	..	0.796
Korea	553.0	0.1439	..	..	1.690
Czech Republic	601.6	0.1221	177.5	436.9	1.672
Germany	782.7	0.1391	210.9[c]	360.7[c]	0.792
Poland	430.9	0.1375	146.7	510.0	1.080
Portugal	1 089.6	0.2221	..	..	1.299
OECD Europe	762.3	0.1304	175.7[c]	432.9[c]	0.957
Price in Hungary/OECD Europe price	*85%*	*119%*	*74%*[c]	*85%*[c]	*169%*

a) At current exchange rates.
a) At current PPPs.
b) 1997.
Source: IEA-OECD.

Air management and transport policy

The transport sector is a major source of air emissions; in 1997, it was responsible for 55 per cent of NO_x emissions, 61 per cent of CO and 49 per cent of NMVOCs (Table 7.1). *Road transport* is the largest contributor to air pollution from the transport sector. Private car ownership in Hungary (23 per 100 people), two-thirds of the average for OECD Europe (Figure 7.2), is increasing. The motor vehicle fleet has an average age of 12 years; 27 per cent is 16 years old or more. Despite an increase in the number of catalyst-equipped vehicles, about half the fleet consists of two-stroke vehicles and old vehicles without emission control equipment (Chapter 7).

The *Hungarian Transport Policy* of 1996 identifies environmentally related objectives, including internalisation of external costs and promotion of less-polluting forms of transportation. Important steps have been taken to improve fuel quality and to reduce air and noise emissions from vehicles (Chapter 7).

Hungary began *phasing out leaded gasoline* in 1989 and completed the phase-out in 1999 (before the 2002 deadline set in the National Environmental Programme). Smuggling of sub-standard oil products and fuels from other Central and Eastern European countries, a significant problem in the mid-1990s, has largely ceased following a government crackdown on service stations.

3. Environmental Performance

Emissions performance

Large reductions in emissions of air pollutants have been achieved in recent years. From 1990 to 1997, SO_2 emissions decreased by 35 per cent, NO_x by 17 per cent and particulate matter by 34 per cent. The national gas supply programme is resulting in the decrease of SO_x and dust emissions; the continued increase of NO_x emissions is to be expected. Road transport is responsible for an increasing part of air pollutant emissions. Hungary has met, or is likely to meet, all of its international commitments to reduce emissions of air pollutants (Table 8.2).

Decoupling of certain air emissions from economic growth appears to be under way; from 1993 to 1997, GDP increased by 10 per cent (1991 prices and PPPs) while SO_2 emissions decreased by 13 per cent (strong decoupling), and NO_x emissions increased by 7 per cent (weak decoupling).

Nevertheless, *emission levels of a number of pollutants remain high* compared with other OECD countries, on both a per capita basis and a per unit GDP basis. The high sulphur content and relatively low calorific value of domestic coal and lignite, which provide 21 per cent of energy supply, lead to high emission levels of SO_x and particulates. In addition, continued use of old technologies with relatively low energy efficiency in power plants and industries leads to comparatively high emissions of CO_2. Vehicles with two-stroke engines (about 10 per cent of the motor vehicle fleet) and old four-stroke engines without emission control devices (another 30 to 40 per cent of the fleet) contribute to the high emissions of NO_x, particulates, CO and VOCs.

Energy supply and consumption account for most of Hungary's air pollution emissions. Emissions from the power sector remain high, although particulate emissions declined significantly between 1980 and 1991 with the installation of electrostatic precipitators at coal and lignite plants. In contrast, emissions from motor vehicles have emerged as a growing source of air pollution.

Air quality performance

Overall *air quality has improved* in Hungary since 1990, largely as a result of economic restructuring and energy switching. Air quality is good to acceptable in most regions, with the exception of specific problem areas classified as "seriously or moderately polluted" by the NPHMOS. These regions include the largest settlement and the areas of highest population density. Numerous studies carried out in Hungary have found positive correlations between ambient concentrations of air pollutants and respiratory morbidity and mortality.

Ambient *SO_x concentrations* are well below the NAAQS in all major urban areas. Large reductions in SO_x concentrations were achieved in the 1980s due to changes in the energy sector. This improving trend has been sustained in most cities since 1990, but in Budapest SO_x concentrations have stabilised at about one-half the EU guideline value.

Average *NO_x concentrations* decreased by about 10 per cent in the early 1990s and then stagnated or reversed after 1995, largely due to increased emissions from road transport. Occasional NO_x exceedances occur during winter, corresponding with peaks in demand for residential heating. Growth in the transport sector threatens to increase NO_x concentrations, especially in large urban areas and along major thoroughfares (Chapter 7).

Since 1992, significant reductions in *ambient concentrations of particulates* have been registered in most urban areas. Despite this progress, the NAAQs for particulates are frequently exceeded in Budapest. Air quality data for particulates are insufficient.

Tropospheric ozone is emerging as a serious air quality concern in Hungary, with frequent exceedances of the NAAQS during summer. Since 1990, measured average ozone concentrations have increased at urban, rural and background monitoring stations. Ozone levels are especially elevated in Budapest.

The regional character of air pollution has greatly changed in recent years. Traditional air pollution "hot spots" located in industrial regions such as the Sajó Valley, the Central Transdanubia region and Baranya County now have better air quality. A major factor in these air quality gains was the large reduction in industrial activity; the extent to which these improvements can be sustained, as the industrial sector revives and expands, remains to be seen. Government programmes to encourage the adoption of new, more energy-efficient technologies and techniques in industries are encouraging, but further air quality management measures may be necessary.

Air quality in Budapest is problematic. The NAAQS for particulates and ozone are frequently exceeded in the downtown area. With 20 per cent of the population

living in Budapest, deterioration of air quality there results in widespread human exposure with consequent public health risks.

The growth in *road transport* is negatively impacting air quality, as demonstrated by recent increases in NO_x and O_3 concentrations. Implementing further measures to control mobile source emissions and to renew the fleet will be necessary to prevent deterioration of air quality.

Improvements to Hungary's *air quality monitoring system* should be carried out to ensure that measurements are consistent with international standards, as well as meaningful for evaluating public health risks. In particular, the monitoring of particulates (e.g. $PM_{2.5}$ and PM_{10}) is imperative, and the monitoring of PAHs, BTX and other toxic substances should be considered. Data collation and reporting should also be strengthened.

Energy efficiency and pricing

Hungary has made *considerable progress towards eliminating price distortions in the energy sector* and balancing its energy supply. Oil product prices, as well as coal and LPG prices, have been liberalised and related direct government subsidies have been eliminated. Hungary continues to regulate prices of natural gas, electricity and heat for captive customers (as do most OECD countries), but has adjusted prices to better reflect real energy costs. Since 1995, average nominal prices for residential customers have been raised by 65 per cent for electricity and 53 per cent for natural gas. Industrial prices have been raised at lower rates, helping to dismantle historical cross-subsidies. Residential prices are now higher than industrial prices, but the difference between them is still much smaller in Hungary than in most OECD countries. Motor vehicle fuel prices are quite high compared with those in other OECD countries (Chapter 7).

There remains a large potential for energy efficiency improvements in Hungary. Inefficient energy use patterns are changing, but there is still a need for progress, especially in the residential, industrial, and transport sectors. The newly expanding industrial sector has the opportunity to make a sea change in this respect, since much of the country's industrial equipment is obsolete and must soon be replaced in any case. The road vehicle fleet is old and highly energy consuming, as is the rail and inland shipping fleet (Chapter 7); large improvements in energy efficiency are possible through fleet renewal. Financing energy efficiency improvements remains a challenge. Effective orientation of international financing towards real national priorities will be essential for making the needed energy efficiency gains.

3

WATER MANAGEMENT

1. Current Situation and Trends

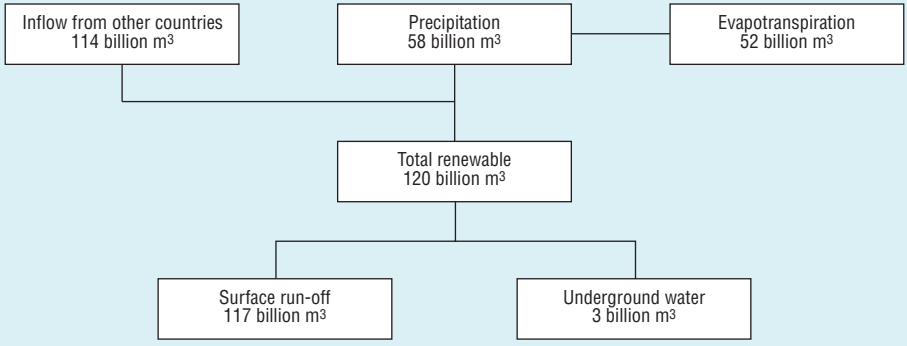
Freshwater resources

Hungary has abundant surface water resources, which are unevenly distributed throughout the country. *Inflow from other countries* accounts for 95 per cent of renewable water resources (114 billion cubic metres), the highest share in the OECD area. Located at the bottom of the Carpathian basin, half of Hungary (and two-thirds of its arable land) is *prone to floods*, mostly following heavy rains and the melting of spring snow in the surrounding mountains. The ratio between minimum and maximum river flows is up to 1/65 in the upper part of the Tisza river and frequently greater than 1/100 in the tributaries of major rivers. National mean annual *precipitation* is about 600 mm (or 58 billion cubic metres), of which 90 per cent is lost to evapotranspiration (Figure 3.1). The area west of the Danube receives more precipitation than the area east of it, which experiences frequent droughts in summer, particularly in the Alföld plains.

Although a number of rivers enter it from the west, north and east, the *three major rivers* that flow through Hungary are the Danube, the Tisza and the Dráva. About three-quarters of total run-off is carried by the Danube and Dráva, while the rivers of the Tisza basin carry hardly one-quarter. The Dráva and Tisza are tributaries of the Danube, joining it in Croatia and the Federal Republic of Yugoslavia, respectively. Hungary has *12 river catchments* covering from 4 000 to 13 000 km^2.

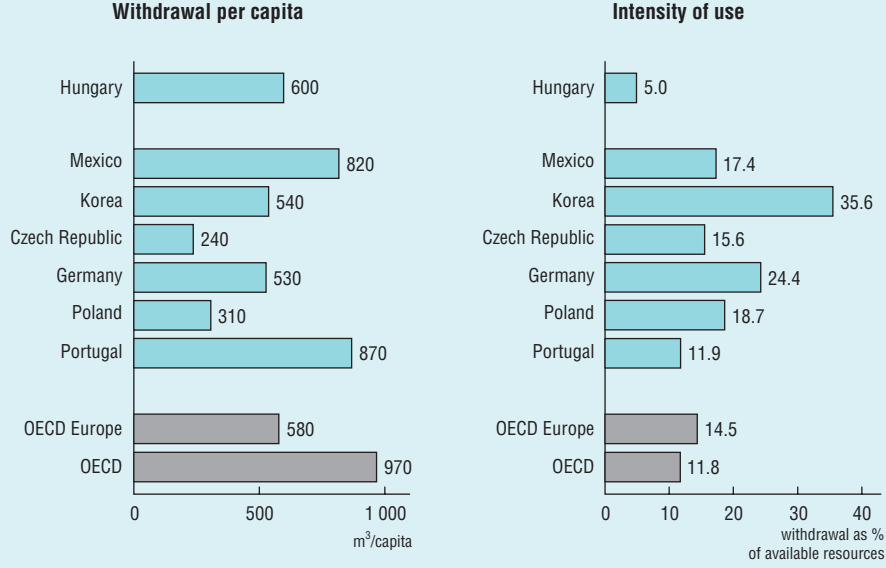
Among the 200 *natural lakes* with a surface area of over 1 km^2, the Carpathian basin contains Central Europe's largest shallow lake, Lake Balaton (59 300 hectares, 1.9 billion cubic metres). Other important lakes are Lake Velence (2 600 hectares) and Lake Fertó (of which 90 per cent is in Austria). There are 25 *wetlands* of international importance (Chapter 5). Lake Tisza (with 6 000 hectares) is a floodplain impoundment reservoir created by the Kisköre Dam. Most of the 400 *oxbow*

Figure 3.1 **Water resources**[a]



a) Annual averages.
Source: OECD.

Figure 3.2 **Water use,** late 1990s



Source: OECD.

lakes are found along the Tisza and its tributaries. Only a few have a surface area of over 1 km^2.

Groundwater resources provide almost the entire drinking water supply. Forty per cent is bank-filtered water along the major rivers, one-third is shallow groundwater 30 to 50 metres below the surface; other groundwater is held in deep aquifers (less than half this water is estimated to be technically and economically exploitable) and karsts (in the Transdanubian range). Deep and karstic waters over 30°C are considered thermal waters; more than 400 thermal baths are scattered throughout the country.

Water quality

The quality of *surface waters* is assessed against 30 parameters (e.g. oxygen balance, nutrient balance, microbiological, micropollutants) and ranked according to five quality classes: I and II are good quality; III is acceptable quality (can be used to produce potable water); IV and V are polluted. In 1997, 59 per cent of samples were in classes IV and V for N and P budget, 55 per cent for coliform count, 34 per cent for oxygen budget and 31 per cent for micropollutants.

Large *rivers* have relatively high dilution capacities; the main quality concern is bacterial contamination (class IV), which occurs almost everywhere along the Danube and Tisza. The Danube is also polluted (class IV) by high nutrient supply between Budapest and Baja and by dissolved iron on the Slovakian border. The Tisza is polluted by micropollutants (mainly zinc) in its upstream section. The Dráva shows good to acceptable quality for all parameters. Secondary rivers are generally polluted: high levels of pollution (classes IV and V) for various parameters are frequent in tributaries of the large rivers, particularly in the vicinity of major urban centres. Concerning trends in overall water quality (measured by class changes), the number of highly polluted (class V) stations was higher in the 1980s than the 1970s but has clearly decreased in the 1990s. Over the past 20 years, BOD has decreased by half all along the Danube, down to 4 mg O_2/litre in 1996 (class I).

Water quality in *lakes* and reservoirs depends on nutrient content and hydrometeorological conditions. In Lake Balaton, end of summer algal blooms were common in the mid-1990s; the phosphorus load has decreased since, which translates into lower concentrations of chlorophyll a. Lake Balaton is free from microbiological contamination. Lake Velence, which is in an advanced stage of eutrophication, contains dissolved salts and organic matter in very high concentrations. Water quality is good in Lake Fertó and the Kisköre reservoir.

Nitrates in phreatic *groundwater* exceed the limit value of 40 mg/litre in many places, particularly in the surroundings of settlements. For karstic waters, a survey conducted in 1993 showed that nitrates exceeded the limit value in only 7 per cent

of samples. Deep aquifers are less subject to anthropogenic pollution, but they do not always meet water quality standards (methane, iron, manganese, ammonia and arsenic are naturally present). The quality of bank-filtered water is mostly related to that of the parent river.

In 1997, the bacteriological and chemical quality of *drinking water* was unacceptable in 16 and 26 per cent of samples, respectively, and the proportion of poor quality samples was higher in wells than in waterworks. Overall, about 75 per cent of the population is supplied with water of good or acceptable quality and about 5 per cent with water of unacceptable quality (arsenic, nitrate, faecal coliforms). The remaining 20 per cent is supplied with water of aesthetically poor quality (not in compliance with iron, manganese or plate limit values). A long-standing drinking water quality problem is the presence of nitrates in shallow groundwater outside the Great Plain and Small Plain. On the Great Plain, the main concerns relate to bacteria in deep well water and natural arsenic in groundwater. About 80 per cent of the population consumes drinking water with low iodine content, leading to high frequency of goitre.

Pressures on water resources

Pressures on water quantities

Overall pressures on water quantities, measured as a 5 per cent *intensity of use*, are well below the OECD average (Figure 3.2). At 600 cubic metres per capita, consumption is broadly equivalent to the OECD Europe average. Following a three-fold increase in the period 1970 to 1992, total annual water withdrawal fell from 7 billion to less than 6 billion cubic metres in 1996 due to the decline and restructuring of industrial production, reduced household consumption, and a decrease in total irrigated area following domestic and irrigation water price increases.

Industry and energy account for around 70 per cent of total *freshwater withdrawals*, mostly for cooling power plants. Some 18 per cent of withdrawals are used in agriculture (fish ponds and, to a lesser extent, irrigation); the remaining 12 per cent are for drinking water. Surface waters provide 98 per cent of the water used for industrial purposes. Within the processing industry, metallurgy is the largest water user, followed by the food and chemical industries. In agriculture, following an increase to more than 200 000 hectares in the early 1990s, the total irrigated area fell to 82 000 hectares in 1997 (or only 2 per cent of cropland).

About 15 per cent of total withdrawals originate from *groundwater* in deep aquifers (40 per cent), bank-filtered wells (30 per cent), karsts (20 per cent) or shallow groundwater (10 per cent). These withdrawals are mainly for drinking, industrial and irrigation purposes. Nearly 95 per cent of drinking water demand is supplied

by groundwater. Intensity of groundwater use has fallen by one-third since the mid-1980s. Withdrawals currently amount to about one-third of total available groundwater resources. In Transdanubia, after overexploitation of karstic groundwater by mining operations was halted in the early 1990s, the water table, which had fallen an average of 30 metres, recovered. Between the Danube and Tisza, agricultural activity and droughts (particularly in the early 1990s) have led to a lowering of the shallow groundwater table, threatening some natural wetlands.

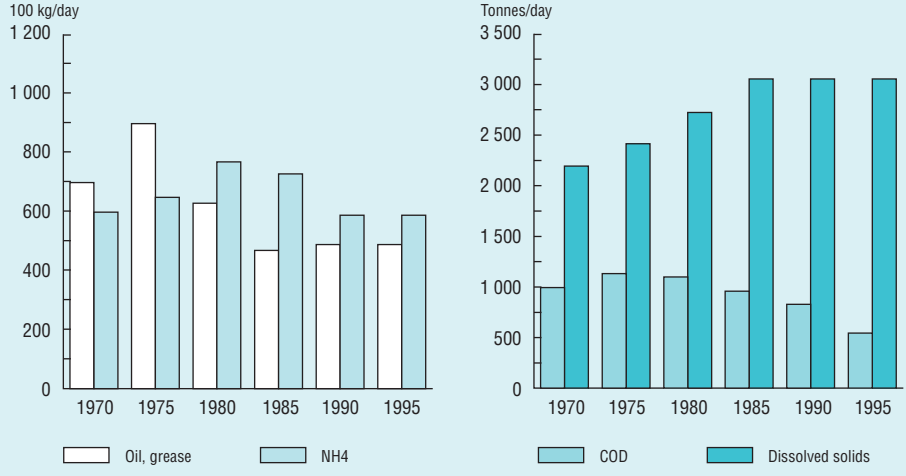
Pressures on water quality

Domestic and industrial *waste water discharges* to rivers are concentrated in large urban and industrial areas. Pollution loads in surface waters started to decrease in the second half of the 1970s, mainly as a result of recession in industry (Figure 3.3). In the 1990s, the contraction of industrial activity led to a major decrease in industrial effluents released in surface waters. Today, more than 80 per cent of the total load is discharged to the Danube basin and the remaining 20 per cent to the Tisza basin. Close to three-quarters of Budapest's effluents and half of the total amounts of organic substances and ammonium are discharged untreated directly to the Danube. The Danube is mainly polluted by urban waste water, organic discharges from the sugar and pulp and paper industries, and micropollutants from coal and oil power plants, as well as by chemical, iron and steel industrial plants.

During *flood events*, leaching of soil nutrients affects the quality of small watercourses. During heavy rains, the phosphorus load of *Lakes* Balaton and Velence increases with water flows from agricultural and urban areas. Summer tourism also increases the nutrient load. Widespread nitrate contamination of shallow *groundwater* is mainly due to domestic sewage and, in some places, slurry. High extraction rates affect groundwater quality by reducing dilution capacity. Aquifer contamination by micropollutants from inappropriate landfills is another concern. The irrigation canals on the Great Plain are often used for drainage of domestic sewage, limiting use of water for irrigation.

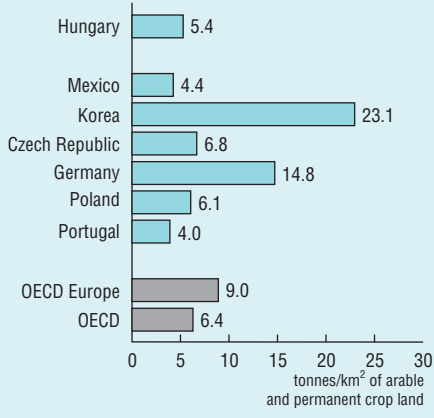
Since the removal of fertiliser subsidies in 1990, *fertiliser use has sharply decreased*. The national nutrient balance (at soil surface) decreased from 60 kg N/hectare of farmland in 1985 to 9 kg N/hectare in 1995. At 5.4 tonnes/km^2, the application rate of nitrogenous fertilisers is below the OECD average (Figure 3.4). Impacts associated with manure disposal have generally also been reduced with the privatisation and fragmentation of large pig farms. In the mid-1990s, *intensity of pesticide use* was about 1.5 kg active ingredients per hectare of cropland, below the OECD average of 2 kg/hectare; from 1980 to date, Hungary has experienced the steepest decline in both fertiliser and pesticide use among OECD countries.

Figure 3.3 **Pollution loads in surface waters**



Source: NWM; VITUKI.

Figure 3.4 **Use of nitrogenous fertilisers,** late 1990s



Source: FAO; OECD.

2. Responses

Objectives

The main environmental objectives and targets for water resource management are stated in the *National Environmental Programme 1997-2002*:

- *prevent water shortages* and encourage economical water use by households and enterprises;
- in the long run, *improve surface water quality*, particularly by ensuring at least class III quality for the Danube and Tisza rivers (for micropollutants and microbiological parameters) and class II quality for lakes (class III for chlorophyll a);
- develop the *groundwater quality* monitoring network (by 2002 for the most endangered areas); promote the establishment of associations for protecting aquifers which are a source of drinking water; enforce the legal and financial liability of identified polluters;
- connect 60 per cent of settlements to public sewerage by 2002, and 65 per cent by 2010, in particular by *developing sewerage* in highly protected water supply areas sensitive to nutrient loads (lakes, reservoirs, oxbows, temporary and low flow watercourses);
- achieve *waste water treatment* in all municipalities of over 2 000 population equivalent by 2010; use tertiary treatment in all public treatment plants discharging to live waters and all plants discharging in highly protected areas; enforce pre-treatment of industrial effluents prior to discharge in communal sewerage; use economic instruments to encourage waste water treatment by industries; improve sewage sludge disposal, particularly through composting.

Legal and institutional framework

According to the *1995 Water Management Act*, all groundwater and natural lakes, as well as the main rivers (including flood channels), canals, reservoirs and flood control works, are owned by the State. Local governments own water and hydraulic facilities handed over to them in separate Acts. Priority is given to drinking water supply, followed by disaster control, supply to medical services, livestock and fish farming, nature conservation, economic activities and recreation. The Water Management Act defines State and municipal management responsibilities and contains provisions concerning the establishment of Regional Water Management Directorates (RWMDs). Water management responsibilities may

also be met through waterworks associations (for public water supply and sewage removal) and water associations (for land drainage and flood control at the local level, and agricultural water use). The *1995 Act on General Rules of Environmental Protection* broadly refers to the protection of surface and groundwater quantity and quality, including maintaining aquatic life, conserving biodiversity and protecting the landscape. There is no specific recent legislation concerning water quality (other than regulations issued under the 1964 Water Act). New legislation is under preparation for waste water discharges.

Since 1990, responsibilities for water administration fall under the *Ministry of Transport, Communication and Water Management* (MTCWM) and are separate from those responsibilities for environmental protection (including water quality control supervision) which fall under the Ministry for Environment. MTCWM has a co-ordination role, including formulating water management policy and responding to emergency flood situations. It is also responsible for international co-operation and agreements on water resource management. At national level, water management is directed by a Deputy State Secretary who controls the activities of the National Directorate General for Water Management (NWM); the NWM supervises 12 RWMDs employing 4 730 persons and corresponding to the 12 water catchment areas. Their main responsibilities are to allocate water resources, operate and maintain state waterworks, develop water utilities and supervise water management activities by local governments, farmers and industries. The regions covered by the RWMDs are identical to those of the 12 Regional Environmental Protection Inspectorates (REPIs) of the *Ministry for Environment* (ME). The nearly 200 REPI employees concerned with water issues evaluate point source pollution loads, enforce compliance with quality standards and conduct licensing procedures. ME ensures the application of EIA procedures in the case of large water projects. Since 1998, the development of irrigation systems has fallen under the *Ministry of Agriculture and Regional Development*.

Since 1990, *municipalities* have been legally responsible for installing, operating and maintaining their own drinking water supply and sewerage systems. The former 28 council companies offering water services have been split up into more than 300 waterworks companies operating under a variety of contractual forms, including concession contracts. A number of waterworks companies are set up as shareholder enterprises: private capital participation has been growing. The five State-owned water utilities have relinquished part of their technical facilities serving individual communities, but continue operating at the regional level. Most public water utilities (over 80 per cent) are owned by municipalities, the rest being part of the State-owned regional network.

Regulatory instruments

Concessions and discharge permits

Concessions allowing State, communal or private firms to establish, operate and maintain waterworks are offered for tender by MTCWM in the case of State-owned public utilities and by municipalities in the case of communal ones. During the period of the concession, the concession holder is entitled to provide fishing, recreational and commercial services. A *water licence* is required to construct hydraulic facilities as well as for all water uses including withdrawals and discharges. The licensing procedure involves three stages: a preliminary permit following a declaration of intent to construct or use water, a permit for infrastructure development, and an operating permit. All relevant authorities (Regional Environmental Protection Inspectorates, Public Health Services, etc.) must be consulted during the procedure. RWMDs and NWM, respectively, act as first and second instance authorities. Since 1992, decisions may be appealed to administrative courts, although this has happened in only a few cases.

Compliance is enforced by *effluent fines*. *Fines* are imposed for discharging harmful substances directly into watercourses (waste water fine) or into sewerage (sewer fine). The Regional Environmental Protection Inspectorates are responsible for waste water fines, while sewer fines are imposed by municipalities. Both fines are proportional to the amount of harmful and toxic substances in excess of limit values (effluent limit standards are in force for 32 water pollutants). The rate of the fine is higher for toxic substances. The sensitivity to pollution of the water to which discharges take place is also taken into account. Revenue from the waste water fine goes to the Central Environmental Protection Fund (70 per cent) and local governments (30 per cent) while revenue from the sewer fine goes to companies operating the sewerage system. The level of effluent fines has not been adjusted for inflation since it was created in 1984 (except a doubling of the waste water fine in 1993), and it is now much too low to provide an incentive to reduce industrial pollution. Introduction of an effluent charge ("environmental load charge") is under discussion.

Municipal and industrial waste water discharges are subject to fines and industrial enterprises are required to pre-treat effluent before discharge to the municipal sewerage system. On the basis of *inspections and sampling analyses* by the Regional Environmental Protection Inspectorates, "expert opinion statements" are prepared which may lead to the imposition of fines or a requirement to comply with emission limit values by a given deadline.

Other measures

It is the obligation of the State, through the NWA, to construct, maintain and operate *flood control* works (flood protection levees, reservoirs) serving more than

two localities. Local governments are responsible for smaller flood control works. Farming activity may continue in areas located between river banks and levees, but at the farmer's risk.

A 1997 regulation provides for the *protection of vulnerable aquifers* used for drinking water supply. Inner and outer protection zones have been delineated around 643 vulnerable well fields (or 3 640 abstraction wells) in which polluting activities (e.g. use of pesticides) are restricted (the shorter the leaching time to the aquifer, the stricter the restriction). The regulation is to be enforced within ten years for wells existing before 1996, and with immediate effect for new wells.

Regional water resource management plans have been proposed in 33 water catchment areas, half of which extend to neighbouring countries. A pilot plan prepared in 1995 for the 5 000 km^2 catchment of Hortobágy-Berettyó has been submitted for consultation by all social and economic actors. Additional plans are being prepared for other catchments. The aim is to set long-term water resource management strategies through consensus among all users while meeting environmental needs.

Concerning *agriculture*, maximum limits for toxics contained in *fertilisers* were introduced in 1992. Sewage *sludge* can be disposed on agricultural land subject to laboratory testing and authorisation from soil conservation authorities. The forthcoming Plant Protection Act will regulate the distribution and use of *pesticides* on the basis of their toxicity to the environment.

Monitoring

The national *surface water* quality monitoring network consists of 150 stations where analyses are performed jointly by REPI laboratories for physical, chemical and hydrobiological parameters, and by public health agencies for microbiological ones. In addition, REPIs operate 91 regional stations and various local stations. Surface water quality was formerly monitored at 300 stations. Since 1994, the number of stations has been reduced by half while the number of parameters and frequency of monitoring have increased. Qualification is made in five groups of parameters into five quality classes. There is a MTCWM network of 315 surface water gauging stations; 179 and 23 of these stations, respectively, measure discharges and sediment loads.

Monitoring of *groundwater* quality and quantity is performed by MTCWM through its RWMDs. Groundwater quality is regularly monitored in 513 wells. Groundwater level, nitrate and other chemical components concentrations in water produced by waterworks are monitored by operators in around 4 400 wells. There are no national standard specifications for groundwater quality other than the limit values for drinking water. Pesticides are not monitored regularly yet, but a survey has started in vulnerable aquifers (more than 600 wells).

Economic instruments

Prices and charges

New principles for water pricing, requiring that prices cover production costs, were introduced by law in 1990. Prices are set by municipalities except at State-owned regional waterworks, where maximum prices are established each year by MTCWM decree. In the latter case, prices are to cover operation and maintenance costs plus a maximum of 3 per cent (above inflation) to allow development activities. To encourage industries to have their own treatment facilities, provision of these activities depends on whether there is full sewage treatment, pre-treatment or no treatment.

Metering is widespread for both domestic and industrial users; water pricing is mostly in the form of *simple volumetric rates* (no fixed charge element) and, in a few instances, progressive pricing (price per cubic metre increases with level of consumption). Some waterworks companies have introduced capital contributions by users, to be used for additional investments, as a one-off charge. On average, 60 per cent of the water bill is for public water supply and 40 per cent for sewerage and sewage treatment, on both of which a 12 per cent VAT is applied.

Water withdrawal is subject to an *abstraction charge* ("water resource charge") which varies according to type of water (surface, ground), the water situation in the region (higher charges in polluted areas or those experiencing water scarcity). The revenue from this charge is placed in a Water Management Fund administered by MTCWM. However, more than 90 per cent of industrial water is abstracted by industries'own surface water intake equipment (most diversions are from the Danube), for which abstraction charges are estimated based on the operating permit (basic fee multiplied by 1.2 times the volume of permitted abstraction).

The elimination of automatic price subsidies for all households, a policy which existed until 1992, has resulted in large real increases in *domestic water prices* (18.7 per cent per year in the period 1986 to 1996). This has led to a strong decline (of one-third since 1990) in household water consumption. State subsidies are still provided to municipalities to keep water prices within acceptable limits (i.e. what can be expected to be collected). In 1998, water prices ranged from HUF 44/m^3 to HUF 162/m^3 (HUF 68/m^3 in Budapest) for the public water supply component and from HUF 31/m^3 to HUF 120/m^3 (HUF 71/m^3 in Budapest) for the sewerage and sewage treatment component. Although water prices are very low at current exchange rates, they are close to those of other OECD countries when expressed using purchasing power parities, with the notable exception of Budapest (Table 3.1). Per capita household water consumption in Hungary is among the lowest in the OECD area at around 100 litres/day (50 to 60 litres/day in some western areas).

Industries connected to public water supply tend to pay the full cost of water delivery. Prior to 1990, *irrigation water* was provided at a fixed, uniform rate throughout the country. From 1990, farmers have been required to bear the operational (but not maintenance) cost of water infrastructure, while new investments (canals, reservoirs, wells) have been subsidised up to 40 per cent. In 1998, irrigation water prices ("price of service") ranged from HUF 0.5/m^3 in small networks supplied with pumped water to HUF 12/m^3 in large systems supplied by gravity.

Table 3.1 **Water prices,**[a] 1996

	City	At current exchange rates (USD/m^3)	Corrected for PPPs (USD/m^3)
Hungary	Budapest	0.28	0.58
	Debrecen	0.55	1.16
	Pécs	0.69	1.45
Korea	(national average)	0.36	0.46
Czech Republic	Praha	0.37	0.86
	Brno	0.29	0.67
	Ostrava	0.38	0.88
Germany[b]	(national average)	1.70	1.47
Portugal	Lisbon	0.99	1.24
	Coimbra	1.02	1.28
	Porto	0.98	1.23

a) Prices calculated on the basis of a family of four (two adults and two children) living in a house with a garden rather than an apartment. Price based on annual consumption of 200 m^3. VAT not included.
b) Germany: country data refer to 1997 and are provisional.
Source: International Water Supply Association, 1997; International Statistics for Water Supply.

Other measures

Fertiliser subsidies in *agriculture* were discontinued in 1990. Between 1992 and 1994, a 50 per cent land tax concession was granted for activities such as sustainable nutrient management and proper use of manure. Since 1997, financial support has been made available for farmers who adopt organic production methods. A comprehensive agri-environmental programme is being designed by the Ministry of Agriculture and Regional Development with support from the EU (PHARE programme). Direct payments will be made available to farmers implementing low-input farming methods in target areas, following the model of the EU's 1992 agri-environmental directive.

Funding and expenditure

Development of State-owned water supply and sewerage facilities is entirely financed from the central budget. Municipalities-owned companies can receive State subsidies of up to 30 to 50 per cent of the cost of *priority investments* (sewage treatment facilities). By law, 25 per cent of the cost of expanding sewage treatment for major municipalities (Budapest and county administrative centres) is eligible for State subsidy (30 per cent in the case of mechanical treatment combined with a sludge disposal facility). The remaining 75 per cent typically originates in equal shares from local governments' own sources, EU PHARE support (refundable) and World Bank loans. To supplement their own sources, county administrative centres may also obtain support from separate State funds. In addition to these sources, other (smaller) municipalities may obtain funding from contributions of interested parties and regional development support. Joint projects of several communities may receive an additional 10 per cent State support (20 per cent if the population is under 1 000). As demands for State subsidies are considerably greater than the amount earmarked in the State budget, priority is given to municipalities situated on a vulnerable aquifer. In 1997, investments in waste water treatment amounted to USD 210 million, of which more than 70 per cent was end-of-pipe technologies; these investments mainly concerned communal services. Expenditure in 1997 was USD 65 million for sewerage and USD 57 million for sewage treatment.

According to the 1992 Act on Separate State Funds, every user is obliged to contribute to the *Water Management Fund* supervised by the NWM. Monthly abstraction charges must be paid by users to the RWMDs. Their revenues amounted to USD 16 million in 1998, of which 30 per cent was for water use by Hungary's one nuclear energy plant. Provision of the Fund in 1999 is USD 25 million. Expenditure was mainly (70 per cent) related to subsidising municipalities'investments (sewerage, sewage treatment) and, to a lesser extent, to financing the State monitoring network and supporting some rural (drainage systems) and industrial activities. Revenue from waste water fines going to the *Central Environmental Protection Fund* amounted to USD 1.5 million in 1997. Part of this fund is used to finance waste water treatment plant and sewerage investment projects when requested by municipalities and industrial installations.

Government funding for *flood control* is determined by the previous year's flood events. About USD 9 million was earmarked in 1998; the provision in 1999 is USD 18 million (as important floods occurred in 1998).

3. Environmental Performance

Water quantity

Overall, Hungary benefits from abundant water resources, most of which originate from neighbouring countries. Having increased in the 1970s and 1980s, *water use intensity* fell to 5 per cent, much lower than the OECD Europe average. Groundwater use intensity, however, reaches about 33 per cent. Higher water use intensity is expected to result from planned increases in household (from 100 to 170 litres/day) and industrial consumption. Trends in water withdrawal for agriculture will be strongly influenced by changes in agricultural policy, as Hungary prepares for EU accession. Increases in the extent of irrigated areas (up to the early 1990s level) may be driven by a rise in agricultural and food exports, but could be offset by the EU's Common Agricultural Policy requirement to set aside 1 million hectares of farmland.

The introduction of *abstraction charges* reflecting water scarcities is a step towards the NEP objective of more efficient water use by households and industry. The ten-year programme launched in 1997 to improve water retention of the sandy plain between the Danube and Tisza should stimulate the *adoption of water conservation methods by farmers*.

Nevertheless, greater efforts should be made to stop *groundwater exploitation* without a permit, including through higher fines for non-compliance. More attention should be given to maintenance and *renewal of public water supply networks*, as losses from water pipe systems are reaching more than 20 per cent in some regions. The main *flood control* levees, which extend to 4 300 kilometres, protect an area of 23 600 km^2 or one-quarter of the country. However, more than 40 per cent of these levees have not yet been upgraded to the necessary size (to resist 100-year floods) and 560 kilometres of them fail to meet safety requirements. Given the high economic and environmental costs of flooding in recent years, the 1995 flood control enhancement programme should be given higher priority and steadier funding.

Drinking water

The share of the population supplied with drinking water increased from 75 per cent in 1980 to 98 per cent in 1997. Since 1991, around 600 settlements (or 20 per cent of villages) have been newly connected to the public water supply through the "target support system" (financed 90 per cent by the government). *Access to piped water supply* remains an issue for 14 settlements and 150 000 persons living on the outskirts of towns and villages or in the countryside. All water diverted from surface water bodies and over one-quarter of that abstracted as groundwater is

treated. The proportion of the population consuming water of unacceptable quality (in terms of arsenic, nitrate or faecal coliforms) is estimated at about 5 per cent. Annual consumption of drinking water (about 37 cubic metres per capita) is well below the European average of 100 cubic metres. Privatisation of municipal water supply services has made good progress.

The presence of nitrates in shallow groundwater is a long-standing issue. Protected zones have been designated around vulnerable water resources used for drinking water supply through the 1997 five-year programme to *protect aquifers that supply drinking water*. Within protected zones, polluting activities are restricted, environmentally friendly practices are encouraged and preferential subsidies are given to municipal sewage treatment.

The 1989 *drinking water quality standards* broadly comply with the requirements of the EU's 1980 drinking water directive (and are more stringent for boron and lead), but not with those of the 1998 framework directive on arsenic, which is naturally present in most groundwater of the Great Plain. From 1983 to 1995, a project conducted (with government support) in the Southern Great Plain brought about a reduction in the arsenic (and also ammonium, iron and manganese) content of drinking water in the municipal waterworks of 80 settlements. However, much remains to be done to comply with the 10 µg/litre (instead of 50 µg/litre) limit. Harmonisation with EU legislation will also raise the issue of laboratory accreditation to increase monitoring capacity.

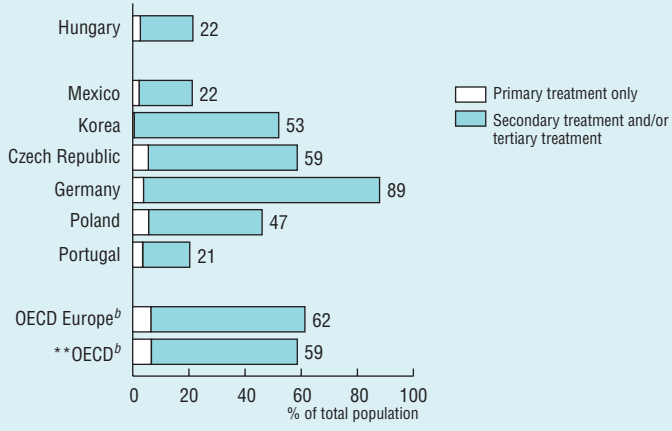
Water quality

Water quality in Lake Balaton has improved as a result of actions taken since the early 1970s, notably to decrease the phosphorus load and prevent eutrophication. Further, a Balaton Development Council was established in 1996 and an eight-year government programme was launched to improve the water quality and ecological condition of the lake, particularly through treatment of sewage from neighbouring urban areas.

The *water quality of rivers* has improved overall in the 1990s, related to the decline in industrial production. However, much remains to be done. Bacterial contamination occurs almost all along the Danube and the Tisza. Secondary waterflows are highly polluted, particularly in the vicinity of major urban centres. Nitrates in groundwater exceed limit values at many locations. A major international effort is in place to clean the Danube (Chapter 8).

Little progress has been made in regard to *domestic waste water treatment*, and substantial efforts are needed to meet NEP objectives. The share of the population served by sewerage increased from 40 per cent in 1980 to 60 per cent

Figure 3.5 **Population connected to public waste water treatment plant,** late 1990s[a]



a) Or latest available year.
b) Secretariat estimates.
Source: OECD.

in 1997. Only 22 per cent of the population is connected to a sewage treatment plant, well below the OECD average (Figure 3.5), and treatment is mostly secondary. In Budapest, about 7 per cent of total sewage flow is discharged to the Danube through free outfalls and without any treatment. A 14-year programme was launched in 1996 to extend municipal sewerage (from 17 000 kilometres to 29 400 kilometres) and sewage treatment capacity (from 1.7 million cubic metres/day to 2.9 million cubic metres/day). More than half the existing sewerage and sewage treatment capacity is in the main cities, where the proposed extension of sewage treatment will take place (Table 3.2). *Considerably higher investment will be needed* in order to comply with the EU's 1991 urban wastewater treatment directive asking to treat waste water from all cities with a population equivalent of over 2 000. Estimates suggest more than EUR 4 billion. This represents a major challenge for national and local authorities, as well as for firms delivering water services. International comparison of water prices using purchasing power parities suggests that municipalities'revenues from water pricing can be increased through higher tariffs in some cases (e.g. Budapest), in line with the *user pays principle* and with appropriate attention to *income disparities*.

Better results have been achieved for *industrial waste water treatment*, with only 9 per cent of waste water untreated. Treatment is primary for only half the discharges and is secondary for the rest. These proportions refer to the minority of industries connected to public sewerage. For the great majority of industrial waste water discharged directly to surface waters, the current form of pollution control through sewage fines is not dissuasive (as fines are much too low) and is not enforced in a comprehensive manner. Fines should be much higher and periodically adjusted for inflation. Higher sewerage service costs would further dissuade industries from discharging their sewage to the public sewer system. The proposed *introduction of an effluent charge* (based on the pollutant load) would be a positive step towards greater use by industry of self-treatment and of production processes that reduce effluents to a minimum.

Table 3.2 **Sewerage and sewage water treatment in main cities**

County towns	Population (000)	Length of the public sewer network (km)	Number of connected flats	Waste water treatment capacity existing[a] (1 000 m^3/d)	Waste water treatment capacity planned[a] (1 000 m^3/d)
Budapest	1 861	4 228.3	732 801	212 B	600 K
Békéscsaba	64	217.7	13 734	28 B	28 K
Debrecen	207	267.3	56 146	80 M (40 B)	40 B
Dunaújváros	60	128.8	20 227	–	30 B
Eger	58	233.2	19 487	22 B	4 B
Györ	128	242.0	42 069	80 M	80 B
Hódmezövásárhely	49	63.3	6 650	5 B	15 B
Kaposvár	67	118.0	19 274	20 B	–
Kecskemét	105	239.0	19 712	24 M	48 B
Miskolc	176	664.5	61 584	140 M	105 B
Nagykanizsa	52	93.3	15 226	25 B	25 B
Nyíregyháza	113	324.8	27 593	40 B	–
Pécs	160	506.4	54 981	45 B	60 B
Salgótarján	45	144.8	13 981	18 K	–
Sopron	54	137.3	17 561	15 B	7.5 B
Szeged	160	303.8	47 236	–	60 B
Szekszárd	35	171.5	11 998	16 B	16 K
Székesfehérvár	106	321.3	32 500	40 B	7.5 B
Szolnok	78	277.7	23 695	–	30 B
Szombathely	83	195.3	27 394	30 B	15 B
Tatabánya	72	138.4	23 889	32 K	–
Veszprém	63	176.9	18 067	30 M	30 B
Zalaegerszeg	61	228.9	15 101	20 B	28 K

a) M: mechanical treatment; B: biological treatment; K: tertiary treatment.
Source: ME.

In *agriculture*, several measures have been taken to reduce pressures on water quality: discontinuation of fertiliser subsidies since 1990, support to organic farming since 1997, and preparation of a Plant Protection Act. Water quality should also benefit from the comprehensive agri-environmental programme being prepared.

4

WASTE MANAGEMENT

1. Current Situation and Trends

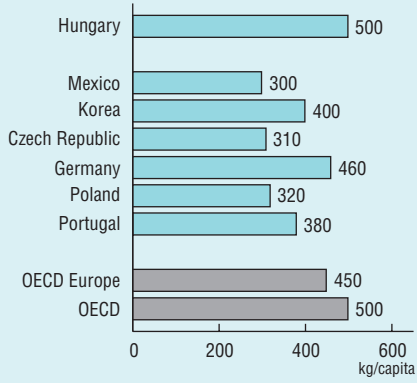
The first comprehensive *review of waste management* in Hungary, particularly management of hazardous waste, appeared in 1994. Earlier publications had provided only very general information. Today data regarding waste generation still lack precision, reflecting inadequate waste regulation. In the absence of official definitions, Hungarian practice distinguishes three main types of waste: municipal, industrial and hazardous. According to the latest estimates of the Ministry for Environment, about 104 million tonnes of waste is produced annually in Hungary.

The quantity of *municipal solid waste* amounted to some 5.0 million tonnes in 1996 (i.e. 500 kg per inhabitant per year), increasing by 2 per cent a year (Figure 4.1). The proportion of packaging materials, especially plastics, is increasing while glass and metal content is decreasing (Table 4.1). Some 82 per cent of municipal solid waste is collected through an organised and regular service; 85 per cent of the population is served on average, but this figure is nearly 100 per cent in Budapest and only 70 per cent in the rest of the country. Most of this waste is transported for disposal in communal landfills.

Municipal liquid waste produced by populations living in areas without a proper sewer system represents a special category. It amounts to some 100 million cubic metres per year. This type of waste is collected by private enterprises, whose activities are not controlled. Part of this waste drains into the sewer system, but most (70 per cent) goes to landfills. Present capacity in existing waste water treatment plants is largely insufficient to treat this type of waste.

Construction and demolition waste is handled with communal solid waste and generally disposed of in municipal landfills. Its quantity is estimated to be at least 800 000 tonnes a year. Less than 1.2 per cent is used as secondary raw material.

Figure 4.1 **Municipal waste generation,**[a] late 1990s



a) When interpreting national figures, it should be borne in mind that the definition of municipal waste and the survey methods may vary from country to country. According to the definition used by the OECD, municipal waste is waste collected by or for municipalities and includes household, bulky and commercial waste and similar waste handled at the same facilities.

Source: OECD.

Table 4.1 **Composition of municipal waste in Budapest**
(%)

Waste	1990	1995	1996	1997
Paper	19.6	17.0	19.0	19.2
Plastic	4.6	3.5	4.5	11.5
Textile	6.8	4.3	3.4	5.8
Glass	5.3	3.1	3.0	2.8
Metal	6.0	4.2	3.8	2.2
Hazardous components	–	–	1.2	0.8
Decomposing organic	32.0	35.1	32.3	28.4
Other inorganic	25.7	32.8	32.8	29.3
Total	100.0	100.0	100.0	100.0

Source: Public Areas Maintenance Company of Budapest.

Industrial non-hazardous waste, which amounted to 36 million tonnes per year in the late 1980s, decreased dramatically as a result of declining industrial production. Current estimates are around 4 million tonnes per year. Part of this waste is stored by the producing factories; more than 400 million tonnes have been accumulated over the years, mainly from mining and energy industry. Slag heaps in the mining industry are estimated to weigh about 1 billion tonnes. Waste produced by *agriculture and forestry* amounts to about 25 to 28 million tonnes per year. The food industry generates an additional 5 to 6 million tonnes.

Some 2.6 million tonnes of *hazardous waste* was produced in 1996. About 700 thousand tonnes is red mud from alumina production. On factories' dumping grounds is hazardous waste which has accumulated over several decades; the total amount is estimated at around 34 million tonnes. Some 6.5 thousand tonnes of hospital waste was generated in 1995.

Most *radioactive waste* arises from the operation of the Paks nuclear power plant, which generates over 40 per cent of the country's electricity. It produces 53 tonnes of spent fuel, 100 cubic metres of low and intermediate level solid waste, and 250 cubic metres of low and intermediate level liquid waste per year. Another 30 to 35 cubic metres of low and intermediate level waste is produced at facilities where various radiation applications are used.

There are approximately 10 000 *contaminated sites*. Some information exists on only a fraction of them. They include 175 abandoned Soviet military sites and training grounds, where the most important contamination involves toxic metals (lead, cadmium, etc.) and hydrocarbons (oil, tar, etc.).

2. Responses

Objectives

General objectives regarding waste management have been included in the national action plans adopted since 1991. The Short- and Medium-Term Environmental Protection Action Plan emphasises *defining and regulating* responsibilities in the area of waste disposal; eliminating environmental pollution accumulated in highly *contaminated areas* over the previous decades; and *reducing the quantity* of waste to be disposed of, through separate collection and recycling and the use of low- and non-waste technologies in industrial production processes.

The 1994 National Environmental and Nature Conservation Policy Concept reinforces previous orientations and introduces more specific objectives, including: establishing full-scale registration of all kinds of wastes and setting up a *central database* on waste generation; *decommissioning* illegal and improper waste dumps and replacing them with a smaller number of environmentally safe regional landfills;

establishing *regional incinerators and landfills* for treatment of hazardous waste; providing *organised collection* of municipal waste throughout the country; and introducing *taxes and deposit fees* for environmentally damaging products.

In the National Environmental Programme for 1997 to 2002, waste management is recognised as a serious problem. The NEP addresses the various components of waste management and disposal – municipal solid and liquid waste, non-hazardous production waste, hazardous waste, special waste (red sludges, hospital and radioactive waste) – with *19 specific proposals* and includes a number of quantitative targets, such as:

- for municipal solid waste: no increase in the quantity of waste generated; decrease in organic content to 5 per cent (20 per cent by the year 2002); organised collection to reach 90 per cent of total municipal solid waste generated; increase in rates of separate collection to 10 per cent and of recycling to 25 to 30 per cent; at least 10 to 15 regional landfills (with a total capacity of 2 million cubic metres) to be established every year;
- for hazardous waste: increase incineration and dumping capacities by 25 000 tonnes per year over the six years of the Programme.

Although problems relating to agricultural waste are mentioned in the National Environmental Programme, no specific action regarding such waste is envisaged.

Institutional and regulatory framework

National *waste management policy* is the responsibility of the Ministry for Environment. Implementation is the responsibility of its 12 Regional Environmental Protection Inspectorates. Local governments are responsible for collection and treatment of municipal waste, and for authorising the establishment of waste treatment facilities.

The 1995 Act on General Rules of *Environmental Protection* addresses waste management briefly in its Section 30, which stipulates that "the user of the environment shall provide for the treatment (disposal, recovery) of wastes". According to this Act, local governments shall develop municipal programmes, tasks and regulations concerning, inter alia, disposal of communal wastes. It also introduces the concept of product charges and deposit fees, the details of which are to be specified in separate regulations.

The *Government Decree on Hazardous Waste*, incorporating the provisions of the Basel Convention, was adopted in 1996. It reinforces producer responsibility for safe handling and treatment of hazardous waste, and stipulates that fines shall be imposed for non-compliance. It distinguishes three categories of waste: i) particularly hazardous, ii) highly hazardous and iii) moderately hazardous. The list appended includes a wide range of materials which are not considered hazardous waste

according to OECD and EU definitions. Management and disposal of *radioactive waste* are covered by specific regulations.

A comprehensive framework *Act on Waste Management is in preparation*, based on the 1998 Waste Management Concept. It is intended to ensure that Hungary is fully in line with relevant OECD and EU legal instruments. This new act has received general support in principle from the various parties concerned; the bill should be discussed in Parliament in late 1999.

The *Act on Environmental Product Charges*, in force since 1996, helps finance collection and recycling (or safe disposal) of a number of products once they become waste. Charges collected under this act go to the Central Environmental Protection Fund.

Waste minimisation, recycling and disposal

The largest part of non-hazardous waste produced in Hungary (e.g. more than 90 per cent of municipal solid waste) is sent to public or private *landfills*. Only 30 per cent of the 2 700 communal landfills more or less conform to environmental standards, and only 10 per cent are operated properly. Their present capacity is estimated to be adequate to deal with municipal solid waste during the next five years. A number of illegal disposal sites exist.

Only Budapest has a municipal waste *incinerator*. It has a capacity of 310 000 tonnes per year (about 60 per cent of the municipal waste generated).

Traditional *spreading of sewage sludge on land* (previously carried out through arrangements with collective farms) is decreasing in response to resistance by farm owners, based on its toxic metal content. Quantities requiring disposal will increase, however, as more municipalities are to be provided with sewerage systems.

A strategy for *separate collection* of municipal solid waste, identifying a number of actions for implementing this concept, was prepared by the Ministry for Environment in 1991. Separate collection has not yet been generally developed, however, occurring only occasionally for experimental purposes. Composting plants either do not exist or are not properly operated due to the lack of selective waste collection.

The provisions of the *Act on Environmental Product Charges* have been applied since 1996 to a number of types of waste, including used batteries and old refrigerators and refrigerants, packaging materials and used tyres. This produced a revenue of some HUF 10 billion in 1997, which went to the Central Environmental Protection Fund. Twenty per cent of the fund is used for waste management activities, including subsidies to companies undertaking collection and treatment of the relevant waste types. Through this system, some 90 per cent of used batteries are now collected. Collection and recycling of paper and cardboard packaging materi-

als from shops and large users reach a level of 35 to 50 per cent. In 1998, the provisions of the product charge act were extended to cover waste oil. Organisation of a national collection and reprocessing system has begun. Revision of this act is now planned, taking into account the experience gained.

A *National Cleaner Production Centre* (NCPC) was established in Hungary in 1997, on the initiative of UNIDO and UNEP, to promote the expansion of integrative and preventive technologies. It serves as a central co-ordinating and catalytic body and as a clearing house, developing information systems, building educational programmes and organising in-plant demonstration projects.

In most cases, collection and disposal of municipal solid waste is *financed* through the general budget of the municipalities with subsidies from the Ministry of Interior. These subsidies amounted to HUF 1.4 billion in 1996 and HUF 0.9 billion in 1997. Attempts are being made, especially in the largest cities, to introduce a special waste management tax related to some extent to the quantity of waste discarded for the purpose of disposal. When applied, this tax will nevertheless be far from covering real costs.

Hazardous waste management

The fate of hazardous waste produced in Hungary has so far been *difficult to trace*, owing to large deficiencies in the reporting system. This situation should be corrected through the provisions laid down in the 1996 Government Decree on Hazardous Waste, which states clearly that the owner of such waste shall provide for its treatment. The producer must prepare, by mid-1997 for the first time, a three-year waste management plan for prevention of hazardous waste generation, reduction of hazard level and quantity, and recuperation and disposal. Licences granted to industrial facilities are now systematically reviewed by the Regional Environmental Protection Inspectorates on the basis of these waste management plans.

According to available information, 63 per cent of the hazardous waste generated by industry is *treated by the producers themselves*, either on site or elsewhere, by incineration or landfilling. Many facilities do not meet the relevant environmental standards and are frequently subject to environmental fines. About 0.5 million tonnes of hazardous waste is re-used, and a similar amount is stored at temporary sites. It is estimated that 1.8 million tonnes of hazardous waste (i.e. about one-third of the total generated per year) is disposed of correctly. Half of the red sludges from alumina smelting is stored untreated at special disposal sites or at transitional facilities. Hospital waste is generally incinerated in small units on the premises; many of the incinerators are in improper or poor condition.

Modern facilities for hazardous waste disposal include one high tech incinerator with a 25 000 tonne per year capacity (total incineration capacity in Hungary is 84 500 tonnes per year), one chemically secure landfill (10 000 tonnes per year)

and four interim storage sites. An ambitious programme in the mid-1980s to create a network of regional hazardous waste landfills, incinerators and interim storage sites has failed to be completed.

In the past, all *spent fuel* from the Paks nuclear power plant was returned to the former USSR as part of the agreement with the fuel supplier. Since shipment to Russia has become increasingly difficult, plans are being developed to establish the necessary facilities in Hungary. Attempts to determine a site have failed so far.

Remediation of contaminated sites

The 1991 Short- and Medium-Term Environmental Action Plan identified the task of *remediating sites with accumulated environmental pollution*. Two types of sites were distinguished: abandoned Soviet Army facilities, and other "inherited" contaminated sites.

Some 175 former *Soviet military facilities* were registered during a control programme carried out by the Ministry for Environment between 1990 and 1995. Financial resources were provided by the State Privatisation and Holding Company. Remediation of the worst polluted of these has been completed.

Remediation of *other "inherited" contaminated sites* did not begin until 1996, due to lack of resources. In 1997, the Hungarian Environmental Clean-up Programme was launched to make up for this delay. During preparation of the Programme, information on the most serious pollution and other environmental damage was collected. About 200 sites were registered; the estimated total cost of their clean-up is approximately HUF 40 billion.

According to present legislation, it is the *responsibility of the government* to address the consequences of significant environmental damage if no other party can be held responsible. In each of the Environmental Clean-up Programme's first two years, the annual budget law has allocated HUF 1 billion to the Central Environmental Protection Fund for implementation. Funds have been provided from privatisation revenue.

By mid-1997, *diagnostic investigations* had been completed at 15 sites and emergency measures taken at eight of them. The Programme's medium-term phase will cover the years 1998 to 2002. During this phase, subject to availability of financial resources, diagnostic or partial investigations will be carried out at the 200 sites for which the government is responsible.

Trends in transfrontier movements

Hungary ratified the *Basel Convention* on the Control of Transboundary Movements of Hazardous Wastes and their Disposal in 1990. Its provisions are incorpo-

rated into a number of decrees concerning different aspects of hazardous waste disposal and transfrontier movements. The Conventions's detailed implementation rules are included in the 1996 Government Decree on Hazardous Waste.

Under present legislation, *importing hazardous waste* is forbidden except for the purpose of recuperation in a facility with appropriate technology and available capacity. Import licences for waste are subject to authorisation by both the Ministry for Environment and Ministry of Economic Affairs. Since 1997, a licence is not required to import aluminium or iron and steel wastes.

It is intended that a Government Decree will be issued following adoption of the framework Act on Waste Management to conform the OECD Council Decision on Transfrontier Movements of Wastes Destined for Recovery Operations, and in particular to *introduce the "green list"* of wastes which are allowed to move subject only to controls normally applied in commercial transactions.

Exports of hazardous waste amounted to about 30 000 tonnes (Table 4.2) in 1996.

Table 4.2 **Hazardous waste exported from Hungary,** 1996

Wastes				Hazardous characteristics	Amount exported (metric tonnes)	Importing Country
Basel code[a]	Nature	UN code	UN "H" code			
Y 31	Lead and lead compounds	UN 9	H 11-H 12	Toxic, ecotoxic	7 540 558 8 232	Austria Germany Slovenia
Y 22	Copper compounds	UN 9	H 11-H 13	Toxic	755	Germany
Y 23	Zinc compounds	UN 9	H 11-H 12	Toxic, ecotoxic	110 555	Germany Belgium
Y 00	Mix of compounds	UN 9	H 11-H 12	Toxic, ecotoxic	39	Germany
Y 00	Waste from slaughterhouses	UN 6.2	H 6.2	Infectious components	10 323	Austria
Y 00	Molybdenum	UN 9	H 11-H 13	Toxic	80	Austria
Y 00	Used photographic prints, slides	UN 4.1	H 4.1	Flammable	19	Germany
Y 00	Leather residues	UN 6.2	H 6.2	Infectious components	1 776	Netherlands
Y 00	Aluminium waste	UN 9	H 12	Toxic, ecotoxic	138 21	Austria Germany
Y 00	Alpacka	UN 9	H 11-H 12	Toxic, ecotoxic	18	Sweden

a) Basel Code Y 00 stands for wastes which are considered hazardous in Hungary but are not listed in the Basel Convention.
Source: ME.

3. Environmental Performance

The *current situation* of waste management in Hungary can be characterised as follows:

- absence of a reliable information system on waste generation, handling and disposal;
- accumulation of large amounts of untreated waste generated by industry over the last decades, especially hazardous waste;
- large number of sites contaminated by previous industrial and military operations;
- landfilling largely predominant;
- small percentage of waste recycled or recovered;
- lack of comprehensive waste management legislation.

The National Environmental Programme 1997-2002 defines some *19 specific objectives* intended to cope with this situation. It is not clear, however, how implementation of this ambitious programme will be funded. A detailed action plan for implementing it does not seem to exist.

Waste management was recognised only recently as a *serious problem* in Hungary. A questionnaire circulated to 1 800 municipalities in preparation for the National Environmental Programme revealed that, for more than three-quarters of them, solving the problem of disposal of municipal waste was the most urgent environment-related activity. Only problems related to hazardous waste and, to some extent, contaminated sites have received serious attention during the last few years. Previous attempts at developing a comprehensive waste management law, which would replace the existing scattered and sometimes insufficiently harmonised regulatory texts, have failed so far due to lack of consensus between the various authorities and other actors concerned. The *new waste management act*, to be adopted in late 1999, would allow the creation of a reliable data base, from which a realistic action programme could be developed. This act should reinforce producer responsibility, confirm the polluter pays principle, firmly establish the waste management hierarchy (i.e. prevention and reduction of waste generation, recovery of material or energy, environmentally sound treatment and disposal) and clearly define the responsibilities of municipal authorities for ensuring the collection and safe disposal of municipal solid waste.

The network of *regular municipal solid waste* collection does not extend over the whole country, and 15 per cent of the population is still not served on an organised basis. By far the largest part of the over 4 million tonnes of municipal solid waste is transported to communal landfills, a large number of which are not operated properly, or to illegal dumpsites which are potential sources of pollution. The

capacity of existing communal landfills will be exhausted within five years. There is only one municipal solid waste incinerator in Hungary, with a capacity of 310 000 tonnes per year. Serious efforts are needed in order to create, as soon as possible, the necessary capacity for safe disposal of municipal waste, either in regional landfills or through incineration, and to close inadequate or illegal facilities.

Landfills and dumpsites also receive an uncontrolled amount of *municipal liquid waste* collected from households not connected to the sewer network. A solution for the disposal of sewage sludge needs to be found rapidly, especially since quantities are likely to increase with the expected expansion of waste water treatment plants' capacity in the near future.

The objective of substantially *reducing the quantities* of waste to be disposed of, through introducing low-waste technologies in production processes and developing separate collection and recycling of materials, has only been partially met. In most industrial branches the level of direct recycling or recovery of materials for use in other sectors cannot be considered satisfactory. Part of the revenues generated through applying the Act on Environmental Product Charges are devoted to assisting in the collection and disposal of types of waste subject to the act. This has practically solved the problem of used battery collection and, to some extent, collection of paper and cardboard packaging materials. The collection rate for old refrigerators and used tyres is still insufficient, however, and further efforts are needed to improve it. The establishment of the National Cleaner Production Centre in 1997 should be acknowledged, even if its activities in the field of waste prevention and minimisation will have to be further developed. The separate collection of municipal solid waste is practically non-inexistant, apart from some sporadic and experimental attempts.

Present capacity for handling and safe *disposal of hazardous waste* is largely inadequate, especially considering the quantities accumulated over the years which continue to be stored at industrial facilities. Incinerators operated by the waste generators themselves, including most hospital waste incineration facilities, are generally not large enough to be run cost-effectively. A serious effort would be needed, in pursuance of the 1996 Government Decree on Hazardous Waste, to enhance existing treatment possibilities, ensure that they are operated in full compliance with environmental regulations (especially as concerns air pollution emissions from incinerators) and ensure that all hazardous waste is sent to an adequate disposal facility. The use of waste tyres, used oils and waste solvents as alternative fuels in cement kilns should be considered in this respect. Regional incinerators should be established to treat hazardous hospital waste.

Clean-up of *contaminated sites* is of particular importance, as over 90 per cent of the water consumed by the public originates as groundwater. This was recogn-

ised as early as 1991 as one of the government's priority concerns, with special emphasis being put on remediation of sites abandoned by the Soviet Army. Following remediation of the worst polluted of these sites, a national clean-up programme was launched in 1996. As a result of its first, investigatory phase, some 200 sites were registered as needing urgent remediation measures. The associated cost is estimated at about HUF 40 billion. The resources allocated so far (HUF 1 billion in 1996 and again in 1997) suggest that improvement will be very slow, considering that the total number of potentially contaminated sites whose clean-up is the government's responsibility has been estimated at 1 500 to 3 000, with a cost of over HUF 100 billion.

Hungary was among the first countries to sign and ratify the Basel Convention on the Control of *Transboundary Movements* of Hazardous Waste and their Disposal. Implementation of the rules of the Convention concerning export of hazardous waste is enforced by a Government Decree of 1996. Import of hazardous waste is subject to a licensing procedure and is restricted to cases in which the waste will be recovered. So far, Hungary has not introduced the OECD "green lists" into its legislation. Most of the waste materials considered as being freely tradeable within the OECD area when destined for recovery are still subject to import licensing by the Ministry for Environment and Ministry of Economic Affairs.

5

NATURE CONSERVATION, FORESTS AND BIODIVERSITY

1. The State of and Pressures on Nature

Status and trends

Flora and fauna

Owing to its geographical location, Hungary has a wide variety of Eurasian flora and fauna. There are over 3 000 plant and 43 000 animal species, including 83 of mammals, 373 of birds, 16 of reptiles, 16 of amphibians and 81 of fish (Table 5.1). This diversity is comparable to that of neighbouring countries; given its size, Hungary may be said to be *rich in species*.

Many of Hungary's plant and animal species are endangered by fragmentation of ecosystems. The proportion of *threatened species* is around 20 per cent for birds and vascular plants and 32 per cent for fishes (Table 5.1). Migration routes of large mammals have been affected by infrastructure development, and over 70 per cent of mammal species face some degree of threat. Amphibian and reptile species, whose survival strongly depends on their habitats (wetlands), are all threatened. The most endangered vascular plant species are those characteristic of wetlands, natural forests and steppes; 3 per cent of moss species are threatened, a situation comparable to that in other Central European countries.

Most of the *Hungarian forest* (85 per cent) consists of broad-leaved species. Oaks predominate (34 per cent), particularly Turkey oak, followed by beeches (6 per cent), hornbeam (6 per cent), black locust, poplars and larches. The black locust has been expanding in recent years. Among conifers, pines (Scots and Austrian) are the main species.

Habitats and landscapes

Hungary's flora and fauna result from a mix of species originating from *three climatic zones* (Atlantic-Alpine, continental and sub-Mediterranean). Most of its territory lies in the biogeographical region of Pannonia, characterised by thermophilic, forest and steppe ecosystems. Many of the most characteristic "Pannonian" flora and fauna live on dry plains and in rocky meadows.

In contrast to other European countries, more than 90 per cent of Hungary's territory has fertile soils with rich biological life, which are among its greatest natural resources. Terrestrial *habitats* form four large sub-networks: *plains habitats* (the largest part of the country); *hilly/mountain habitats* along a line from Alpokalja (foothills of the Alps in western Hungary) to the Zemplén Mountains in the north-east; *sub-mountain habitats* from the Keszthelyi Mountains to the Tokaj Mountains; and *other habitats* in the Transdanubian Hills and some scattered individual mountain areas. The tributaries and main upstream stems of the Danube, Tisza and Dráva host the principal *aquatic ecosystems*.

In terms of *landscape* diversity, between 1960 and 1990 almost 500 000 hectares was withdrawn from agricultural production, of which 70 per cent was turned over to afforestation. The amount of land under cultivation has further decreased by almost 15 per cent since 1990. However, some two-thirds of Hungary's territory is still agricultural land; most of it is arable and permanent cropland and 13 per cent

Table 5.1 **State of flora and fauna,** mid-1990s

	Species known[a]	Threatened[b]		Decreasing	
		Number	(%)	Number	(%)
Vertebrates					
Mammals	83	59	*71*	–	–
Birds	373	70	*19*	–	–
Reptiles	16	16	*100*	16	*100*
Amphibians	16	16	*100*	16	*100*
Fishes	81	26	*32*	14	*17.3*
Invertebrates	> 43 000	> 400	*> 1*	9	
Vascular plants	2 500	495	*20*	386	*15.4*
Mosses	600	20	*3*	–	–

a) Of which indigenous species: 212 species of birds; 6 freshwater fish species; 2 433 vascular plant species.
b) Refers to protected and strictly protected species of vertebrates.
Source: ME.

is permanent grassland. Around one-third is made up of forest and other wooded land (19 per cent) and uncultivated areas (14 per cent).

Pressures on ecosystems, landscape and biodiversity

The main wildlife habitats outside protected areas are in agricultural areas. During the late 1980s, around 80 per cent of agricultural land was devoted to *large-scale and intensive farming*. Intensive fertiliser use has had side effects on habitats and on biodiversity, including soil acidification and contamination as well as phosphate and nitrate pollution of surface and sub-surface waters. Large fields cultivated by State farms and agricultural co-operatives have made the landscape quite monotonous.

In the 1990s, *pressures from agriculture have diminished*. Agriculture's share of GDP decreased from 15 per cent in 1989 to 6 per cent in 1997. The number of livestock is 40 per cent lower than in 1990. Use of mineral and organic fertilisers has fallen drastically. Pesticide use also dropped, from roughly 35 000 tonnes of active ingredient in 1980 to less than 8 000 tonnes in 1995. Organic and integrated farming is developing. Between 1994 and 1997, as a result of privatisation, the share of total agricultural area cultivated by collective and State farms decreased from 56 per cent to 42 per cent. This division of large farms into smaller private holdings has led to positive landscape changes.

Whereas forest covered more than 70 per cent of the present area of Hungary before human activities expanded, it now covers less than 20 per cent. *Forestry* accounts for about 0.5 per cent of GDP and 0.1 per cent of employment. Forest cover has increased by 600 000 hectares over the past 50 years (by 100 000 hectares since 1980) to reach 1.8 million hectares; this has partly been the result of planting fast-growing tree species (which now account for 10 per cent of the total forest area), sometimes to the detriment of unique grassland ecosystems (black pines in the case of dolomite rock meadows, Scotch pines and black locust in the case of sandy meadows). However, mixed forest stands including native species still make up about half the total forest area. Picking in forest (berries, fruits, mushrooms) is practised by 30 per cent of Hungarian households.

The increase in the extent of *roads and motorways* throughout the country has created barriers for migrating species by splitting biotopes and corridors. *Water resource management* has also had some negative impacts on biodiversity, particularly through intensive drainage of wetlands (in order to cultivate them) and cutting off of river meanders. With the regulation of the main streams, most of the "flood forests" of oak, ash and elm trees have disappeared and been replaced by softwood tree plantations and farmland. During the communist period, it is estimated that about 20 per cent of the country was affected by heavy *industrial pollution*. Industrial production (with the associated pollution pressures on biodiversity) subsequently dropped considerably.

The growth of *mass tourism*, along with inadequate infrastructure, have contributed to several environmental problems: poor water quality at Lake Balaton, degradation of some important tourist regions (e.g. Lake Velence, Bükk Mountains, soda lakes), deterioration of landscape elements and biodiversity loss. The future development of tourism in sensitive areas and the growth of transport infrastructure will increase the fragmentation of ecosystems.

Particularly strong pressures on nature are exerted by building activities on the shores of Lake Balaton and by urban and industrial development in the Sajó Valley. The *most threatened habitats* are the mixed oak-elm-ash forests of large rivers, marshland, bogs, grassland (loess and humid) and salt steppes. Regarding wetland habitats, the greatest threats are the drying up of these habitats and pollution resulting from human activities. Several water bodies have remained in place over time on the plains, preserving elements of their aquatic life. However, many bog meadows and bogs are subject to eutrophication.

2. Responses

Objectives

The *National Environmental Programme* 1997-2002 includes objectives specific to nature conservation and landscape protection (National Nature Conservation Master Plan):

– establish a network of national parks, and a *national ecological network* consistent with the Pan-European Ecological Network;

– survey all *protected areas* and prepare management plans. The proportion of protected areas should reach 11 to 12 per cent of the national territory;

– increase *forest cover* to 20 per cent (25 per cent in the longer term), and the area of native forest species to 12 per cent;

– increase *forest biodiversity*, including in regard to the age composition of species;

– establish a *gene bank* supervised by nature conservation authorities;

– adopt an action programme for *landscape protection*;

– adopt an action programme for *protection of caves*.

The NEP also defines nature and biodiversity conservation, as well as protection of soil and water, as explicit goals in agriculture.

Legislation

Nature conservation and forest management have *long been regulated in Hungary*. The first Forestry Act dates to 1791. The first comprehensive legislation on nature conservation was established in 1935 with the Forest and Nature Conservation Act. This Act provided for the delineation and protection of nature reserves and, more generally, aimed at protecting native forests by regulating forestry activities. Since 1961, nature conservation has been subject to specific regulations, including those setting up various categories of protected areas. In 1982, more than 400 species were put under legal protection and caves in need of strict protection were identified.

Hungary's nature conservation legislation has developed rapidly since the mid-1990s. The *1996 Nature Conservation Act* is based on the 1994 National Environment and Nature Protection Concept and refers to all natural values and areas. The 1996 Act on Forests and Forest Protection, and the 1996 Act on Protection of Game, Game Management and Hunting identify actions needed to conserve biodiversity. The 1994 Agricultural Land Act states that consideration must be given to the protection of Hungary's natural and semi-natural areas, e.g. residual vegetation patches, natural water bodies, geomorphological formations, etc. It also requires farmers to protect land from erosion and acidification. The Nature Conservation Act will undergo some amendments in order to fully transpose the relevant EU directives.

Institutional framework

At the central government level, the National Authority for Nature Conservation is part of the *Ministry for Environment* and counts with 40 employees. At the regional level, there are nine National Park Directorates (NPDs); each has its own administration (a total of 500 employees) which implements management plans and supervises both protected and unprotected areas of high natural value. The *forestry administration*, supervised by the Ministry of Agriculture and Regional Development, has ten regional Directorates. The *Ministry of National Cultural Heritage* (MNCH) has inspectorates in each county. A number of *research institutes* provide data and information on nature conservation and forestry.

Currently, some 50 000 volunteers take part in several hundred *non-governmental organisations* involved in nature conservation. This reflects a strong interest in preserving the country's natural heritage.

The *ownership structure for forests* has changed considerably in recent years due to the land privatisation process. About 60 per cent of forest land (1.1 million hectares) is under various forms of state ownership, less than 1 per cent is owned

by municipalities and nearly 40 per cent (700 000 hectares) belongs to private individuals. There are some 300 000 private owners.

Protected areas

In Hungary, there are protected areas of national and local significance (Table 5.2). About 845 000 hectares (or 9 per cent of the national territory) benefit from some type of *legal protection* (Figure 5.1).

The area under legal protection has significantly increased since the mid-1970s (Figure 5.2). In 1997, four new *national parks* were established (Duna-Dráva,

Table 5.2 **Protected areas,** 1999

	Year First established	Ministry [a]	Number of sites	Surface area (ha)	Surface area (%)
National parks	1973	ME	9	440 840	*4.7*
Protected landscape areas	1951	ME[b]	37	341 700	*3.7*
Nature reserves	1939	ME	145	26 400	*0.3*
Natural monuments	1991	MNCH	1	–	–
Protected natural areas of local significance	1975	LG	1 067	36 000	*0.4*
Total			1 259	844 940	*9.1*

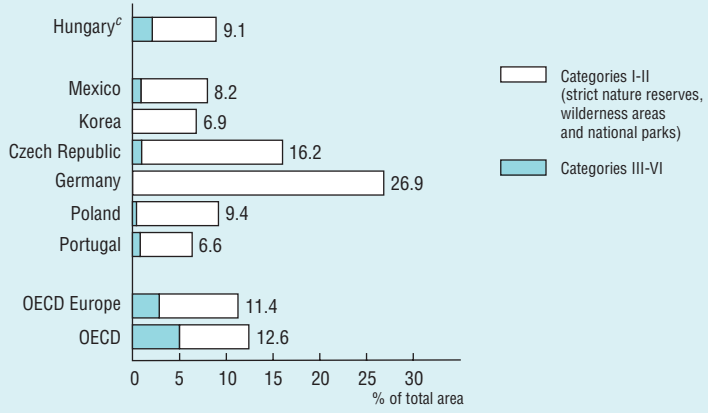
a) ME = Ministry for Environment; MNCH = Ministry of National Cultural Heritage; LG = Local government.
b) Shared competence with the Ministry of Agriculture and Regional Development (forestry administration).
Source: ME.

Table 5.3 **Land use in nationally protected areas,** 1999
(%)

	National parks	Protected landscapes	Nature reserves	Total
Forests	39	55	41	46
Meadows and grasslands	29	22	28	26
Arable land	11	15	6	12
Land set aside from agriculture	14	6	10	11
Reeds	3	–	5	2
Fish ponds	2	1	8	1
Vineyards	2	–	1	1
Gardens	–	1	1	1
Total	100	100	100	100

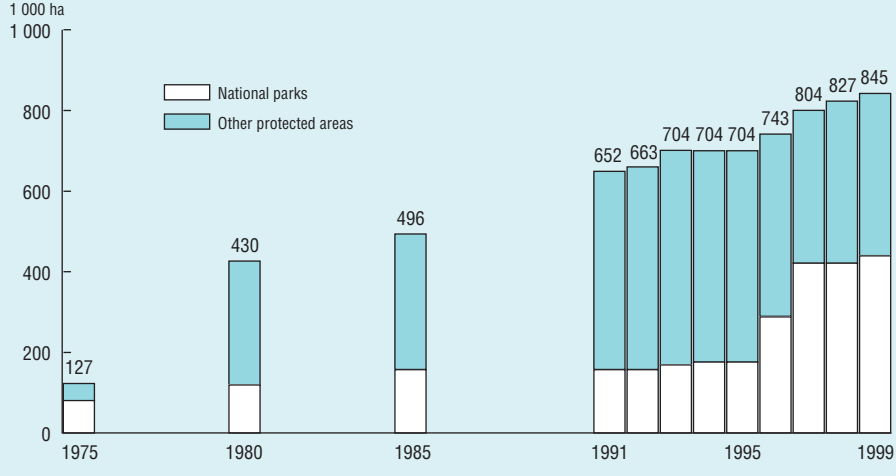
Source: ME.

Figure 5.1 **Major protected areas,**[a] 1998[b]



a) IUCN management categories; national classifications may differ.
b) Or latest available year.
c) National data.
Source: ME; IUCN; OECD.

Figure 5.2 **Trend in protected areas**, 1975-99



Source: ME.

Körös-Maros, Balaton-Felvidék, Duna-Ipoly) and new areas were added to existing parks (Hortobágy, Kiskunság, Bükk, Aggtelek, Fertó-Hanság). However, only 18 per cent of the total area of the nine national parks is under strict protection and there are often conflicts with farmers, hunters and forest owners.

Many *protected areas of national significance* are located in forest ecosystems (Table 5.3). Protected areas also include remnants of the Hungarian "puszta steppe vegetation" in eastern Hungary, protected in the Kiskunság, Körös-Maros, Hortobágy and Fertó-Hanság National Parks, and Lake Balaton in the western part (in the area where mountainous landscape formed by volcanic activity is protected in the Balaton Uplands National Park). The valleys of the Danube, Tisza and Dráva are extremely important corridors for the migration of species and still have (despite substantial changes) high natural values. In the Danube Valley and surrounding areas, the Duna-Dráva and Duna-Ipoly National Parks have been established.

Local authorities are very active in nature conservation. Since 1990, on the basis of the Self-Government Act, they have established about 1 100 *protected areas of local significance*.

Hungary has numerous *karstic caves*; all (3 265) are protected, including in Budapest. The Aggtelek cave system comes under national park jurisdiction. Some other rare geomorphological and historic sites are also protected, including bogs and grave mounds.

Habitats outside protected areas

The rapid impoverishment of floral meadows, especially over the last 20 to 25 years, is one of the most striking sign of biodiversity loss and is related to the disappearance of traditional meadow farming in mountainous and hilly regions. Nevertheless, several valuable wildlife habitats remain, and in some areas centuries-old *farming practices* known as "mild farming" continue. More recently, the Ministry of Agriculture and Regional Development has launched, in co-ordination with ME, an ambitious agri-environmental programme in which various schemes have specific nature conservation objectives. These include wildlife habitat restoration and development and the provision of favourable conditions for nesting of important bird species.

Hungary decided to keep more than half of its *forests* in public ownership, with the aim of conserving biodiversity and making a wide range of goods and services available to society through multiple use. An equally important task has been to establish a private sector that adheres to sustainable forest management. These complementary goals have been included in the 1996 Act on Forests and Forest Protection, which also stipulates that afforestation programmes shall be carried out

primarily with indigenous species and in a composition corresponding to natural types of Hungarian forests.

Environmental impact assessments are important to maintain habitats affected by human activities. EIAs are compulsory for agricultural development projects (e.g. new or expanded drainage systems, new channels and dikes) larger than 500 hectares. They are also required for the building of reservoirs with a capacity greater than 700 000 cubic metres and dikes over two metres high. Water projects involving more than 1 000 hectares in lowland areas and more than 500 hectares in hilly ones are subject to EIA.

Protected species and hunting

All threatened species are legally protected, and 10 per cent are strictly protected. Protection measures concern one-third of vertebrates (161 species) and fishes (26 species), more than 400 species of invertebrates (mostly insects), 495 vascular plant species and 20 species of mosses (Table 5.1). Introduction of non-native species is also regulated. The number of *protected species* has increased regularly over the last 15 years (Table 5.4).

Hunting is an important traditional activity in Hungary: the first hunting regulation dates back to 1348. The 1996 Act on Protection of Game, Game Management and Hunting puts a strong focus on wildlife protection, particularly through sustainable hunting plans. In forests, mainly five large game species are hunted: red deer, fallow deer, roe deer, moufflon and wild boar. Smaller game species and birds are hunted in the open (hare, pheasant). There are around 50 000 registered hunters and many occasional hunters, including from other countries. Hunting is supervised by the

Table 5.4 **Trends in numbers of protected species,** 1985-97

	1985	1991	1997
Plants protected	340	415	515
(*of which*, strictly protected)	30	31	52
Animals protected	571	619	855
(*of which*, strictly protected)	34	46	84
Total species protected	911	1 034	1 370
(*of which*, strictly protected)	64	77	136

Source: ME.

county offices of the Ministry of Agriculture and Regional Development. Hunting districts cover nearly all the national territory. The right to hunt on private agricultural land must be obtained through a lease agreement with the landowner.

Expenditure

In 1998, *expenditure on nature conservation* (investment and development projects) by the Ministry for Environment was around HUF 500 million. This did not include expenditure incurred by local governments in protecting areas of local significance, or voluntary contributions such as grants by organisations involved in nature conservation to promote ecotourism. In 1998, expenditure on forestry by the Ministry of Agriculture and Regional Development was HUF 6.1 billion. Forty per cent of afforestation expenditure is covered by budgetary sources.

Financial support for nature and biodiversity conservation has also been provided by the *European Union* through pre-accession funds. In 1999, EUR 1 million was granted to Hungary by PHARE for preparations towards implementation of the EU habitats directive. Upon accession, Hungary is likely to receive much higher financial support from the EU, particularly for the establishment of the Natura 2000 network, the LIFE programme and SAPARD (agri-environmental measures).

International agreements

Since the end of the 1970s, Hungary has become a party to all relevant *international conventions on nature conservation*: the Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat (1979), the Bonn Convention on the Conservation of Migratory Species of Wild Animals (1983), the Paris Convention concerning the Protection of the World Cultural and Natural Heritage (1985), the Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1985), the Bern Convention on the Conservation of European Wildlife and Natural Habitats (1989), the London Agreement on the Conservation of Bats in Europe (1994), the Rio Convention on Biological Diversity (1994) and the Hague Agreement on the Conservation of African-Eurasian Migratory Waterbirds (1996).

Protected *natural areas of international significance* include 25 Ramsar sites (covering nearly 150 000 hectares), five UNESCO Man and the Biosphere reserves (covering about 130 000 hectares, with nearly 6 000 hectares of core areas) and four World Cultural and Natural Heritage areas (cave system of Aggtelek Karst-Slovak Kras, Hollókó, historical buildings of Buda Castle, Pannonhalma). The global significance of Hungary's cultural landscapes, as recognised by UNESCO, and their tourism value give their protection a high priority. National

implementation of the Council of Europe's Pan-European Biological and Diversity Strategy, adopted in Sofia in 1995, has commenced.

Hungary takes part in international initiatives in the field of establishment and expansion of *information systems*, including the CORINE-Biotope Programme and the UNEP/GEF Clearing House Mechanism. A National *Biodiversity* Strategy (and associated Action Plan) is about to be completed before submission to the Cabinet for approval. Its aim is to provide a long-term nature protection concept at national and local levels.

3. Environmental Performance

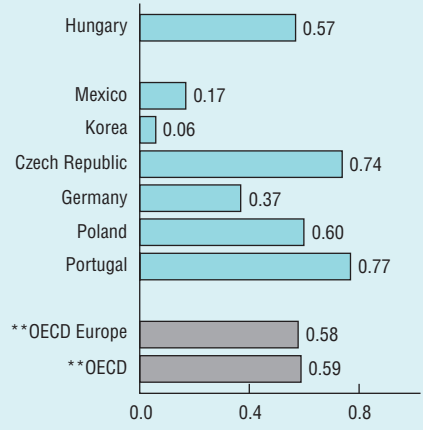
Nature conservation has a *long tradition* in Hungary. During the transition period, overall pressures from agricultural activities have decreased while new pressures are emerging related to transport and tourism infrastructure development. Implementation of recently developed legislation on nature conservation, forestry and hunting has brought about substantial progress in ecosystem and species protection, although there are areas in which progress still needs to be made.

Ecosystem management

The forest cover has increased by 600 000 hectares over the past 50 years and is expected to increase by another 150 000 hectares in the future. Forest management is based on sustainable yields, as can be seen from the intensity of use of forest resources (harvest/growth), which is around 0.5 (Figure 5.3). The *number of protected areas*, essentially located in forest ecosystems has *increased steadily* over the last 25 years (Figure 5.1). The State nature conservation system (national parks, protected landscapes, nature reserves) is complemented by the active involvement of local governments, which have established about 1 100 local protected areas. Good progress has been made, as 9 per cent of Hungary's territory is currently protected (Figure 5.1). These significant efforts should be continued, in order to meet the NEP 2002 target of protecting 11 to 12 per cent of the national territory.

Current *uncertainties of ownership* resulting from the privatisation process have slowed down the process of designating protected areas. Most of the protected areas and areas proposed for protection are State-owned, and there are often conflicts with the interests of farmers, hunters and forest owners. Some protected areas have been leased to State farms and State forestry companies. For example, an experiment in preserving ancient livestock breeds was established at the Hortobágy Nature Conservation and Gene Preservation Public Utility Farm,

Figure 5.3 **Intensity of use of forest resources,**[a] late 1990s



a) Harvest divided by productive capacity (measured as annual growth).
Source: OECD.

which uses large areas of the Hortobágy National Park. The areas which are not under strict protection (87 per cent of total protected areas) should be given special managerial attention.

The National Environmental Programme's key objective of establishing *a comprehensive network of protected areas remains to be achieved*. The ambitious programme initiated to establish the National Ecological Network (NECONET) should be given high priority. This programme should be designed in connection with the Pan-European Ecological Network.

Species protection

Hungary's natural flora and fauna have undergone considerable transformation over time, and *long-term decline in biodiversity* is still under way. Changes in land use, economic and urban development, and even some types of afforestation threaten the survival of many animal and plant species. There is an urgent need to finalise the National Biodiversity Strategy and implement the related action plan.

However, *outstanding successes have been achieved* in the protection of some animal species and groups, such as birds of prey. There are newly reappear-

ing or reintroduced species (beaver, lynx, wolf). Despite substantial pressures exerted over time by agricultural drainage, fragments remain of unique steppe flora and fauna which cannot be found elsewhere in Central Europe. In large part, this relates to extensive forms of human intervention, in particular on agricultural land and in forests. It is also possible to find wild species of fruits, vegetables, medicinal plants and fodder.

Implementation of nature conservation objectives

Hungary has a *well established nature conservation administration*. The increasing involvement of local governments and environmental NGOs is to be encouraged. Hungary takes part in international initiatives related to development of information systems, and increasing attention is given to inventorying the most valuable natural sites.

Spatial planning is well developed, but priority should be given to developing an effective system of land-use planning and control, particularly to reinforce nature and landscape conservation efforts outside protected areas. *Better integration of nature conservation objectives in agricultural, regional development, transport and tourism policies* is paramount, especially since land is being privatised and landowners are often demanding compensation for any constraint on the exercise of their property rights.

Part II

INTEGRATION OF POLICIES

6

ENVIRONMENTAL AND ECONOMIC POLICIES

1. Towards Sustainable Development

Economic development and the environment

Legacy of central planning and economic transition after 1989

After the Second World War, the Hungarian economy operated under *central planning* with allocation of resources regulated by the National Planning Office. Industrial production was mainly based on State orders, and most agricultural production was purchased at controlled prices. A tightly controlled trading regime used export and import licensing. The 1968 "New Economic Mechanism" included elimination of centrally determined targets, decentralisation of some decision-making to enterprises, and profit-oriented incentive schemes. Investment booms in the 1970s were intended to boost convertible currency exports, while Hungary took the view that higher oil prices resulting from the oil crises would be temporary and did not call for major domestic oil prices adjustment. These policies resulted in social peace, full employment and slowly rising living standards. By the end of the 1980s, however, Hungary had the highest foreign debt per capita in Central and Eastern Europe and its economy used 40 per cent more materials and energy per unit of GDP than OECD countries. These *inefficient production patterns* had negative effects on the environment.

By the end of the 1980s, Hungary had begun the *transition to a market-based economy*, including price and trade liberalisation, a major tax reform introducing VAT and personal income tax, and important steps towards privatisation. It had also initiated political reforms. Hungary's *economy contracted in the early 1990s*. Industries such as steel, construction and engineering suffered badly. From 1993, exports deteriorated sharply; in 1994, the budget deficit rose to 7.5 per cent of GDP. In 1995, the government adopted a *national modernisation plan*. Further enterprise restructuring, the privatisation process, and a large inflow of foreign

direct investment have helped Hungary redirect its trade and continue to service its foreign debt. Price and trade liberalisation, cutbacks in subsidies, and budgetary reform have supplemented previously initiated tax and legal reforms, thus helping to improve the general economic climate. Inflation in the 1990s has been relatively low, compared with other countries in transition (Table 1.2).

Price liberalisation started in 1988. Oil product prices were liberalised in 1991, LPG and coal prices in 1992. Some prices nevertheless continue to be regulated, such as those of natural gas, electricity, heating and, in some municipalities, drinking water. This situation is evolving with the privatisation of the gas and electricity industries. The very high level of *subsidies* to industry has been eliminated. Support to agriculture, measured as Producer Subsidy Equivalent, has also declined steadily and is now less than half the OECD average. Prices of some agricultural commodities (feed maize, wheat, milk, live cattle and pigs for slaughter) are still supported through minimum guaranteed prices, paid up to a production quota limit, with government purchases in the event of market instability.

Today Hungary has *an open economy.* Trade liberalisation is proceeding. Exports and imports of goods and services account for over 50 per cent of GDP (Figure 1.2); 80 per cent of trade (both exports and imports) is with OECD countries. The changes in Hungary's trading partners were much influenced by the privatisation process and high *foreign direct investment* (FDI) during the 1990s (Table 1.2). Restructuring programmes under the 1992 Bankruptcy Law have led to the closure of non-profitable companies and a shift to modern and more efficient technologies. FDI has contributed to the introduction of new and more environmentally friendly technologies. However, Hungary maintains a global quota on a wide variety of consumer goods, from household detergent to cars. The agro-food industry still benefits from import tariffs and export subsidies, and quantitative export licenses are used to stabilise domestic markets.

Privatisation has been a key element of Hungarian industrial policy. Overall, 85 per cent of GDP is now generated by the private sector. Private ownership accounts for 60 per cent of subscribed capital, but only 10 per cent of electricity, gas and water supply and less than 40 per cent of transport and communications. Privatisation has been based mostly on negotiations with potential buyers, auctions and management-worker buy out, rather than on mass privatisation. It has been slow for State farms and mixed for the food industry. An aspect of privatisation that causes some concern is the increasing ownership role of the still State-owned banks.

Economic and environmental trends

Hungary's *GDP* decreased by 15 per cent over the period 1990 to 1993 and then increased, returning to the 1990 level (Table 6.1). *Industrial and agricultural*

activity followed a similar pattern although agricultural output is not yet back to its 1990 level. Since 1990, total final *energy* consumption has decreased due to the overall stagnation of industrial production and the fall in agricultural production, partly offset by the rise in consumption by households (electricity and gasoline). *Road freight traffic* has evolved in line with GDP and road traffic remains below the OECD average (in veh.-km per capita terms).

Air pollutant emissions (SO_x, NO_x, CO_2) decreased significantly, mainly as a result of the fall in industrial production in the early 1990s (23 per cent decline over the period 1990 to 1993). However, SO_x emissions per unit of GDP are still nearly four times the OECD average, those of CO_2 are 13 per cent higher, while those of

Table 6.1 **Changes in GDP, sectoral trends and environmental pressures**
(%)

	1990-93	1993-97	1990-97
Selected economic trends			
GDP[a]	–15.3	10.4	–6.5
Population	–0.7	–1.2	–1.8
GDP[a]/capita	–14.7	11.7	–4.7
Agricultural production	–26.4	9.4	–19.5
Industrial production (ISIC 2 + 3 + 4)	–23.4	31.7	0.9
Total primary energy supply	–11.7	0.7	–11.1
Energy intensity (per GDP)	4.3	–8.8	–4.9
Total final consumption of energy	–18.0	–0.4	–18.3
Road freight traffic[b]	–11.7	12.8	–0.5
Road passenger traffic[c]	2.1	–10.0	–8.1
Selected environmental pressures			
CO_2 emissions from energy use	–10.4	–4.5	–14.5
Emissions of SO_x[d]	–25.0	–13.3	–35.0
Emissions of NO_x	–22.7	7.3	–17.0
Emissions of CO	3.8	–9.4	–6.0
Water abstraction[e]	5.5	–9.5	–4.5
Municipal waste[f]	–1.7	15.4	13.4
Nitrogenous fertiliser use	–57.5	88.7	–19.8
Phosphate fertiliser use	–81.1	211.8	–41.1

a) GDP at 1991 prices and PPPs.
b) Based on values expressed in tonne-kilometres.
c) Based on values expressed in passenger-kilometres.
d) SO_2 only.
e) Data refer to 1996 and not 1997.
f) Municipal waste: refer to collected and transported amounts.
Source: OECD; ME; HCSO.

NO_x are equivalent. Total primary energy supply decreased by 11 per cent and energy intensity per unit GDP has therefore also declined, although it is still 20 per cent higher than the OECD average.

In the 1990s, *municipal waste* has increased by 13 per cent, in contrast to the fall in GDP, and is now equivalent to the OECD average (in per capita terms). Annual production of industrial waste has drastically decreased and is now equivalent to the OECD average. *Water withdrawal* has decreased, and water use intensity is well below the OECD average.

In the 1990s, agricultural production decreased by 20 per cent, while *pesticide* use also declined by 70 per cent and *nitrogenous fertiliser* use by 20 per cent. The application rate of nitrogenous fertilisers is now equivalent to, and intensity of pesticide use below, the OECD average.

Overall, *decoupling from GDP* has occurred for SO_x emissions, for water withdrawal and for the use of agro-chemicals. Weaker results (CO_2 and NO_x) and even negative trends (municipal waste) are to be noted. Given the present growth prospects, these *results in eco-efficiency* need to be consolidated and expanded, with particular attention to energy, industry and transport sectors, and to production and consumption patterns.

Production and consumption patterns

Increases in *water prices* have led to a strong decrease (by a third since 1990) in household water consumption, which is among the lowest in the OECD area. Private car ownership, half of the OECD average, is growing. Changes in *energy prices* are also influencing energy use by households (residential heating, transport). The quantity of household waste is growing. Organic and integrated farming are increasing.

A national voluntary programme of *eco-labelling*, called "Environmentally Friendly Product", was introduced in 1994 for a variety of goods (excluding raw materials, food products and pharmaceuticals). The programme is supervised by the Ministry for Environment; more than 100 products have been awarded an eco-label so far. A fee for use of the logo is to be paid (0.2 per cent of the net income from the labelled product). The 1995 Public Procurement Act allows the inclusion of environmental claims in tendering conditions to require "environmentally friendly products" although it is not compulsory.

Economic development and strategic environmental planning

The strategic goals of the *government's economic policy* are defined in the Government Programme. The 1994 to 1998 Government Programme stressed that economic growth should not be accompanied by further deterioration of the

natural and built environment. To that end, environmental liabilities must be clearly defined in the privatisation process, integrated economic, social and environmental planning must be developed in the context of regional development, and action programmes must be worked out in environmentally sensitive regions.

Hungary's first *National Environmental Programme* (NEP) was adopted by Parliament in 1997. The NEP covers a six-year period (1997 to 2002), and its basic objectives are to reduce harmful environmental impacts, preserve natural values, and create the conditions for a harmonious relationship between economic development and environmental protection in the framework of sustainable development. Specific quantitative objectives are set for protection of environmental media (air, water, soil), the built environment (human settlements, human health), nature and landscape, as well as special environmental issues (waste management, noise and vibration abatement, environmental safety). The NEP takes into account relevant international environmental policy action plans and programmes, such as the Environmental Action Programme for Central and Eastern Europe, the EU Fifth Action Programme and the Agenda 21.

The NEP promotes co-ordination of environmental protection with regional development. It introduces concepts, plans and action programmes for economic sectors such as energy, industry, transport, agriculture, forestry and game management and other services (trade, tourism, water management). It provides a *strategic framework* implementing environmental policies, with an emphasis on sustainable development, the precautionary and prevention principles, partnership and an "owners" attitude at central and local levels. It identifies areas requiring special measures: Budapest and large industrial regions such as the North Transdanubia industrial area and the Sajó Valley (air, water and soil pollution, waste disposal), Lake Balaton (water quality) and the Great Plain (lack of water). An annual NEP action plan was prepared for 1998 and 1999 by the Ministry for Environment and adopted by the Government.

Mechanisms for promoting institutional co-ordination and co-operation

The *Ministry for Environment* is in charge of co-ordinating of national and international environmental activities (Chapter 1). Many *other ministries* have environmental protection responsibilities (Figure 1.3). These include the Ministry of Transport, Communication and Water Management (water resource management); the Ministry of Health; the Ministry of Agriculture and Regional Development (soil protection and forest management); the Ministry of Interior, which supervises municipalities; the Ministry of Economic Affairs (mineral resources and mining); and the Ministry of National Cultural Heritage.

Environmental protection (12 regional inspectorates), water management (12 regional directorates), nature conservation (nine national park directorates)

and state forest management (10 directorates) are dealt with at the regional level (with different regional distribution, except for environmental protection and water management). National cultural heritage protection, plant and soil protection, and health services are administered in each of the 19 counties. There is no mechanism to promote *local and regional environmental co-ordination* other than at the initiative of municipalities. An advisory board to local authorities was created for the protection of Lake Balaton, with representatives of the municipalities surrounding the lake and researchers (Balaton Development Council).

Although the Ministry for Environment has primary responsibility for strategic environmental planning, experts from various ministries, research institutes and the private sector are invited to discuss policies related to a particular sector, including through the establishment of *interministerial committees*. The *National Environment Council* is a government advisory body. Although its origin dates to 1974, its membership, operations and functions have changed over time and have been redefined in the 1995 environmental protection act. The Council is now made up of equal shares of leading scientists, business sector representatives and environmental NGOs; the Minister for Environment co-chairs the monthly meetings *ex officio*. The Council's opinion is published in the Official Gazette of the Government; in the case of lack of consensus, both majority and minority opinions are published. The Environment Committee of Parliament and the Environmental Policy Adviser in the Prime Minister's office also contribute to integration.

Economic impacts of environmental policies

Public and private environmental expenditure

Hungary's *pollution abatement and control (PAC) expenditure* accounted for 1.25 per cent of GDP in 1997, or approximately HUF 106 billion (Table 6.2). PAC expenditure as a share of GDP is equivalent to that in other OECD countries, but it has a much lower per capita share (with USD 124 per capita). Overall, 60 per cent of the expenditure is on waste water treatment, 28 per cent on waste management and 5 per cent on air management. Investment expenditure represents 0.72 per cent of GDP and mainly relates to end-of-pipe technology (72 per cent) and, to a lesser extent, integrated pollution prevention and control (28 per cent); operational expenditure is about 0.5 per cent of GDP. However, this later figure is underestimated as it excludes industries' own waste water treatment facilities and treatment plants operated by municipalities (without concessions to water companies). When these are added, operational expenditure is likely to be above 0.7 per cent of GDP. Thus *PAC expenditure reached about 1.5 per cent of GDP* in 1997.

From the early 1990s, *PAC investment* has remained within a range of 0.6 to 0.9 per cent of GDP. Expressed as a proportion of total investment, it was about

3 per cent in 1997 (compared with 1 to 3 per cent in other OECD countries). In recent years, public and business expenditures on PAC investment have been roughly equivalent. Municipalities make most of the investment in water pollution control, while most end-of-pipe investment for waste management comes from companies (Table 6.3).

Total environmental expenditure (i.e. PAC expenditure plus nature protection and water supply expenditure) reached about 1.7 per cent of GDP in 1997. According to the National Environmental Programme (NEP), *environmental expenditure is planned to increase* annually by 15 per cent over the period 1997 to 2002, reflecting Hungary's stated intention to implement rapidly all EU environmental directives.

Financing of public expenditure

The *national budget* provided HUF 52.5 billion in 1997 for various pollution abatement and control projects, as well as for measures related to drinking water, flood control, remediation of contaminated sites, nature conservation, and agriculture (Table 6.4). The overall level of public subsidies is relatively small. Out of HUF 106 billion PAC expenditure in 1997, HUF 31.5 billion (or 30 per cent) is not paid by polluters.

Table 6.2 **Pollution abatement and control expenditure**, 1997
(HUF billion current)

	Investment expenditure	*of which:* end of pipe (%)	Operational[a] expenditure	Total expenditure	Share in total PAC (%)	Share in GDP (%)
Water protection	43.4	*73*	24.5	67.9	*64*	*0.80*
of which:						
Waste water treatment	39.3	*72*	24.5	63.7	*60*	*0.75*
Soil and groundwater	2.7	*80*	..	2.7	*3*	*0.03*
Surface water protection	1.4	*100*	..	1.4	*1*	*0.02*
Waste management	9.9	*88*	19.4	29.3	*28*	*0.35*
Air protection	4.8	*48*	..	4.8	*5*	*0.06*
Noise protection	1.6	*48*	..	1.6	*1*	*0.02*
Other	2.2	*52*	..	2.2	*2*	*0.03*
Total PAC expenditure	61.8	*72*	43.9	105.7	*100*	*1.25*

Note: 1% GDP = HUF 84.52 billion in 1997.
a) Current expenditure of providers of environmental services (firms with more than 10 employees).
Source: HCSO.

Most of the national environmental budget originates from central government revenues. Environmental revenues from local governments remain insignificant. The share of earmarked funds has doubled since 1991, in particular with the introduction of environmental product charges in 1995; they now account for 40 per

Table 6.3 **Pollution abatement and control investment by sector,** 1996
(HUF billion current)

	Water protection	Waste management	Air protection	Other[a]	Total
Total PAC investment	27.9	7.1	3.3	2.8	41.0
of which:					
Public sector	20.5	1.0	0.2	0.6	22.2
Business sector	7.4	6.1	3.1	2.2	18.8
of which:					
Agriculture, hunting, fishing, forestry	0.2	0.0	0.0	0.0	0.3
Mining and quarrying	0.0	0.1	0.0	0.0	0.1
Manufacturing industry	1.9	0.9	2.4	0.7	5.9
Electricity, gas and water	1.3	2.6	0.1	0.5	4.6
Other	4.0	2.5	0.5	1.0	8.0

Note: 1% GDP = HUF 68.45 billion in 1996.
a) Includes noise protection.
Source: OECD; HCSO.

Table 6.4 **Environmental expenditure in the national budget,** 1997
(HUF billion current)

Central government	21
Central Environmental Protection Fund	8
Water Fund	2.5
Subtotal: PAC expenditure[a]	*31.5*
Drinking water	12
Flood control	2
Former Soviet military bases[b]	1
Nature conservation	3.1
Agri-environment payments[c]	0.7
Protection of soil and groundwater	2.2
Subtotal	*21*
Total	52.5

a) PAC = Pollution abatement and control.
b) Clean-up of contaminated sites.
c) Support for organic farming, payments for environmental protection and for environmental sowing systems.
Source: HCSO.

cent of total environmental revenues. The *central government budget* provides support for various environmental investments, mainly for combating water pollution and, increasingly, for nature conservation. In recent years, support has been given to nature conservation (50 per cent), municipal water treatment (25 per cent), groundwater protection (about 20 per cent), air pollution control, and protection against noise and soil contamination (about 1 to 2 per cent each). Small amounts were allocated to waste management.

Earmarked funds are created to channel earmarked public revenues for specific purposes. The *Central Environmental Protection Fund* (CEPF), established in 1991, is mostly financed by environmental product charges and, to a lesser extent, revenues from privatisation, fines, loans, PHARE grants, mining charges and, from 1998, revenues from historical buildings (Table 6.5). Environmental product charges on motor fuels account for half of CEPF revenues. The CEPF receives 70 per cent of the revenue from environmental fines, the remaining 30 per cent going to local governments which are not required to spend it for environmental purposes. Use of the fund is through grants, interest-free loans, interest payment support and loan guarantees. At least 75 per cent of the revenue must be spent in the form of environmental protection investments, 2 to 5 per cent set aside for accidents and environmental emergencies, and the rest for environmental tasks of

Table 6.5 **Central Environmental Protection Fund,** 1993-97
(HUF billion current)

	Revenues[b]	Expenditure[b]
Water	1.2	5.7
Air	2.1	7.5
Noise	0.1	0.5
Waste	0.2	3.2
Nature and landscape	0.0	3.0
Product charges	31.4	
Mining royalties	4.3	
Environmental tasks of public interest[a]		5.3
Clean-up after accidents		2.2
Environmental education		0.6
Other	6.2	3.6
Total	45.5	31.6

a) Includes monitoring, R&D, protection of built and natural environment, public awareness, tasks related to international treaties, support to NGOs.
b) Total over the period 1993 to 1997.
Source: HCSO.

public interest (monitoring network, education, research, raising awareness). The proposed introduction of water effluent and air emission charges could substantially increase the fund's revenue.

Besides the CEPF, *other funds* provide support for environmental protection projects. The Water Management Fund collects its revenue from the water abstraction fee and supports municipal waste water treatment and sewerage construction, while the CEPF focuses on industrial sewage treatment. The Water Fund also contributes to water supply and flood control infrastructure. Some Agricultural Funds assist farmers in organic farming, liming of acid soils, and farm nutrient and soil conservation management. The Forestry Fund, raised from forest land-related fees and fines, aims at forest rehabilitation. The Regional Development Fund can support environmental actions in disadvantaged areas. Since 1999 (1996 for the Agricultural and Forestry Funds), all the earmarked funds have been integrated into the central government budget.

Since 1997, the amount that can be spent on environmental protection obligations arising from privatisation appears in the Budgetary Act. In 1999, the *State Privatisation and Holding Company* may spend HUF 1 billion on remediation of former Soviet military bases, HUF 1.5 billion on financing environmental risks for which the liability cannot be transferred to entrepreneurs, and HUF 3 billion on financing environmental protection duties for which the state is liable as owner.

Foreign financial resources have played a relatively small role in environmental expenditure, accounting for EUR 67 million over the period 1990 to 1998. The main source has been the European Commission through the PHARE programme which, since the new orientation adopted in 1998, has mainly focused on institution building (Chapter 8).

Financing of private expenditure

Industry has played a major role in financing environmental improvements, based mostly on end-of-pipe technologies (less than 30 per cent of expenditure in 1997 was on technology innovation). Most of the HUF 18 billion in investments by the business sector were made by manufacturing industries – particularly chemicals, refineries, cement factories, machinery and food industries – and, to a lesser extent, electricity, gas and water companies.

Competitiveness and environmental technology

Several industries have given importance to environmental protection as part of technological development in order to *increase their competitiveness*, especially on international markets. The chemical industry has demonstrated the most active investment policy: environmental protection investments have been outstanding,

and the level of technology is above the national average. Considerable measures have also been taken in regard to technological development in the cement and brick producing factories. However, the technological level of the metallurgy and metal processing industries, and of pulp and paper factories, is becoming outdated and the resources needed to finance technological change have been uncertain. In years to come, a further decline in the mining industry can be predicted. However, the costs (including environmental costs) of closing down mining operations are considerable and there is thus some pressure to maintain production.

A key challenge for the future in industry will be to comply with EU environmental regulations. As harmonisation of legislation progresses, monitoring of implementation will create major *business opportunities*, for example to fulfil the need for accredited laboratories. A number of large companies have introduced environmental management systems (including EMAS and ISO 14001) as tools for promoting their activities. They are also examining compliance with the EU's 1996 Integrated Pollution Prevention and Control (IPPC) directive.

2. Instruments for Policy Implementation

Legal and administrative instruments

Legal framework

Since 1972, citizens' right to a healthy life and environment has been embodied in the Constitution (Chapter 1). The 1976 Act on the Protection of the Human Environment was the basic piece of environmental legislation until the *1995 Act on General Rules of Environmental Protection* introduced the basic principles of pollution prevention, precaution, environmental liability and right to information. Other important pieces of environmental legislation have subsequently been enacted (Table 1.3).

Compliance and enforcement

The 1995 environmental protection act has introduced pollution prevention measures, such as EIA, environmental auditing and environmental performance evaluation, which pave the way for *compliance with environmental legislation*. The National Inspectorate for Environmental Protection and Nature Protection, 12 Regional Environmental Protection Inspectorates and nine National Park Directorates are in charge of compliance/enforcement. The latter primarily define environmental protection obligations by issuing licences. Inspections may lead to issuance of a compulsory order and, if it is overlooked, to levying of fines. The National Inspectorate acts as second level appeal body for decisions taken by the inspectorates, and may act, in special cases, as first level appeal body.

In 1997, the *Regional Environmental Protection Inspectorates* (1 060 employees) delivered 11 200 licences, carried out around 10 000 inspections, issued nearly 1 700 compulsory orders and levied about 1 500 fines for a total of HUF 1.4 billion. Most fines were related to air pollution (mainly power plant emissions), water pollution from sewage discharge (1984 legislation) and hazardous waste (1996 legislation). Non-compliance with fines may lead to bringing the case to court. From 1990 to 1998, polluters were condemned in 88 per cent of 246 *court decisions*, of which 21 by the Supreme Court.

Enforcement of legislation is a serious problem. Emission and discharge levels are sometimes determined solely through reporting by the polluters themselves, without verification by the Inspectorates. *Fines are usually too low to provide incentives to cease violations*. There is little way to prevent repeated and continuous violations. Despite recent improvements, Inspectorates have inadequate resources for their important role in ensuring implementation of environmental policies.

Approximation with EU legislation

With the 1994 *European Agreement*, Hungary started approximation of its legislation with that of the EU. The 1998 to 2002 Government Programme has introduced a legislative harmonisation programme with the aim of achieving, by 2002, complete approximation beyond the 60 to 65 per cent of Hungarian environmental laws that already conform with EU legislation (Chapter 8).

Concerning *water*, the most important tasks are to develop communal sewerage and sewage treatment and comply with drinking water quality standards. For *air*, efforts should focus on introducing air quality standards, reviewing emission limits and developing an air quality monitoring system. In regard to *waste management*, much remains to be done. Draft government decrees on water quality and air protection and a draft waste management law are being prepared, but a transition period (whose duration is not yet fixed) will be needed for urban waste water treatment.

In the field of *industrial pollution control and risk management*, the major challenges will be: implementation of the IPPC directive, with an effectively coordinated permit system based on new principles, including BAT; putting in place of industrial risk analysis and prevention of industrial accidents, in accordance with the Seveso directive. Legislation on *nature conservation* is well advanced, although the allocation of future Natura 2000 territories and the establishment of management plans and monitoring systems will require significant effort.

The National Environmental Programme (NEP) estimates that Hungary will need to spend EUR 5 billion over the period 1997 to 2002 to satisfy the requirements of international environmental conventions and national programmes. It is

difficult to arrive at a satisfactory estimate of the overall cost of complying with EU environmental legislation, but it is clear that *substantial funding will need to be mobilised*. It is estimated that additional expenditure of EUR 10 to 15 billion would be needed representing an effort of 1 per cent of present GDP over 20 to 30 years (including more than EUR 4 billion to implement the urban waste water directive alone).

Financial assistance from the EU has so far been granted through the PHARE programme for institution building and, to a lesser extent, investment projects. Co-financing is being introduced through two main schemes: the Large Scale Infrastructure Facility (LSIF), with assistance from international bank institutions, and the Instrument for Structural Policy for Pre-Accession (ISPA), according to which EU grants may cover up to 75 per cent (85 per cent in some cases) of some investment costs.

Economic instruments

Charges

The government has established *several charges* relating to the environment, but there are not yet emissions or effluent charges. Existing charges include charges for use and abstraction of water, for waste collection and disposal, for mining and changes in use of agricultural land, and product charges (Table 6.6). There are no pollution charges. These charges mainly have a financing function. Charges are often used in association with regulatory instruments (fines), although they account for a much larger share of the revenue. In addition to water use and waste collection and disposal charges, 10 per cent of mining royalties as well as 30 per cent of the revenue from environmental fines go to municipalities. Until recently, part of total revenue went to the Central Environmental Protection Fund (CEPF), in particular product charges, 10 per cent of the mining royalties and 70 per cent of the environmental fines. In the recent past, the water abstraction charges were paid into the Water Management Fund, while until 1996 charges and fines related to land use went to the Land Protection Fund and the Forestry Fund. All these earmarked funds have now been integrated into the central budget.

For industry and in some cases households, *water abstraction charges* vary according to type of water (surface, ground) and region (higher rates in water-scarcity and water-polluted areas). The power sector is charged about half the base rate for industry. Abstraction charges for irrigation are lower in small networks supplied with pumped water, and higher in large systems supplied by gravity. Since 1992, revenue from water abstraction charges has decreased because water withdrawal has decreased, and also because the charge rate was not adjusted for inflation. For social reasons, maximum and minimum *water use charges* were introduced

Table 6.6 **Economic instruments**

Instrument	Rate[b]	Remarks[c]
Water		
Water abstraction charge	Households and small-scale industry: 1.15 HUF/m^3 (base rate) Large-scale industry: 3.50 HUF/m^3 (base rate) Irrigation: 0.5-12 HUF/m^3	Total income: HUF 4.2 billion. For households and industry, charges vary according to the type of water and the region, so that the effective rate ranges from 0.001 HUF/m^3 to 10 HUF/m^3. Revenue goes to the Water Management Fund.
User charge for public water supply	Households: 53-140 HUF/m^3 Industry: 53-604 HUF/m^3	Payment for service of municipal facilities. From 1995, maximum and minimum user charges have been introduced.
User charge for sewerage and sewage treatment	Households: 26.7-163 HUF/m^3 Industry: 26.7-866 HUF/m^3	Payment for service of municipal plants. From 1995, maximum and minimum user charges have been introduced.
Waste water fine[a]		Total income: HUF 374 million. For municipal and industrial sewage.
Sewer fine		Total income: HUF 761 million. For industrial discharge into the municipal sewerage system. Revenue goes to companies operating sewerage systems.
Air and noise		
Air pollution fine[a]		Total income: HUF 761 million. For stationary and mobile industrial and building emissions above limits.
Noise and vibration fine[a]		Total income: HUF 32 million.
Waste		
Municipal waste charge	Budapest: 1 545 HUF/m^3 Outside Budapest: 3 000-5 800 HUF/t (MSW); 2 600-4 700 HUF/t (industrial waste); 2 600-3 800 HUF/t (other waste)	Total income: HUF 14.5 billion (for the 5.4 million people serviced *i)* in Budapest and *ii)* by the Sanitary Alliance outside Budapest). Revenue goes to waste collection and treatment plant operators.
Waste disposal charge	Outside Budapest: 295-1 000 HUF/m^3 (MSW); 360-780 HUF/m^3 (industrial waste); 300-780 HUF/m^3 (other waste)	Total income: HUF 220 million. (Budapest waste collection company's disposal costs, excluding usage of its own sites for disposal). Revenue goes to landfill operators.
Hazardous waste disposal charge	Incineration: 60-80 HUF/kg (solid waste); 50-60 HUF/kg (liquid waste) Disposal: 45 000-160 000 HUF/t	Revenue goes to hazardous waste landfill operators and incinerator operators.
Hazardous waste fine[a]		Total income: HUF 212 million.

Table 6.6 **Economic instruments** *(cont.)*

Instrument	Rate[b]	Remarks[c]
Deposit refund system for beverage containers	20-30 HUF/glass bottle 28-65 HUF/plastic bottle	
Land, minerals and nature		
Charge for removal of land from agricultural production		Total income: HUF 780 million. Revenue goes to Land Protection Fund.
Fine for inadequate use of agricultural land		Total income: HUF 0.4 million. Revenue goes to Land Protection Fund.
Charge for removal of land from forestry use		Revenue goes to the Forestry Fund.
Soil protection fine		Total income: HUF 6 million. Revenue goes to the Forestry Fund.
Mining royalty		Total income: HUF 16.8 billion. 90% of the revenue goes to CEPF and 10% to local governments.
Nature conservation fine[a]		Total income: HUF 5 million.
Product charges		The revenue goes to CEPF.
Fuels	2.3-2.5 HUF/litre (gasoline and diesel) 69.90 HUF/kg (lubricating oil)	Total income: HUF 7.1 billion.
Packaging materials	2-10 HUF/kg	Total income: HUF 2.5 billion. Rate varies according to the type of packaging material (in ascending order: glass, paper and wood, metal, aluminium, plastic).
Tyres	35 HUF/kg (new tyres); 140 HUF/kg (imported used tyres)	Total income: HUF 2 billion.
Refrigerators and coolants	Refrigerators: 812.5-3 775 HUF/unit Coolants: 147 HUF/kg (HCFC/HCFC mix; 590 HUF/kg (imported, regenerated or regenerable HCFC/HCFC mix) 1 748 HUF/kg (imported, regenerated CFC/CFC mix)	Total income: HUF 349 million.
Batteries	45-63 HUF/kg	Total income: HUF 642 million.

a) 70% of the revenue goes to CEPF and 30% to local governments.
b) Data on rate refer to 1999.
c) Data on total income refer to 1997.
Source: OECD; ME.

in 1995. A *municipal waste charge* recently introduced in the largest cities covers about half the cost of waste collection and treatment. A *waste disposal charge* is imposed for depositing waste in landfills or in the Budapest municipal waste incinerator.

Since 1987, a one-off charge is applied in case of *use of arable land* for purposes other than agriculture. The 1994 Agricultural Land Act introduced an exception for arable land used for nature conservation or soil protection. Since 1994, a land use fine is used to discourage bad agricultural practices and a soil protection fine aims at preserving agricultural soil fertility (soil analysis is made compulsory prior to irrigation, liquid manure disposal, etc.). The amount of the soil protection fine per hectare relates to the income that would be obtained from a crop of high quality wheat at guaranteed prices.

The 1993 Mining Law established *charges on natural resource extraction* (including coal, oil and geothermal energy) to finance the cost of mine closure. Ninety per cent of the charge is transferred to the CEPF for landscape rehabilitation of closing mines, as well as to address environmental problems at mines still in operation. The maximum extent of support from CEPF is 60 per cent of the cost, half of which is non-refundable.

Product charges are paid by importers and wholesalers and go into the CEPF. Introduced in 1992, the fuel charge is 1 to 1.2 per cent of the price of gasoline and the revenue must be spent on reducing environmental damage from the transport sector. The 1995 Act on Environmental Product Charges introduced charges on other products, such as packaging materials, tyres, refrigerators and refrigerants, and batteries. A 50 per cent rebate is granted to eco-labelled products. Between 1993 and 1996, total revenue in real terms provided from product charges increased; it decreased in 1997 as the charge rates have not changed since 1995. However, positive waste management results have been registered from the application of product charges and the distribution of part of the revenues to assist in the collection of used batteries, old refrigerators, paper packaging materials and used tyres.

Deposit-refund scheme

Until the late 1980s, the deposit-refund scheme was widely used for packaging materials (with little success) and bottles (with a 70 to 80 per cent return rate). Since 1990, fixed refund charges have been replaced by charges negotiated between industry and retailers and the scheme only applies to some *glass and plastic bottles* (those which are economical to refill). The rate of deposit dropped considerably for glass bottles (less than 3 per cent for 0.75 litre wine and 6 to 8 per cent for beer), but is higher for 1.5 to 2 litre soft drink plastic bottles (30 to 40 per cent) due to higher refund charges.

In Budapest, a programme dealt specifically with *old vehicles* with highly polluting two-stroke engines. Public transport tickets were given to owners who give up their two-stroke vehicles (10 000 Trabants were exchanged for transport tickets under this programme in 1993).

Liability and insurance

In the initial period of privatisation, contracts for the sale of industrial sites either did not contain *environmental protection liabilities* and guarantees or, if they did, investors could be compensated for liability on a case-by-case basis. Subject to approval by the Ministry of Economic Affairs for sums exceeding HUF 500 million, privatisation agencies could either deduct clean-up costs from the purchase price or undertake to reimburse site clean-up costs for pollution identified within four years of the sale. Since 1995, both the environmental protection act and the act on the sale of state property include the obligation to reveal and restore any environmental damage. Unresolved environmental problems with properties privatised before 1995 are now being dealt with in the framework of the Hungarian Environmental Clean-Up Programme. The 1996 Act on Corporation and Dividend Tax authorises tax rebates for sums devoted by companies to cover environmental liabilities. There is no compulsory *insurance* system, except for the transport of hazardous products.

Fiscal instruments

Environment-related taxes mainly relate to excise taxes on gasoline and vehicle taxes (Table 6.8). On the whole, these fiscal measures provide much higher revenues than total environmental investment.

The *taxation rate for fuels* is among the highest in OECD Europe for diesel fuel, but it is among the lowest for unleaded gasoline. Prices of gasoline and diesel fuel are high compared with other transition countries, although 25 per cent lower than the OECD Europe average (Table 2.3). There is a differentiation between *excise taxes* on leaded and unleaded gasoline (Table 6.7). Three per cent of the revenue of the excise taxes on fuels and other energy products for transport purposes are earmarked for environmental purposes (28.7 per cent are earmarked for construction and maintenance of motorways).

A 50 per cent refund of the *vehicle tax* is granted for cars with built-in catalytic converters (75 per cent for cars subsequently equipped), combined freight transport (up to 80 per cent refund), lorries fulfilling the Euro 1 and Euro 2 environmental protection norms (up to 75 per cent refund) and electric and gas vehicles. Forty per cent of the revenue from the vehicle tax (100 per cent for foreign vehicles) is used for maintenance and development of the public road network. A tax also has to be paid on purchase of cars. The rate is lower

for small cars (less than 1 600 cc) and for those equipped with catalytic converters (10 per cent instead of 32 per cent). *Import duties* are lower for new cars or those less than four years old (18 per cent instead of 48 per cent).

A preferential *VAT* (12 per cent instead of 25 per cent) applies to energy prices (except gasoline) and to some environmental goods and services, such as catalytic converters for public vehicles and sewage and waste treatment. However, agricultural pesticides are free from VAT. To disseminate clean technologies, equipment for environmental protection with a value over HUF 100 000 may be granted higher amortisation rates in the calculation of *corporate tax*. From 1995, the increment of target reserves for environmental obligations may also reduce the tax basis. This encourages, for example, accumulation of reserves for landscape rehabilitation following closure of mines. Certain environmental tasks by non-profit organisations are exempted from corporate tax. Moreover, 30 per cent of the sums paid to environmental foundations may be deducted from *income tax*. A 50 per cent rebate on *land tax* is associated with good agricultural practices, although such tax has been temporarily suspended given the low level of farm profitability.

Table 6.7 **Environment-related taxes,** 1999

Tax	Rate	Exemptions
Excise tax on gasoline		
Fuels	75 HUF/litre (diesel) 86.90 HUF/litre (unleaded gasoline) 93.90 HUF/litre (leaded gasoline)[a]	Diesel-powered ships and trains, diesel used in electricity generation and in agriculture.
Other energy products for transport purposes	41.80 HUF/litre (gas hydrocarbon) 83.10-86.70 HUF/litre (liquid hydrocarbon)	Military aircraft and international air navigation.
Other energy products for stationary purposes	67.50 HUF/litre (lubricating oil and additives) 93.90 HUF/litre (diesel and gasoline)	
Vehicle tax		
Foreign vehicles	3 HUF/t/km (lorries) 50 HUF/day (passenger vehicles)	Lorries used for transit traffic and passenger vehicles for a period of 60 days a year.
Domestic vehicles	600 HUF/100kg/year	Motor vehicles of less than 2 500 cc, public transport and agricultural tractors.

a) Leaded fuel was phased out in April 1999.
Source: OECD; ME.

Integration of environmental concerns into fiscal policy will need to be further developed, and the current system of tax differentiation will need to be adjusted towards EU requirements. In 1995, a first step was taken when the VAT on electricity and gas was increased from 10 to 12 per cent.

Subsidies

Legislation has not yet given legal force to the polluter pays principle. Overall, 30 per cent of environmental investment is not paid by polluters and there are still many situations in which *public subsidies for environmental investments* are provided to private firms or local bodies. Despite increases in domestic water prices and the introduction of a municipal waste charge, state subsidies are still provided to municipalities confronted with high costs for domestic water supply and sewage treatment, and for municipal waste collection and treatment services.

Public *subsidisation of sectoral activities* is likely to have detrimental effects on the environment. In 1990 and 1991, in the context of price and trade liberalisation, tight monetary policy was accompanied by the elimination of a very high proportion of industrial subsidies. However, *subsidies to industry* remain, though well below former levels (71 per cent decrease in real terms from 1989 to 1993). *Support to agriculture*, as measured by the Production Subsidy Equivalent, also declined steadily from 45 per cent in 1986 to 12 per cent in 1998 (compared to 45 per cent in the EU); 49 per cent of total support to agricultural production was in the form of direct payments to farmers, of which 2.5 per cent or HUF 1.7 billion for environmental services in 1998.

Privatisation of industry leads to better cost-covering *energy pricing* arrangements. The five gas and six electricity distributors, six (of eight) power plant companies and 75 per cent of the market leader, the MOL Oil and Gas Company, were sold to private investors. Oil prices were liberalised in 1991. For electricity and natural gas, prices remain subject to regulation although legislation requires that end-user prices cover supply costs plus an 8 per cent real rate of return for private investors.

Environmental impact assessments

A 1993 Government Decree established provisional environmental impact regulations. It was later codified in the 1995 Act on General Rules of Environmental Protection. A further 1995 Government Decree (amended in 1997) defines the scope of activities subject to EIA, including large thermal power plants, nuclear power stations, oil refineries, highways, and hazardous waste storage, treatment and incineration facilities. These *regulations* have created an innovative two-stage process for EIA: a preliminary EIA possibly followed by a detailed EIA. For a new

project to obtain an environmental permit, a preliminary EIA must be submitted to the Regional Environmental Protection Inspectorate (REPI) describing the activity, its consumption of natural resources, associated emissions and other environmental effects. The REPI may then grant a permit, require modifications to the project, reject the project or require the preparation of a detailed EIA. No public hearing is required during the preliminary procedure (although the inspectorate may call one if deemed necessary), but is required for the detailed EIA. For investors, in many cases a land use permit from local authorities is required before the EIA.

Since 1994, *around 300 projects* are submitted for EIA each year, mainly relating to mining, industry, waste management, remediation of contaminated sites, waterworks (drainage canals), waste water treatment, energy, road construction and some infrastructure (e.g. shopping centres, stream harbours). Few EIAs have dealt with nature conservation (one per year). Around 8 per cent of EIAs have been required to include a detailed statement stage. Overall, 8 per cent of the projects submitted to EIA have been rejected and another 10 per cent have been withdrawn or stopped.

Each REPI has received one additional staff member to help implement the detailed EIAs. Western donors have provided training to regional and national environmental staff in the management of the EIA process. The EIA process appears to provide a sufficiently *flexible mechanism* for determining environmental effects and issuing environmental permits. Hungary's EIA regulation almost completely meets the requirements of EU legislation. However, issues of transboundary environmental impacts should be introduced and the list of compulsory projects extended. No systematic strategic EIA applicable to policy, programme and plans has been undertaken yet.

Other instruments for policy integration

Regional planning and physical planning

The *1996 Act on Regional Development and Physical Planning* has created regional development institutions at four levels. At the central level, the National Council for Regional Development was created to advise the government on harmonisation of national and regional development actions. The Council is chaired by the ministry in charge of regional policy (currently the Ministry of Agriculture and Regional Development) and composed of representatives of concerned ministries, national economic chambers, counties, municipalities and local governments. The Hungarian Foundation of Enterprise Promotion, the Hungarian Academy of Sciences and the Hungarian Development Bank have advisory status. At the regional level, Regional Development Councils have been set up, made up of representatives from three to four counties (for example, Budapest and its agglomeration,

Lake Balaton). County Development Councils have been established in each of the 19 counties, as well as Regional Development Associations at the local government level.

In addition, the central government has finalised a *National Concept for Regional Development* which has been approved by the National Council for Regional Development and subsequently by Parliament. It will subdivide Hungary into seven regions, and will be used as the basis for dialogue with the regions and counties on regional development issues. The proposed regions are expected to produce integrated regional development plans.

A 1998 decision of Parliament establishes the principles of the *National Regional Development Plan*. To alleviate regional disparities, priority regions include poor regions, but also those with valuable natural and landscape features. Main sector priorities have been defined in the area of environmental protection. *Physical plans* determine land use priorities in accordance with regional development objectives. These plans are public, and must include tasks related to the environment, landscape and nature protection. Physical plans at the national level and for priority regions must be approved by Parliament. Detailed rules applying to physical planning have been defined by a 1998 ministerial regulation which also makes EIA compulsory for regional development plans.

Efforts have thus been made to include environmental protection in regional planning and physical planning. However, *implementation is lagging behind* both for county and regional development plans. Studies have been carried out to help the process of physical planning: for example, a manual was recently published to help planners rehabilitate green areas. It is estimated that around half of total public and private investments relate to regional development aims, of which 5 to 6 per cent come from the Regional Development Expenditure Approximation (RDEA, former Regional Development Fund) and the Spatial Equalisation Financial Assistance (SEFA, applied through local governments). The RDEA is mainly used in poor regions, but about 60 per cent of total *regional development investments* have been used in the two most developed regions (Central Hungary and North Transdanubia); very little has gone for environmental protection.

Environmental information, education and public participation

General guidelines regarding *access to environmental information* are contained in the 1992 Act on the Protection of Personal Data and Publicity of Data of Public Interest, and the 1995 Act on General Rules of Environmental Protection. Information concerning the state of the environment has been regularly published since 1989 and has been made available on the Internet. The ME hosts an information centre, open to the public, and a centre of the UNEP Global Resource Information Database (GRID) network. However, legal guarantees for obtaining

environmental information have not yet been properly clarified. Efforts are needed to increase *public awareness*.

To improve environmental awareness, the first co-operative agreement was reached between ME and the Ministry of Education in 1992. For students, a national environmental scientific congress is organised by the two ministries every two years, which attracts an increasing number of participants. Seventy thousand copies of a textbook entitled "People and their Environment" have been distributed in primary and secondary schools. In 1998, NGOs published a national environmental education strategy primarily addressed to educators and policy-makers. Specialised primary and secondary schools have been created, such as the Danube Bend Forest School. In 1997, nearly HUF 200 million (from the CEPF) has been spent on environmental education and public awareness activities.

The first significant non-governmental environmental movement was the Danube movement formed in 1984 in protest against the potential ecological consequences of the Bós-Nagymaros hydro power station. Since then, *many NGOs have been created* following the entry into force in the early 1990s of the Association Act, the Act on Chambers and the Act on Foundations. There are over a thousand "green movements" and environmental and nature protection groups, clubs and societies, and several hundreds environmental foundations. Environmental policy-making increasingly strives for consultation with NGOs. This was the case during the elaboration of the National Environment and Nature Conservation Policy Concept (in 1994) and the 1997 to 2002 National Environment Programme. Environmental NGOs are represented in the Hungarian National Environment Council, an advisory body to the government. Some NGOs are hosted by the ME's Nature Conservation Office in Budapest.

Role of R&D and industry in environmental technology development

For many years, basic and applied research was the responsibility of the Academy institutes while technical and industrial research was handled by R&D units of specialised ministries. Universities and companies were not allowed to undertake research activities on their own. Over time, this pattern has considerably evolved and distinctions have become blurred. Universities and major companies have gradually established research units, and the decline of state support has led academic institutes to be involved in profit-oriented activities for industry. The current trend is that *many academic or industry researchers have left their laboratories* to seek work in sectors offering higher salaries. From 1990 to 1997, the number of R&D staff has remained stable within the universities (around 22 000), but has declined sharply in academic institutes (from 15 500 to 7 300) and industry (from 17 100 to 6 400). From 1990 to 1997, overall *expenditure on R&D decreased*

from 1.6 to 0.8 per cent of GDP; nearly 40 per cent is financed by companies. Ten per cent of companies have research units, which is low by OECD standards.

Concerning *environmental research*, a National Environmental Management Research Programme was launched in 1995 with the co-operation of the National Committee for Technological Development, several universities and research institutes. In 1997, around HUF 80 million has been spent on environmental R&D activities, mostly for end-of-pipe investments. The ME supports two *environmental research* institutes.

Hungarian companies have achieved positive results in reducing pollution by means of pollution control investments (e.g. dust collectors in power plants). They promote the use of clean technologies and of *eco-auditing*: more than 80 firms have made unilateral commitments for environmental protection performance evaluation. In early 1999, 60 firms were ISO 14001 certified and EMAS was applied in two of them. *Voluntary agreements* with public enterprises have been used, such as with the National Oil and Gas Company (MOL) to reduce emissions of hydrocarbons at filling stations (Chapter 7). The ME has made general co-operative framework agreements with four umbrella federations (e.g. National Federation of Industrial Corporations). In 1997, 12 companies were granted the *eco-label* for an environmentally sound product or technology.

3. Environmental Performance

From central economic planning to a market economy

By the end of the 1980s, Hungary had undertaken economic and political reforms initiating the *transition from central planning to a market economy*. Hungary's economy contracted in the early 1990s, largely due to the loss of guaranteed (COMECON) markets. The extensive 1995 macro-economic stabilisation package, as well as the deepening of structural reforms implemented earlier, created the conditions for the remarkable progress of the Hungarian economy over recent years. Overall, 85 per cent of GDP is now generated in the private sector.

Regarding *effects on the environment*, the decline in both industrial and agricultural production in the early 1990s contributed to a significant reduction of air and water pollution and a sharp decrease in the use of agricultural chemicals. There are signs that the increase in industrial production since the mid-1990s has not been accompanied by a similar increase in industrial pollution loads, mainly as an effect of modernisation of industry and of environmental policies, although waste management remains a problem. The privatisation process combined with a high share of foreign direct investment led in many cases to the introduction of cleaner production processes and to cleaner products.

Although pressures on the environment have been significantly reduced, many environmental indicators are still much higher than in most European OECD countries, and very *serious challenges remain* before environmental convergence with EU countries can be achieved. With around 1.5 per cent of GDP in the 1990s, annual *pollution abatement and control expenditure* is sizeable compared with other OECD countries; water pollution control by the public sector, particularly municipalities, represents about two-thirds of the effort.

Estimates of the overall cost of complying with EU environmental legislation range between EUR 10 and 15 billion (or 1 per cent of present GDP over 20 to 30 years). This raises *financing issues* to be addressed in the context of a *sustainable development* strategy aware of economic, environmental and social objectives. To move towards sustainable development and to address these challenges in a cost-effective way, there will be a need to i) strengthen institutional integration, ii) ensure efficient and effective environmental expenditure, and iii) strengthen the environmental democracy.

Strengthening institutional integration

The environmental protection act in 1976 provided the *legal and institutional framework for environmental policy*. However, it is only in 1987 that a full-fledged Ministry for Environment was created, and in 1994 that a National Environmental and Nature Conservation Policy Concept was adopted. In 1995, the new environmental protection act entered into force. The first National Environmental Programme (NEP) of Hungary was adopted by Parliament in 1997 and covers a six-year period (1997 to 2002). The NEP takes into account the Environmental Action Programme for Central and Eastern Europe, the EU Fifth Action Programme and Agenda 21.

The NEP defines specific environmental goals and activities whose purpose is to *integrate environmental concerns into sectoral policies* (energy, industry, agriculture, transport and services) in the context of sustainable development. Efforts have been made in that direction. For example, in the transport sector the relatively high (compared to average income) gasoline price contributed to a smaller growth in car use compared to other countries in transition. The thrust of the proposed agri-environmental programme provides the opportunity to move towards a more integrated approach. In the energy sector, prices have been increased along with the VAT on electricity and gas. These efforts should be strengthened to develop long-term sectoral policies that take environmental considerations fully into account.

To follow up on UNCED, an interministerial commission on sustainable development was created in 1993 and local Agenda 21 activities have been launched with the support of NGOs. However, there is no mechanism to promote *local and regional environmental co-ordination* other than at the initiative of municipalities.

With the support of the EU, Hungary has started the process of approximation with *EU environmental legislation*. Full transposition of the entire environmental acquis is foreseen by the end of 2001. It is not certain that this self-imposed deadline will be met. Regulations on municipal waste management, IPPC and hazardous installations are to be adopted. Draft government decrees on water quality and air protection and a draft waste management law are being prepared, but a transition period will be requested for urban waste water treatment. The accession process will require strengthening of the administrative capacities of the Ministry for Environment and of other ministries with environmental competencies (Chapter 8).

Ensuring efficient and effective environmental expenditure

A number of economic instruments are used. They include environmental charges and environment-related taxes. However, *economic incentives* for the introduction of clean technologies and environmentally friendly behaviour (eco-taxes, deposit-refund systems, etc.) are still at a preliminary stage. *Subsidies should be reduced*, especially when they have negative effects on the environment. For example, prices for household electricity and natural gas remain relatively low. The *polluter pays principle* and the *user pays principle* are not yet the basis for pricing of natural resources and environmental services. The pricing of energy, waste water and solid waste collection and treatment does not fully reflect costs, and should be adjusted taking into account social constraints.

Legislation is not adequately *implemented and enforced* by the environmental inspectorates. The current *system of fines* imposed on harmful substances discharged to watercourses (sewage fine) or into sewerage (sewer fine) is not dissuasive (fines are set at much too low levels) and is difficult to enforce. Similarly, air pollution fines represent only a very small fraction of power plant running costs and thus provide no incentive to reduce pollution levels. Environmental fines should be set at higher levels and systematically adjusted for inflation. The proposed *introduction of emission charges* for water, air and soil pollutants would create additional incentives for industries to invest in cleaner production processes. Inspectorates should help companies change production processes and introduce adequate treatment of pollutants. Sufficient resources should be made available so that inspectorates can efficiently play their important role in enforcing environmental policies.

Part of public environmental expenditure is covered by a *Central Environmental Protection Fund* financed mainly by product charges. Even though CEPF has been integrated into the central budget, the funds are indispensable to finance necessary environmental expenditure. The privatisation process has provided additional financial resources, which have been used for clean-up of contaminated industrial sites. The system of *environmental liability* has been modernised, but insurance for companies engaged in hazardous activities should be made avail-

able. A system of industrial risk assessment and prevention of industrial accidents should be put in place.

While end-of-pipe investments have rapidly reduced emissions of pollutants and proven effective, most regional and local authorities do not seem prepared to organise the establishment and financing of the lacking environmental infrastructure (e.g. waste water collection and treatment, waste management, soil decontamination). In the future, *massive investment will still be necessary*, in particular to converge with EU environmental conditions. It is therefore essential to improve the *cost-effectiveness* of environmental instruments and expenditure. Use of technologies that prevent pollution, rather than end-of-pipe technologies, should be considered. Remediation of environmental damage should be carried out after proper analysis of costs and benefits.

Strengthening the environmental democracy

Progress has been made in the area of *access to environmental information*. The Ministry for Environment hosts an information centre open to the public. The state of the environment is regularly published and disseminated through Internet. However, legal guarantees for obtaining environmental information should be clarified. The important *environmental education* efforts made should be pursued. Efforts are also needed to increase *public awareness*, in particular by paying more attention to environmental issues in the media. *Public participation* is not given enough attention by the government, especially at the regional and local levels.

The innovative two-stage system of *Environmental Impact Assessment* provides a flexible and efficient pollution prevention mechanism for a wide range of projects. EIA has also been made compulsory for regional development plans. This powerful instrument should be extended to policies, programmes and planning.

Efforts have been made to include environmental protection in *regional planning and physical planning*. However, implementation is lagging behind both in regard to county and regional development plans: most regional development investments have been used in the two most developed regions of the country (Central Hungary and North Transdanubia) and very little has been devoted to environmental protection.

Self-responsibility is developing in industry. Some 60 company sites fulfil the requirements of environmental management (eco-auditing). Responsible care activities are taking place in several chemical companies. However, voluntary agreements have yet to be developed in industry branches to promote clean technologies and further develop the use of environmental management systems.

7

SECTORAL INTEGRATION: TRANSPORT

1. Transport Activities and the Environment

Current situation and trends

The transport sector plays an important role in Hungary's economy, accounting for about 5.5 per cent of GDP and employing 127 000 persons. Hungary is a *transit country*, crossed by some of the main trans-European routes; almost all its major transport infrastructure passes through Budapest.

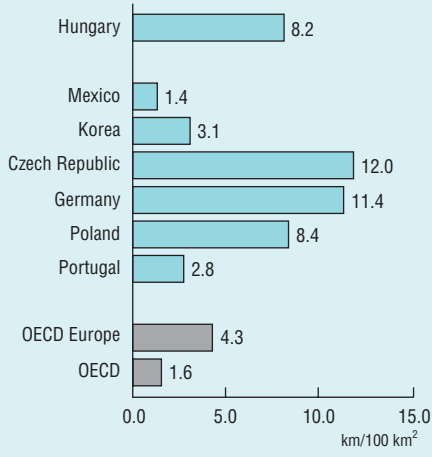
Transportation networks in Hungary

The *road network* totals over 188 000 kilometres; the public road network constitutes around 135 000 kilometres, 49 per cent of which is paved. The total length of national motorways is around 450 kilometres. The density of the road network (200 kilometres/100 km^2) is greater than the OECD Europe average, while the density of the motorway system is less than one-half the average for Western European countries. Road and highway quality generally does not meet European norms.

The density of Hungary's *railway system* is almost twice the OECD Europe average (Figure 7.1). The constructed length of railway lines is 7 700 kilometres, including 1 200 kilometres of double track and 2 400 kilometres of electric rail. Overall, network quality is inferior to that in OECD Europe countries; most of it is designed for speeds below 120 km/hr. Tracks are often unsuitable for easy renovation, passing through towns or curving in such a way that track relocation would be necessary.

Budapest's public transport system (buses, trams and suburban railways) is well developed. Its capacity fell by 12 per cent between 1992 and 1995, due to service reductions and closing of certain lines. Although public transport passenger

Figure 7.1 **Rail network[a] density,** late 1990s



a) Length of line operated by km^2 of total area.
Source: ECMT; UN-ECE; UIC; OECD.

trips have decreased by 16 per cent since 1990, they still represent nearly 65 per cent of total passenger trips (compared with 40 per cent in London and Paris and 70 per cent in Zurich).

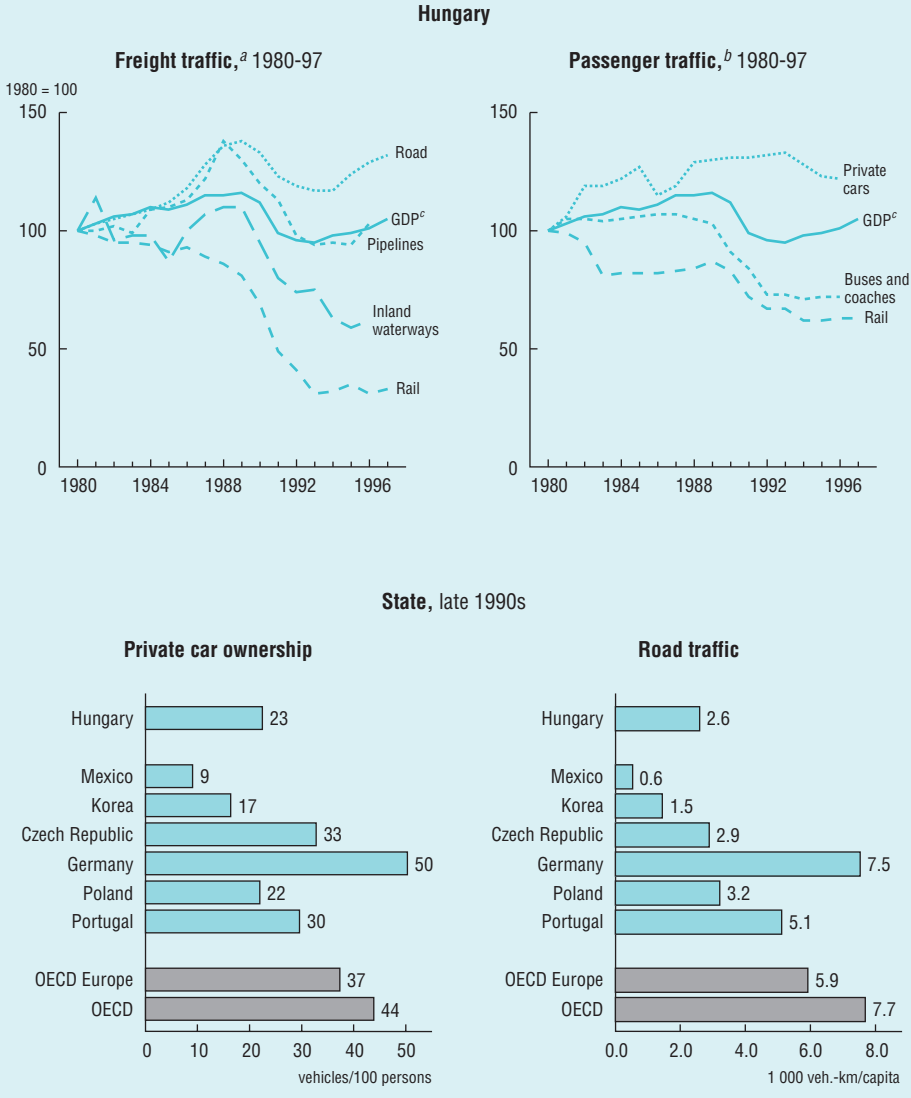
In most *other municipalities*, public transport is provided by buses. Since 1990, the number of municipalities with local bus systems has decreased by 25 per cent and the number of buses in public transport fleets by almost 30 per cent. Small towns and villages are connected by *inter-urban* railway and bus lines.

The length of Hungary's *permanently navigable waterways* is 1 370 kilometres, including 417 kilometres on the Danube and 435 kilometres on the Tisza. In recent years, river maintenance programmes have been curtailed. Certain parts of the Danube (notably the stretch just above Budapest) do not meet EU specifications for navigation; on other navigable rivers, port density is insufficient and cargo ports do not meet loading requirements for Western European ships.

Freight transport

Freight traffic (in tonne-kilometres) decreased in volume by 45 per cent between 1990 and 1997 (Figure 7.2). In 1997, *modal share* (in tonne-kilometres)

Figure 7.2 **Trends in the transport sector**



a) Based on values expressed in tonne-kilometres.
b) Based on values expressed in passenger-kilometres.
c) GDP at 1991 prices and purchasing power parities.
Source: ECMT; IRF; OECD; MTCWM.

was 42 per cent road, 33 per cent rail, 18 per cent pipeline, 6 per cent ship and less than 1 per cent air. Since 1990, significant decreases in the volume of freight shipped by rail (55 per cent) and inland waterways (88 per cent) have occurred. In the same period, road haulage has increased; the truck fleet has grown by 27 per cent since 1990, and its average age is ten years.

With support from the government, the use of *combined transport* (i.e. road-rail or road-water) has increased since 1990, accounting for 0.5 per cent of total transport and 7 per cent of transit traffic through Hungary. In 1997, 110 000 trucks were transported by combined transport, using existing roads, railways and waterways. Development of combined transport is constrained by the fact that many train engines and ships are old (average age over 15 years) and incompatible with Western European cargo loading norms.

Passenger transport

The *modal split for passenger transport* in 1997 (in passenger-kilometres) was 53 per cent road, 14 per cent rail, 21 per cent public transport, 3 per cent air and ship, and 9 per cent other (Figure 7.2). Overall passenger demand has fallen by 8 per cent since 1990, but is expected to grow with continued economic expansion. Tourist arrivals by air (1 200 000 arrivals per year) have nearly doubled since 1992.

Passenger travel by *public transport* is decreasing. While some 84 per cent of urban trips were made by public transport in 1980, this number fell to 73 per cent in 1990 and 56 per cent in 1998. The decrease has been less pronounced in Budapest, where 65 per cent of passenger trips were by public transport in 1998.

The rate of *private car* ownership in Hungary (23 per 100 people) has increased by 18 per cent since 1990 and is presently about two-thirds of the OECD Europe average. Road traffic is about half the OECD Europe average (Figure 7.2). The average age of the passenger car fleet is 12 years, and 27 per cent of the fleet is over 16 years old. Despite a recent increase in the number of catalyst-equipped vehicles, about half the fleet consists of heavily emitting two-stroke engine vehicles and other old vehicles without emission control devices. Some 10 per cent of the fleet runs on diesel.

Pressures on the environment

Air emissions

The transport sector is a major source of air emissions, contributing 55 per cent of national NO_x emissions, 61 per cent of CO emissions, 49 per cent of NMVOC emissions (Chapter 2) and 14 per cent of CO_2 emissions (Table 7.1). Energy use by the transport sector (16 per cent of TFC) is relatively low compared

to the OECD Europe average (28 per cent of TFC). The energy efficiency of the transport sector is quite low, given the high average ages of the train, boat and motor vehicle fleets. Within the transport sector, 85 per cent of air pollution emissions are from road traffic, 13 per cent from rail, and the rest from water and air transport.

Road transport contributes 46 per cent of the nation's emissions of NO_x, 60 per cent of CO, and 46 per cent of VOCs (Table 7.1). SO_x emissions from road transport are negligible. Emissions from trucks are elevated in Budapest due to the amount of transit traffic. Trucks are estimated to contribute 26 per cent of CO_2 emissions from the transport sector. Infrastructure deficiencies, such as lack of bypass roads and bridges, exacerbate congestion and contribute to the degradation of air quality.

Lead emissions, which are almost entirely from road transport, totalled 126 tonnes in 1996, an 82 per cent decrease from 1990 levels. The phase-out of leaded fuel was completed in 1999 (Chapter 2).

Table 7.1 **Transport emissions to air,** 1980-97

	Quantities (kt/year)				Transport as % of total emissions	Road transport as % of total emissions
	1980	1990	1995	1997	1997	1997
SO_x	49.0	16.0	7.5	9.4	1.4	1.4
NO_x	111.3	116.0	101.4	107.6	54.5	45.6
CO	309.0	323.3	448.9	439.3	60.9	60.2
CO_2	8 900	9 000	7 700	8 200	14.0	12.5
VOCs	..	90.5	72.6	71.2	49.0	46.1[a]

a) 1996 data.
Source: IEA-OECD.

Noise

Noise nuisance from traffic is a serious concern. Over 50 per cent of the population of Hungary lives in dwellings exposed to high noise levels (greater than 65 dBA). Over 80 per cent of urban residents indicate road transport as the greatest noise nuisance. Noise from rail traffic is reported to disturb 8 to 10 per cent of the population. Noise from air traffic is not presently a major problem.

Use of land and resources

Transport infrastructure contributes to the *fragmentation or destruction of natural habitats* and farmland. Several NGOs have opposed completion of the M0 highway, the ring-road around Budapest, as the western sector cuts through the Buda hills nature protection area.

Disposal of waste from the transport sector is a challenge, as scrapped vehicles, used tyres, batteries and oil products, and road rubble have to be managed, including the toxicity of many types of waste (Chapter 4).

Accidents and health risks

Both the *severity and frequency of traffic accidents* are increasing. The road accident rate is presently 20 per 10 000 people. The annual rate of fatal accidents from transport is 1.3 deaths per 10 000 people, nearly twice that in the United Kingdom. The number of fatal accidents on national motorways is growing.

Risks posed by *transport of hazardous waste and oil products* raise concern because of the potential scale and intensity of the damage. However, there is a paucity of data in this domain in Hungary.

As the major source of air emissions, the transport sector contributes to significant *respiratory health risks*. Several studies in Hungary have found positive correlations between ambient air pollution levels and respiratory morbidity and mortality (Chapter 2).

2. Responses

Transport policy objectives related to the environment

The Ministry of Transport, Communications and Water Management is responsible for the definition and implementation of transport policy. The *1996 Hungarian Transport Policy* aims to "create a balance between personal freedom of movement, access to various means of transportation, and protection of human life and the environment." The policy sets several objectives that address the environmental performance of the transport sector:

– reduction of air pollution from road traffic by setting more stringent *norms for new vehicles*, corresponding to those adopted internationally;

– reduction of *noise nuisance* by the introduction and operation of quieter vehicles whose noise performance respects UN-ECE regulations;

– discontinuation of use of *leaded gasoline*.

The Transport Policy also defines *mode-specific transport objectives*:

– *road traffic*: facilitate transit traffic (constructing transit highways, urban ring-roads, bridges), encourage use of cleaner and quieter cars, and upgrade fuel quality;
– *railways:* renew rolling stock and upgrade rail quality to ensure a 160 kilometres/hr average speed;
– *inland water transport*: construct ports for combined shipping, renew the ship fleet, and improve the navigational qualities of the Danube and Tisza river systems;
– *urban transport*: halt the decline of public transport (renewing the fleet, establishing "park and ride" and bicycle storage facilities) and limit car traffic in historic and recreational areas as well as in inner cities;
– *air transport*: strengthen air traffic control and develop regional airports to meet demand.

The *National Environmental Health Action Programme (1997-2000)* integrated a noise abatement programme for Ferihegy airport, which had been on-going since 1989. It also calls for development of noise abatement measures for transport infrastructure and noise intensity maps to help identify overburdened areas.

Measures leading to sustainable transport

Since the mid-1990s, Hungary has invested heavily in expanding its national motorways network. Investments have also been made in upgrading infrastructure and services in the railway, inland shipping and public transport sectors. Numerous *regulatory measures* have been used to limit environmental impacts of transport, mostly aimed at road transport. Hungary uses a fairly balanced mix of *economic instruments* to lessen the impacts of road transport; other measures (notably income tax rebates for those who commute by passenger car) have negative environmental effects.

Transport infrastructure investment

Public investment in road construction has grown more rapidly than general public investment since 1990, boosted by international financing (IBRD, EBRD, European Investment Bank, German funds). In the transport budget for the period 1994 to 2000, HUF 355 to 395 billion was earmarked for construction and equipment, renewal and maintenance of the state-owned road network; 70 per cent of these funds are from the central budget (Table 7.2). Since 1995, a number of motorways have been constructed, extending from Budapest to the national borders. Build-Operate-Transfer (BOT) contracts were used in most cases, giving the concession holder the right to collect tolls for 35 years.

Hungary has prioritised investments in its *railway system*, dedicating over HUF 300 billion in its 1994 to 2000 budget to development and maintenance of lines, tracks, buildings and safety equipment (Table 7.2). The Hungarian National Railways Company (MÁV) has received *state subsidies* (HUF 66.263 billion in 1996) and a one-off government grant to reimburse HUF 55.25 billion in loan principal and interest payments. This assistance has not, however, produced a financial turnaround for MÁV.

The government earmarked about 4 per cent of its 1994 to 2000 transport investments for *inland navigation* (Table 7.2), aiming to increase its share in freight transport (presently 5 to 6 per cent) to 8 per cent by 2010. Improvements will require some dredging of the Danube, which could have adverse effects on aquatic ecosystems and on drinking water quality. Hungary is negotiating bilateral agreements with its neighbours, to give reciprocal preference to combined transport and

Table 7.2 **Transport (development and maintenance) investments,** 1994-2000

Field of investment	Specification of investments	Total 1994-2000 (HUF[b]10^9)	State investment from total (HUF[b]10^9)
A. Construction and equipment, renewal and maintenance:		888-1 029	620-715
of which:			
Road transport	State-owned road network	355-395	248-276
	Urban roads,[a] bridges[a]	155-180	60-90
Railway	Lines, tracks, buildings, safety equipment	290-320	290-320
Inland navigation	Waterways and ports	32-43	8-11
Air traffic	Airports, ground construction works, control equipment	56-71	14-18
B. Vehicles:		1 889-2 360	119-146
of which:			
Road	Cars	1 280	0
Transport	Buses	172-232	34-46
Trucks	Trucks	138-198	0
Railways	Locomotives, carriages, freight wagons	198-238	65-78
Inland navigation	Ships, barges	45-51	9-10
Air traffic	Planes, fire engines, service and other vehicles	56-61	11-12
A and B programmes		2 777-3 389	739-861

a) Renewal and maintenance, minimal new construction.
b) HUF of 1994.
Source: Hungarian Transport Policy, 1996.

to construct the special cargo terminals required. Such agreements have already been reached with Germany and Austria.

Since 1995, *investments in Budapest's public transport system* have been made with support from EBRD, IBRD and the EU PHARE programme. IBRD financed the rehabilitation of 47 kilometres of tramway, and several programmes have been aimed at improving the performance of bus lines. A condition imposed on IBRD and EBRD loans is that the Budapest Transport Company (BKV) reach 50 per cent cost recovery by 2000; it was at 34 per cent in 1993 and 40 per cent in 1994.

Environmental impact assessments are required for all transport projects that could have significant environmental impacts; since 1996, an average of 30 EIAs per year have been carried out for transport projects. Highway construction projects require a more detailed assessment than the average transport investment project (Chapter 6). Provisions are made for public participation in the EIA process, but application of these provisions is not monitored.

Measures concerning vehicles and fuels

Hungarian *emission standards* and noise standards established in 1995 for gasoline and diesel vehicles are equivalent to UN-ECE standards. Since 1996, all imported gasoline-burning cars must be equipped with three-way catalytic converters. The Ministry of Health has established *noise and vibration limits* for road, railway, waterborne and airborne traffic, while the Ministry for Environment and the Ministry of Transport, Communication and Water Management have jointly established *noise standards* for certain products including railway vehicles and aircraft. In 1989, the Ministry of Transport issued *regulations for road vehicles transporting hazardous materials*.

A vehicle scrapping programme implemented between 1993 and 1995 was aimed at reducing the number of two-stroke vehicles. Financial incentives in the form of public transport passes were used. During the programme, 10 000 two-stroke vehicles were scrapped.

Yearly inspection of passenger cars, buses, and trucks has been mandatory since 1990 (every three years for those equipped with a three-way catalytic converter) under the "Green Card" system. Since 1991, the annual number of vehicles passing the routine inspection has been about 1.9 million. An addition 350 000 roadside emission checks are carried out annually.

In the mid-1990s, efforts were made to provide Budapest with *less-polluting and more energy-efficient buses*. New buses were purchased and existing ones modernised. Engine upgrading activities achieved improvements of about 80 per cent in emissions and 8 to 10 per cent in fuel efficiency.

Hungary's *fuel quality standards* for gasoline and diesel conform to EU norms (Chapter 2). In 1992, the lead content of gasoline was reduced from 0.4 to 0.15 g/l. Unleaded gasoline now accounts for 75 per cent of vehicle fuels, and leaded gasoline was phased out entirely in 1999. The sulphur content of diesel fuel was reduced to 0.2 per cent in 1995 and 0.05 per cent in 1997. Smuggling of sub-standard vehicle fuels from neighbouring countries, a problem in the mid-1990s, has been effectively controlled by the government through service station inspections.

Between 1990 and 1995, *vehicle fuel prices* rose 22 per cent more than inflation. Fuel prices in Hungary are among the highest in the OECD, particularly if per capita income is taken into account (Figure 7.3). The price (converted using purchasing power parities) of premium unleaded gasoline is 1.7 times higher than the OECD Europe average (Table 2.3).

Voluntary agreements with publicly owned enterprises have been used to reduce fuel-related emissions. In 1992, the National Oil and Gas Company (MOL) voluntarily launched a programme to reduce fugitive hydrocarbons emissions during transfer of gasoline at filling stations. Stations already retrofitted under this programme meet the most stringent environmental requirements in Europe. Country-wide adoption is expected before 2006.

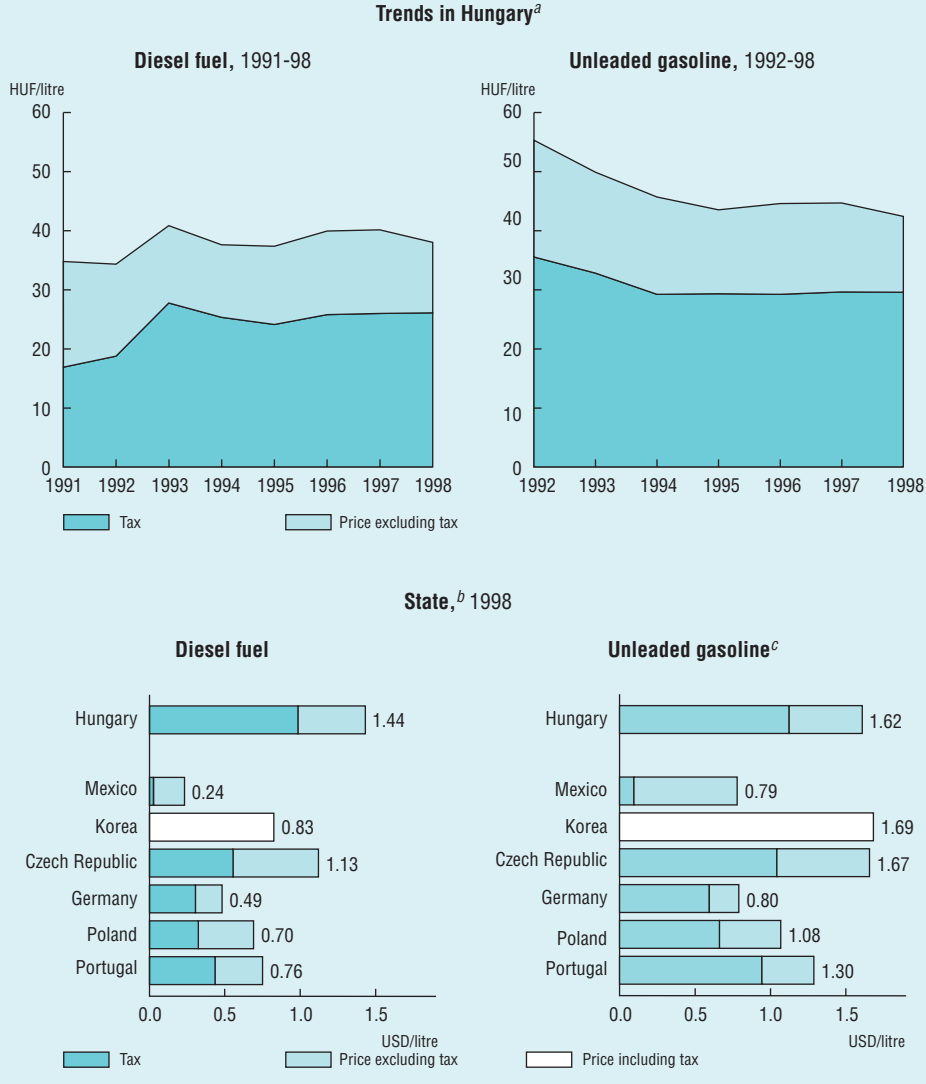
Economic instruments

Differentiated *excise taxes* are levied on leaded (HUF 93.9 per litre) and unleaded gasoline (HUF 86.9 per litre). Part of the tax revenues goes to the *Road Fund* (around HUF 6.1 billion in 1996), where it is allocated to activities such as road maintenance and construction of bicycle paths. A consumption tax of 10 to 32 per cent is levied on the purchase of cars; the tax is reduced for small (less than 1 600 cm^2), low-consumption and electric cars, and those equipped with catalytic converters (Table 6.7).

The standard *25 per cent VAT* is levied on the purchase of vehicles and vehicle parts. A preferential (12 per cent) VAT is applied to environmentally beneficial products and services, such as catalytic converters and exhaust gas filters. The VAT is also differentiated between unleaded (HUF 27.8/litre) and leaded (HUF 29.2/litre) gasoline.

Import duties are reduced for less-polluting vehicles. On cars over four years old there is a duty of 48 per cent (43 per cent if equipped with catalytic converter), while for new cars and those less than four years old it is 18 per cent. On small cars and those with catalytic converters, the duty is further reduced to 13 per cent. The import duty on new trucks is 10 to 12 per cent, but higher rates are applied to used trucks.

Figure 7.3 **Road fuel prices and taxes**



a) At constant 1991 prices.
b) In USD at current prices and purchasing power parities.
c) Unleaded premium.
Source: IEA-OECD.

An *annual vehicle tax* is paid on all cars and trucks. This tax, based on axle weight, is reduced for certain categories. On cars with built-in catalytic converters, the tax is reduced by 50 per cent; on those retrofitted with catalytic converters, it is reduced by 75 per cent. Vehicle taxes on trucks meeting UN-ECE emissions standards are reduced by 50 to 75 per cent.

Income tax provisions established in 1988 encourage use of passenger cars for commuting. A tax credit of HUF 3 per kilometre is given to those using private cars to travel to work; private cars used for company purposes receive a HUF 13 per kilometre credit. Commuters who use public transport receive no tax credit for intra-urban travel. Repair and maintenance of a company-owned vehicle can be treated as costs in calculating *corporate tax,* without any limit.

A system of *parking charges and restrictions* has been developed for central Budapest and some other congested areas, with rates ranging between EUR 0.20 and 0.65 per hour. Enforcement of the parking policy is weak, however.

Product charges designed to encourage efficient use are applied to gasoline, diesel and lubricating oils on a per-unit-volume basis; charges on tyres and batteries are used to help finance their disposal. In 1997, revenue from these charges exceeded HUF 9.7 billion (Table 6.7).

Regulatory measures concerning traffic management and noise

In the early 1990s, the government imposed several *traffic safety regulations* including lower speed limits and seat belt requirements. Enforcement efforts by the police were also stepped up. Between 1990 and 1994, the number of road accidents, as well as the number of persons injured or killed in such accidents, decreased. Since 1995, the accident rate has been on the rise again.

Fines may be imposed on construction companies when *noise or vibration* following construction of a new road, railway line or public airport exceeds set limits. They are calculated as a function of the magnitude of exceedance.

Several cities have created *zones with limited passenger car access*, as well as zones where the speed limit is 30 km/hr. *Quiet zones* have also been established near hospitals, schools, etc. Since 1996, access to central Budapest is restricted for large trucks and is often forbidden during holidays and weekends.

3. Progress Towards Sustainability of the Transport Sector

Hungary is seeking to upgrade and expand its transport infrastructure and services, considering it important for both regional development and integration with Europe. The *Hungarian Transport Policy* gives attention to short- and long-term

impacts of transport on environment and safety and defines related objectives. This demonstrates recognition of the importance of sustainable development of the transport sector. Nonetheless, Hungary faces the challenge of allocating its limited available resources to achieve these objectives.

With the economic transition, the *modal split* has shifted heavily towards road transport and the shares of rail, inland waterways and public transport have decreased. More energy-consuming and more polluting transport modes are therefore gaining ground. Improving transport infrastructure usually stimulates demand, and recent investments in road construction have encouraged the development of road transport to some extent. However, the shift towards road transport has no doubt been stimulated by the worsening quality of infrastructure and services in other modes, which are affected by cutbacks in State subsidies, reduced maintenance budgets and ageing rolling stock. A number of improvements in national road infrastructure are needed (e.g. alleviation of traffic congestion and pollution with bypass roads and bridges), but improving local roads, urban transport systems, railways and inland waterways is also necessary and should be carefully considered in investment policies.

Infrastructure

Since 1995, the majority of public investments in transport have been oriented towards construction of new *national motorways*. Although most of these were designed to be self-financing, cost recovery through tolls has proven problematic. Tolls along the M3 motorway to Ukraine, for example, are considered too high relative to the purchasing power of the area's population, but too low to cover construction costs. While EIAs are carried out before motorway construction, it appears that project alternatives are not given adequate consideration during public consultation stages. Maintenance of the existing road network, which has been inadequate for many years, continues to be disregarded. The poor quality of existing road surfaces contributes to traffic noise and safety problems.

Despite recent investment in the national *railways*, rail traffic is often delayed. Large decreases in both passenger (25 per cent) and freight (45 per cent) demand since 1990 signal the need to restructure the railways, improve service quality, and invest in modernisation of tracks and rolling stock. Track maintenance is presently very poor, with only about one-quarter of necessary maintenance carried out; IBRD estimates the cost of the maintenance backlog at USD 340 million. The very weak financial condition of the Hungarian National Railways Company (MÁV) is an obstacle to achieving the role railways could play in a sustainable transport system.

Navigable inland waterways are under-utilised. Considerable investment is needed to bring the port infrastructure up to international norms, and to ensure that

rivers are navigable by large ships. The ageing of the Hungarian ship fleet reduces the competitiveness of inland shipping by increasing maintenance and operating costs. Government subsidies for combined transport, although small, offer some support. Hungary's agreements with neighbouring countries to favour development of combined transport on rivers must be now be followed up by investment.

Investments in public transport have not been given high priority recently, despite the fact that it offers clear advantages in terms of fuel efficiency, per passenger emissions and safety in urban areas. Modernisation is necessary to provide public transport systems that are attractive to large segments of the population. Projects aimed at replenishing the bus fleet and upgrading tramway tracks, carried out with international funding, represent steps in this direction.

Vehicles, fuels and traffic

Hungary has taken numerous measures to reduce the environmental impacts of *motor vehicles*, including large improvements in *fuel quality*, the progressive phase-out of leaded fuel and the establishment of strict air emission standards for new vehicles. An emissions inspection programme began in 1990, but it is unclear to what extent this programme has been implemented. A vehicle-scrapping programme aimed at two-stroke vehicles was effective, but too briefly implemented. International funding has been used to purchase less-polluting *buses* and to retrofit others with pollution control devices.

The *poor condition of motor vehicles* is mainly responsible for the transport sector's high emissions intensity. An estimated 40 to 50 per cent of the fleet is old and highly polluting (including two-stroke vehicles). Subsidised vehicle replacement and a more extensive scrapping programme should be given further consideration.

Defining of a system of *parking charges and restrictions*, as well as designating areas with restricted access, have been important steps towards controlling urban congestion, but their effectiveness depends on enforcement.

Economic signals

Hungary uses a range of *economic instruments* that limit demand for road transport and internalise some negative externalities. Road taxes, product charges, and fuel and vehicle taxes are all used. While all the environmental costs of road transport are not covered by these mechanisms, their application demonstrates real efforts to address road transport externalities. *Motor vehicle fuel prices* are high and seem to send a clear signal to owners to moderate vehicle use.

The Hungarian Transport Policy prioritises *construction of infrastructure to meet demand*, but makes little mention of managing demand. Large investments (about 2.2 per cent of GDP from 1994 to 2000) in motorways will no doubt further stimulate demand for road transport. Investments in other modes will be necessary to enhance their competitiveness with road transport, and to achieve the balance among transport modes set as a goal in the Transport Policy. Adjustment of *tariffs and prices* will also be important to stimulate demand for other modes. Present efforts to achieve cost recovery in the realm of public transport seem misguided, given the lack of co-ordination with the pricing of other modes. Since 1990, prices of tram and bus tickets have increased twelve- and ten-fold, respectively, while the price of gasoline and diesel has increased six- and ten-fold. The cost recovery objective should be reassessed from an inter-modal, demand-management perspective.

Renewal of the motor vehicle fleet with less polluting and smaller, more energy-efficient models is encouraged through *tax differentiation*. Import duties favour new vehicles and those less than four years old. Import duties on small cars and those with catalytic converters are reduced. The annual vehicle ownership tax is at least 50 per cent lower for vehicles with advanced emissions control devices. Since these instruments were implemented, imports of used cars have fallen; 82 000 were imported in 1992, but only 12 000 in 1997.

Preferential fiscal conditions granted to business vehicles encourage many companies to provide company-owned vehicles as a form of untaxed employee remuneration. There is a significant difference in the rate of utilisation of private and company-owned vehicles. Private vehicle use averages 9 000 kilometres per year; that of business vehicles averages 30 000 kilometres. The average use rate for passenger cars (in annual kilometres travelled per vehicle) has declined since 1991, reflecting the combined effects of rising fuel prices and higher vehicle purchase and operation costs. However, income tax credits for commuting by passenger car and corporate tax credits for company-owned vehicles favour continued passenger car use.

Part III

CO-OPERATION WITH THE INTERNATIONAL COMMUNITY

8

INTERNATIONAL CO-OPERATION

Hungary is a *Danubian country* neighbouring one other OECD member (Austria) and six non-OECD countries. Only one of the latter (Romania) existed as a country before 1990. Since the end of the COMECON, Hungary has reoriented its foreign trade towards OECD countries; exports to EU countries now account for over 71 per cent of total exports.

Hungary's international environmental relations aim mainly at:

– strengthening *co-operation on all environmental issues with all its neighbours* in the new context of economic transition;

– increasing its relations with all countries in the Euro-Atlantic area, and in particular promoting *rapid accession to the European Union*;

– improving its *position at the international level*.

To achieve these objectives, Hungary participates in *regional* environmental co-operation activities at Central, South-eastern and pan-European levels as well as within the OECD, UN-ECE and OSCE. It is a strong supporter of international environmental activities within UNEP and UN-CSD. Hungarian participation consists notably in providing high-ranking experts, paying its normal contributions, and also making voluntary contributions. Prominent Hungarian officials have been elected to leading positions at international meetings.

Hungary is taking many initiatives *internationally*, such as convening ministerial level meetings in Budapest. It has hosted the Danube Commission (navigation) since 1950, the Regional Environmental Centre for CEE (since 1996 in Szentendre) and the Regional Co-ordinating Centre for the Prevention of Industrial Accidents, as well as the Hungarian Centre of the Global Resource Information Database (GRID) co-ordinated by UNEP (since 1997).

Hungary is a *signatory to nearly all relevant international environmental agreements, and rapidly ratifies* most of these agreements. It will probably ratify

11 recent agreements in the coming years, the oldest of which is the Oslo Protocol (1994) on sulphur oxide.

1. Bilateral and Trilateral Co-operation

Co-operation with neighbouring countries

Bilateral co-operation between Hungary and its seven neighbours has evolved considerably during the 1990s due to the breaking-up of the former Yugoslavia, Czechoslovakia and USSR, changes in political and economic regimes, Hungary's association with the EU and wider pan-European co-operation. Environmental co-operation has been facilitated by financial support from the EU's PHARE programme and other donor institutions and countries, but has been hampered by political instability and economic decline in the region. Bilateral activities aim at preparing modern environmental protection and nature conservation agreements, creating joint nature protection areas in border regions and strengthening existing transboundary water management agreements. Progress has already been achieved in a number of areas (Table 8.1).

Co-operation with *Austria* is particularly well developed, with many high-level and expert meetings concerned in particular with preparatory work for EU accession. It has led to the creation of the Fert-Neusiedlersee Transfrontier National Park and also to a joint initiative to propose a transfrontier cultural landscape site for inclusion in the UNESCO World Heritage List. Co-operation with *Croatia* on water issues is subject to consultations because of Hungary's specific nature conservation interests.

Of particular importance is bilateral co-operation with *Slovakia*. Because of disagreement on the carrying out of a joint hydropower project (Gabčikovo-Nagymaros) on the Danube, agreed upon in 1977 by Hungary and Czechoslovakia, in 1993 Hungary and Slovakia brought the matter to the International Court of Justice, which issued its decision in 1997. The main environmental issue for Hungary was the environmental damage caused in that country by diverting the Danube in Slovakia. This very important decision will most probably be implemented soon by the two countries in a spirit of good neighbourliness: Hungary will not build a dam at Nagymaros, near the historic Visegrad castle, and Slovakia has changed the way the Gabčikovo dam is operated. Hungary and Slovakia are now co-operating in a joint programme for monitoring the Danube's water quality, and in managing a joint transfrontier protected area (Aggtelek National Park and the Slovak Carst Landscape Protection Area). They envisage developing joint frontier region projects eligible for PHARE support. A bilateral environmental protection and nature conservation agreement was signed in February 1999. Hungary has also

taken an active role in the preparation of trilateral co-operation programmes with Slovakia and Austria, and in organising trilateral meetings.

Co-operation with non-neighbouring countries

Hungary has developed *bilateral co-operation* on environmental issues with a number of other governments. These include, in particular, those of the Flemish and Walloon Regions (Belgium), Canada, Denmark, Finland and France, as well as those of Bavaria, Baden-Württemberg, Saxony, North Rhine-Westphalia and Thuringia (Germany), Japan, the Netherlands, Norway, Poland, Switzerland, the United Kingdom and the United States. The most significant bilateral programmes from a financial standpoint are with Denmark, Germany, Japan, the Netherlands,

Table 8.1 **Overview of bilateral co-operation**

	Intergovernmental agreements on co-operation in the field of environment and nature protection (year of signature)	Specific areas of nature conservation co-operation	Transboundary water agreements
Austria	1984	Fertö-Neusiedlersee Transfrontier National Park (1994)	Agreement (1956) Bilateral Committee
Slovakia	1999	Aggtelek National Park and Slovak counterpart (1996)	1976 Bilateral Committee
Ukraine	1992	Discussion on nature protection in the Upper Tisza Region (1997)	Interim Agreement (1993) New Agreement (1997) Bilateral Committee
Romania	1997	Joint nature reserve (in preparation)	1986 Agreement to be updated (draft under negotiation) Bilateral Committee
FR Yugoslavia	–	Nature conservation co-operation renewed in 1994 in the border area	1955 Agreement New co-operation launched in 1996 Bilateral Committee
Croatia	–	Duna-Dráva National Park and Mijet National Park (1998) Duna-Dráva National Park and Kopacki Rit Nature Park: co-operation under discussion	1994 Agreement (1988 Dráva Agreement to be updated) Bilateral Committee
Slovenia	In preparation	Trilateral Nature Park (with Austria)	1994 Agreement Bilateral Committee

Source: ME.

Switzerland and the United States. However, PHARE multilateral assistance is much greater.

2. Hungary's Accession to International Organisations

Accession to the Council of Europe and the OECD

Hungary has been a *member of the Council of Europe* since 1990 and is a party to the European Convention on Human Rights. It also ratified the Madrid Convention on Transfrontier Co-operation between Territorial Communities and Authorities, and the Bern Convention on the Conservation of European Wildlife and Natural Habitats. It was awarded a European Diploma for two protected areas and participated in preparing the Pan-European Biological and Landscape Diversity Strategy.

Hungary *joined the OECD* in 1996. It has provided environmental data to the OECD on a regular basis, issued state of the environment reports, and reviewed the extent to which its legislation incorporated OECD Decisions and Recommendations concerning the environment. In 1995, Hungary stated its willingness to accept all relevant OECD legal instruments in the field of environment, and to associate itself with all OECD Declarations and Ministerial Communiqués; it agreed in 1996 to seek compliance with all such OECD legal instruments, notably those concerning hazardous waste, chemicals and industrial accidents. In July 1997, Hungary joined the International Energy Agency (IEA). The IEA carried out its first in-depth review of Hungarian energy policies in 1999. As part of the OECD/IEA Regulatory Reform Project, the Hungarian electricity sector was also reviewed in 1999.

Hungary has reported to the OECD on progress in improving its legal regime for *waste management*. The government has discussed a number of draft laws concerning waste, but as of March 1999 no waste law had been submitted to Parliament. The Government Decrees of 1996 do not incorporate the OECD Decision on the Control of Transfrontier Movements of Wastes Destined for Recovery Operations, or its revisions. Thus the "green" list of wastes which are not considered hazardous is not yet in force (with the exception of aluminium, iron and steel wastes). It was the government's intention to issue a decree in 1998 introducing this list.

Progress has been made in the areas of *chemicals and biotechnology* with the adoption of a Decree on the Regulation of Procedures for Hazardous Substances and Products in 1996, and the Gene Engineering Act in 1998. In October 1998, the government listed 13 OECD Council Acts which had not yet been fully implemented in national legislation. The official report also refers to a bill on chemical

safety which has not yet been finalised and approved by the government. In addition, there are references to a draft Decree on compliance with Good Laboratory Practice (GLP) Principles and compliance verification and a draft Decree on regulation of the export and import of certain dangerous substances, both of which were to be adopted in principle in 1999. Regarding industrial accidents, little progress has been made on legislation in the areas of industrial risk analysis, prevention of industrial accidents, and transfrontier environmental impacts. No date is given for the adoption of new legislation on Integrated Pollution Prevention and Control (IPPC) and Pollution Release and Transfer Registers (PRTRs) to implement the OECD Recommendations of 1990 and 1996, respectively. Corresponding EU directives or regulations will ultimately need to be implemented (on waste, chemicals, Seveso, IPPC, large combustion plants, etc.).

Accession to the European Union

European integration is one of the government's highest priorities. In 1991, it signed an Association Agreement with the Commission of the European Communities. This Agreement stipulates that Hungary's development policy shall be guided by the principle of sustainable development and fully incorporate environmental considerations. Subsequently, the government submitted its request for full membership in the EU, which can be expected to take place during the next decade. In 1993, the European Council agreed that "the countries of Central and Eastern Europe wishing to join could become members of the EU if they can meet the membership requirements." Hungary has strengthened its administrative organisation to prepare for accession and has created a State Secretariat on Integration in the Ministry of Foreign Affairs, under which an Interministerial Committee on Integration has been acting with sectoral expert groups, including on the environment.

Integration in the EU will require approximations of environmental policies and regulations and the strengthening of central, regional and local institutions in order to reach environmental policy goals. Significant steps in this direction were taken with the adoption of the 1994 National Environment and Nature Conservation Concept, the 1995 Act on General Rules of Environmental Protection and the National Environmental Programme (1997 to 2002), all of which are in line with EU policies.

Approximation of EU environmental legislation (transposition, implementation and enforcement of over 270 environmental laws) is a very large task. Tables of concordance have been developed for 24 fundamental pieces of EU legislation. The first phase of transposition, "screening of legislation", was completed in June 1999. This process has shown that there are wide gaps to fill, especially in the areas of water, air quality and waste management. Progress towards adoption of a new waste management act has been speeded up after a previous slow phase owing to difficulties with municipalities. Implementing legislation on industrial acci-

dents required adoption of the new Act on Disaster Prevention and Relief. Developing a regulation on IPPC will be far from easy, in view of the old structure of environmental legislation and administration. Nevertheless, about 60 per cent of Hungarian legislation is already in conformity with EU legislation. The goal of the government is to *complete the harmonisation programme by the end of 2001*. Temporary easements would be possible in problematic areas, for instance concerning investment in waste water treatment or in agriculture and the environment.

In recent years Hungary has recognised that, in order to meet EU requirements, it needs to upgrade its staff and equipment so as to carry out its environmental and nature protection functions and strengthen the means of supervision, implementation and enforcement. A number of visits, meetings, seminars and courses concerning EU-related issues have been organised, but there is no indication of a significant increase in the *means available to carry out new responsibilities related to EU accession*.

Activities concerning EU accession are supported by the *PHARE programme*. From 1990 to 1998, Hungary received EUR 700 million, i.e. 11 per cent of the total PHARE grant. Of this amount, EUR 66.5 million was for the environmental sector. In the period 1994 to 1998, EUR 14.5 million was spent on developing environmental policy (EUR 2.1 million), harmonising legislation (EUR 1.4 million), upgrading laboratories for the Regional Environmental Protection Inspectorates and providing funds to meet the environmental needs of local governments. Hungary is participating in the PHARE Multicountry Environment Programme (EUR 10 million in 1997). Ongoing activities concern a Danube early warning system, national parks, forest protection in border areas, health damage due to air pollution, uranium mining, etc. Hungary also participates in various EU environmental programmes with Austria, Slovakia, Slovenia and Romania under INTERREG, PHARE-CBC sponsorship. Hungary has joined the EU initiative resulting in the establishment of AC-IMPEL and the decision has been made to increase the staff of environmental inspectorates and national parks in the period 1999 to 2000.

3. Regional Co-operation

Pan-European co-operation

Hungary is well placed to foster *pan-European* co-operation, as it is both an OECD country and a country in transition. It participated actively in the Dobris, Lucerne and Sofia pan-European ministerial conferences, and took account of priorities set under the Lucerne Environmental Action Programme to support the preparation of the National Environmental Programme. It has introduced wider public participation and has adopted five product charges and eco-labelling for

eight product groups. Hungary was very active in the preparation of the UN-ECE's Aarhus Ministerial Conference. It signed the Aarhus Convention and the Protocols on persistent organic pollutants (POPs) and heavy metals, and it supported the pan-European strategy for phasing out leaded gasoline.

Hungary *ratified the Espoo Convention* on Environmental Impact Assessment. A draft Decree concerning implementation of this Convention is being submitted to the government for approval. Hungary also ratified the *Helsinki Convention* on Transboundary Effects of Industrial Accidents, which will be implemented along with regulations whose adoption implements corresponding OECD and EU legal acts. It plays a very active role in international implementation of the Helsinki Convention on the Protection and Use of *Transboundary Watercourses* and International Lakes, particularly the preparation of the recently adopted Protocol on Water and Health, which was signed by Hungary.

Danube international basin

Hungary is entirely within the Danube basin; 95 per cent of its water originates in other countries. The three main watercourses are the *Danube, Tisza and Dráva*. Total pollution loading of these rivers in Hungary has been decreasing by a factor of two over the last ten years, in part because of economic decline and restructuring. The main source of pollution of the Danube in Hungary is still the Budapest area, as the majority of municipal waste water is discharged without required treatment. Pollution abatement measures already taken in Austria and Germany, as well as the decrease in pollution loading from countries in transition experiencing an economic decline, have led to a definite improvement in the Danube's water quality. New warning systems under these conventions will facilitate handling of pollution emergencies and floods. Further improvement can be expected due to the growing number of waste water treatment plants being installed and better enforcement of water pollution legislation.

In addition to its participation in bilateral agreements, Hungary is a contracting party to the Convention on the Protection and Use of Transboundary Watercourses (1992) and to the Sofia Convention on Co-operation for the Protection and Sustainable Use of the Danube River (1994). In 1999, it signed the 1997 *UN Convention on the Law of the Non-navigational Use of International Watercourses*. Implementation of these conventions by all Danubian countries should result in better co-operation, information exchange and further pollution abatement. Hungary participates in international working groups on the Danube and supports the International Secretariat of the Sofia Convention, located in Vienna. The PHARE Multicountry Environmental Programme, UNDP/GEF, USAID and various bilateral donor countries are financing a number of projects aimed at improving water management in the Danube region and have facilitated the entry into force of the Sofia

Convention (1998). A Strategic Action Programme for Environmental Protection in the Danube Basin was prepared in 1994; implementation began in 1996. Uniform laboratory methods have been established, a monitoring network set up and comparable data exchanged.

In the framework of Danubian co-operation, special mention should be made of problems arising in the *Upper Tisza* region (Hungary, Romania, Slovakia, Ukraine), which contains wetlands and heavily polluted transfrontier rivers and is subject to flooding. Co-operation has begun with the establishment of a Ramsar site and the carrying out of projects to decrease transboundary water pollution (with support from USAID). Slovakia and Romania will receive USD 6.5 million to abate pollution in their transfrontier rivers. The EU is supporting a project aimed at revitalising previous co-operation in this region; progress is expected soon.

Hungary has been actively participating in *sub-regional co-operation*. Under the Central European Initiative (CEI) it is participating in the Transport and Environment subgroup of the Environmental Protection Working Group, which prepared a Ministerial Statement for UNGASS in 1997 on sustainable transport. Hungary signed this statement. In the framework of the South-East European Economic Co-operation Initiative (SECI). Hungary has been involved in the activities of the Working Group on economic co-operation, in which environmental matters are addressed. Furthermore, Hungary is active in the renewal of co-operation by the "Visegrád" Group (V4 – Czech Republic, Hungary, Poland, Slovakia) to address matters of common interest, including integration into the EU.

Transfrontier air pollution

Despite great progress, Hungary is still a relatively *large emitter of SO_2*, with emissions of 65 kg/inhabitant in 1997 as compared to the OECD average of 39 kg. In terms of GDP, SO_x emissions (8.0 kg/1 000 USD) were also high compared to the OECD average of 2.3 kg. NO_x emissions were 20 kg/inhabitant, much below the OECD average of 40 kg. In terms of GDP, they were equivalent to the OECD average.

Hungary was committed under the Helsinki Protocol to reduce its 1993 *SO_2 emissions* by 30 per cent as compared to 1980. *This commitment was surpassed* in 1993 (54 per cent reduction), mainly due to the economic slowdown but also because there is less use of high sulphur fuel. In 1997, SO_2 emissions were 60 per cent below their 1980 level. Power plants represent 71 per cent of total emissions, and industry and households 13 per cent each. Under the Oslo Protocol (which Hungary intends to ratify in 1999), emission levels should be further reduced (Table 8.2). The set targets are likely to be achieved with the adoption of flue gas desulphurisation and fluidised bed combustion at power plants, and the use of diesel fuel with very low sulphur content.

Table 8.2 **Air emission targets in Hungary**

	Agreement		Reference year	Target date	Reduction target (%)	Reduction achieved (%)
SO_2	Helsinki	1985	1980	1993	*30*	*54* (1993)
SO_2	Oslo	1994	1980	2000	*45*	*60* (1997)
	Oslo	1994	1980	2005	*50*	
	Oslo	1994		2010	*60*	
NO_x	Sofia	1988	1987	1994	*0*	*29* (1994)
	Sofia	1988				*25* (1997)
VOCs	Geneva	1991	1988	2000	*0*	*32* (1997)
CO_2	National	1992	1985-87	2000	*0*	*25* (1997)
	Kyoto	1997	1985-87	2008-12	*6*	
CFCs	Copenhagen	1992	1986	1996	*100*	*100* (1996)
Halons	Copenhagen	1992	1986	1994	*100*	*100* (1994)

Source: OECD.

Table 8.3 **Acid deposition,** 1996
(100 tonnes)

	SO_2		NO_x	
	Hungary as receiver[a]	Hungary as emitter[b]	Hungary as receiver[a]	Hungary as emitter[b]
Austria	14	59	19	8
Germany	55	67	31	10
Czech Republic	62	66	22	10
Italy	37	43	54	8
Slovakia	91	221	36	24
Poland	130	261	52	37
Belarus	2	56	1	11
Russia	4	78	3	16
Ukraine	29	148	8	23
Romania	116	141	26	25
Bulgaria	51	24	9	5
Yugoslavia	103	105	8	18
Slovenia	19	16	5	2
Croatia	16	82	9	12
Bosnia	93	49	11	8
Subtotal	822	1 416	294	217
Hungary	504	504	53	53

a) Quantity deposited in Hungary as a result of emissions in various countries.
b) Quantity deposited in various countries as a result of emissions in Hungary.
Source: EMEP.

The Sofia Protocol (1988) required parties to stabilise their *NO_x emissions* by 1994 at the 1987 level. Hungary *surpassed this requirement* by achieving a 29 per cent reduction in 1994. Recent NO_x emissions trends show a slight increase mainly due to growth in the transport sector. The motor vehicle fleet, although about half the size of those of industrialised countries per 100 inhabitants, is very polluting owing to age, poor maintenance and low motor efficiency and is rapidly growing. Measures are being taken to reduce NO_x emissions from transport (55 per cent of emissions) and power plants (25 per cent) (Chapter 2).

Under the Geneva Protocol (1991), parties agreed to control *VOCs emissions*. While most parties must reduce their emissions by 30 per cent in 1999 as compared to 1988, Hungary is only committed to *stabilisation* at the 1988 level since its total emissions, emissions per capita and emissions per km^2 are very small. A number of reduction measures have been taken. In particular, a decree was issued in 1995 aimed at better control of these emissions from service stations. The stabilisation target will be reached despite economic growth and expanding transport.

SO_2 and NO_x emissions in Hungary cause *acid deposition* within as well as beyond its borders. In Europe, Hungary is mostly an SO_x exporting country because of its large emissions and an NO_x importing country since its motor vehicle fleet is relatively small (Table 8.3). Over half of SO_2 and over 70 per cent of NO_x deposits originate in other countries.

4. Global Co-operation

Climate change

Hungary is quite concerned about climate change. The annual temperature in Budapest has increased by approximately 1 °C over the last 100 years. It is expected that reduced precipitation in Hungary's semi-arid regions will affect agriculture. Hungary ratified the *UN Framework Convention on Climate Change* in 1995 and helped develop the 1997 Kyoto Protocol. Signature of the Protocol is foreseen in 1999; this will mean that GHG emissions in 2008 to 2012 should be reduced by 6 per cent compared with the reference period (1985 to 1987).

Hungary is a *relatively small emitter of CO_2* (5.7 tonnes/inhabitant), but due to inefficient energy use it emits more CO_2 per unit of GDP (0.71 tonnes/1 000 USD) than the OECD average (0.63 tonnes) (Figure 2.1). Much of its electricity is generated by nuclear energy (40 per cent in 1997). As a transition country enjoying the benefit of "a certain degree of flexibility" under the FCCC, Hungary chose the years 1985 to 1987 as the base period for its international commitment on GHG; this corresponds to the peak in energy consumption, before the economic slowdown between 1988 and 1993 (Figure 2.1).

Owing to economic conditions during the early part of the transition period, there was a *significant drop in emissions of greenhouse gases* corresponding to a general reduction in use of energy and fuel by industry, transport, agriculture and households. Methane emissions decreased because of the decline in coal mining (Table 8.4). From 78 million tonnes/year in 1987, CO_2 emissions fell to 58 million tonnes in 1997 (Figure 2.1). During this period there was a shift towards greater relative use of natural gas; there was also greater carbon uptake by forests.

A few measures have been taken during the 1990s to reduce GHG emissions. In particular, *energy prices* have been increased to reflect international prices and subsidies have been very much reduced. According to a law which entered into force in January 1997, end users of electricity and gas must cover supply costs plus an 8 per cent (real) rate of return for all companies that participated in the privatisation process.

As a result of new economic growth, *CO_2 emissions are increasing*. However, they should not exceed 65 million tonnes in 2000 (below the 1990 level of 76 million tonnes). Energy-related CO_2 emissions could possibly reach about

Table 8.4 **GHG emissions in Hungary**

	Total 1995 (kilotonnes)	Trend 1991-95 (%)
Total CO_2	59 758	*–12*
Energy-related CO_2	57 567	*–12*
of which:		
Energy	26 431	*–7*
Industry	6 352	*0*
Transport	7 001	*–5*
Commercial	3 946	*0*
Residential	11 296	*–18*
Agricultural and forestry	1 519	*–28*
Other	1 022	*–17*
Industrial process-related CO_2	1 438	*+4*
Waste management CO_2	754	*0*
CO_2 sink forestry	–4 797	*+47*
Total CH_4	708	*–23*
Total N_2O	8	*0*
GDP		*+1*
TPES		*–7*
Industrial production (manufacturing)		*+8*

Source: Hungarian National Report to UNFCCC Secretariat.

72 million tonnes in 2010. Hungary will easily meet the target, adopted by Parliament in 1993, of not exceeding the 1985 to 1987 level by the year 2000 as regards per capita emissions of CO_2 from energy consumption. Fulfilling the Kyoto target (a 6 per cent decrease) is quite feasible, considering the potential for further reductions. The energy efficiency of industry is rather low in comparison with Western Europe; household appliances consume considerable energy, and energy consumption per unit volume heated is 25 per cent higher. Hungary has established an *overall energy saving and energy efficiency* improvement programme (approved 1994) and a corresponding Energy Saving Action Plan (approved 1995). The Action Plan aims to increase use of renewable energy (especially biomass), improve energy efficiency in the private and public sectors, finance energy efficiency projects, issue legal standards for energy performance of buildings, and improve education and information. Credit facilities for energy efficiency projects include HUF 1.2 billion from Hungary and USD 41 million from foreign and international sources (Germany, PHARE, GEF). In 1996, a soft loan programme for energy saving was launched.

In October 1997, a new Energy and Environment Centre was established by the Ministry for Environment and Ministry of Economic Affairs. Energy prices have been liberalised, but the VAT on energy products is 12 per cent instead of 25 per cent as on most products. Gasoline is heavily taxed (Chapter 6). *Other measures* include plans to increase forest sinks, reduce fuel consumption by vehicles and increase use of public transport. The overall effect by 2002 of measures taken may be a decrease of 2 million tonnes compared with the business as usual scenario (68 million tonnes). Major reductions will occur at power plants and in households. Other GHG such as CH_4 and N_2O will decrease significantly between 1990 and 2000. By the end of 1999, a new Hungarian strategy for meeting Kyoto commitments was to be issued. Additional cost-effective measures was to be identified.

Hungary is collaborating with the Netherlands on *joint activities* aimed at reducing energy use in municipalities and utilities, and promoting use of buses with compressed natural gas engines. It participates in the SCORE Programme to improve energy efficiency. There is co-operation with the United States concerning preparation of an emissions inventory and a national climate change action plan.

Protection of the ozone layer

Hungary is *not a producer of ozone depleting substances* (ODS). Consumption in 1986 was 7 085 tonnes, mostly aerosols, solvents, plastic foam and refrigeration circuits (5 360 tonnes of CFCs and 455 tonnes of halons). Consumption of CFCs and halons fell after 1990 (87 per cent for CFCs between 1990 and 1995, and 81 per cent for halons between 1990 and 1993) and has now ceased.

Hungary is a party to the 1987 Montreal Protocol and subsequent amendments (London, Copenhagen, Montreal). It adopted two decrees in 1990 and 1993 to implement this agreement, and in 1995 introduced a product fee on refrigerators and air conditioners. It *reduced CFCs consumption* initially by banning use in aerosols; it *banned the import of halons* in January 1994 and of *CFCs* in January 1996 (except 10 tonnes in 1996 and 5 tonnes in 1997 for essential use, i.e. in anti-asthma inhalers). Hungary is therefore in full compliance with its international obligations. This result was achieved in part with the support of the World Bank and the Global Environment Facility (GEF), which provided USD 6.5 million in non-refundable support to replace CFCs use in 12 industrial projects (refrigerators, plastic foam, solvents and propellants). That project was completed at the end of 1998, with additional expenditure of USD 1.7 million by Hungarian firms.

Charges on new refrigerators provide revenue to the Central Environmental Protection Fund (HUF 100 per kg HCFC). This fund is supporting recovery of CFCs from foam and discarded refrigerators (HUF 2 300 per unit). Owners of old refrigerators receive HUF 1 000 from the recycler. Since 1996, existing CFCs must be recovered by certified professionals for reuse or destruction; the price of recycled CFCs is growing due to demand for use in refrigeration units in hospitals and agriculture. No CFCs-containing products may be imported. CFCs are being replaced by HCFCs (600 tonnes in 1993, 1 247 tonnes in 1997). In 1996, consumption of carbon tetrachloride and methyl chloroform ceased.

Biodiversity

Hungary protects around 9 per cent of its territory, including *186 national protected areas* (*1 259 protected areas in all*). Among these are nine national parks and 37 protected landscapes; 25 wetlands are protected under the Ramsar Convention, five areas are UNESCO Man and the Biosphere reserves and four are World Natural and Cultural Heritage sites. Hungary actively participates in the Biodiversity Convention (Chapter 4). With UNEP support, it is preparing a national biodiversity conservation strategy and action programme and its first national report. Hungary's rich biodiversity, including high-quality hunting areas and karstic formations, is an important asset in regard to international tourism.

Trade and the environment

Hungary has taken very severe measures against the import of polluting cars by *banning import of cars not equipped with three-way catalytic exhaust systems*. Regarding trade in endangered species, measures will be taken to reinforce sanctions which were considered inadequate by the Conference of the Parties to CITES. Importing ivory is prohibited, as is transit shipment without the required CITES per-

mit. Special attention needs to be given to controlling imports from Ukraine, which is not a party to CITES. In July 1996, Hungary strictly implemented the Basel Convention on the Control of Transboundary Movements of *Hazardous Wastes* and their Disposal by adopting a very wide list of hazardous wastes (which needs to be modified to allow easier entry into the country of OECD "green list" wastes). Governmental decisions are needed in order to approve the Convention's 1995 and later amendments. In the early 1990s, Hungary exported 700 tonnes of lead-acid batteries per year to Slovenia. In 1999, Hungary signed the Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for trade in hazardous chemicals.

Agenda 21

Hungary approved the *Rio Declaration and its various principles*. It introduced the polluter pays principle, public information and participation, strict third party liability and other basic principles of environmental law in its 1995 Act on General Regulations concerning Environmental Protection. It has examined Agenda 21 and transposed much of its content in its national strategies and action plans. Hungary participated in the Brundtland Commission and has been a member of the UN Commission on Sustainable Development (UN-CSD). It has prepared six and published four national reports to UN-CSD.

A National Council of Environmental Protection was created in 1996 to advise the government on sustainable development issues. It consists of representatives of industry, scientific bodies and environmental NGOs. There is also an interministerial body, created in 1993, called the Hungarian Commission for Sustainable Development. Local Agenda 21 activities have been launched with the support of NGOs. These activities are aimed more at implementing sustainable development in a new context than at implementing the various chapters of Agenda 21.

5. Environmental Aid and Foreign Direct Investment

Hungary succeeded in attracting and retaining *foreign direct investment* from the beginning of the reform process, and it has continued to do so since its accession to the OECD. In the period 1989 to 1997, USD 18 billion was invested in Hungary. The 1997 inflow amounted to USD 2 billion (mostly from the Netherlands, France and the United Kingdom). This figure represented 4.7 per cent of GDP in 1997 and 20.8 per cent of Gross Fixed Capital Formation (GFCF), or about twice the corresponding figures in the Czech Republic and Poland. Multinational enterprises in the manufacturing and energy industries bring in new technologies for environmental protection and help reduce industrial pollution. However, they prefer investing in "green fields" than "brown fields" in view of liability issues concerning past contamination.

Hungary *receives very limited foreign assistance* to promote economic development. However, this aid as well as the overall flow of foreign investment have decreased since 1994 due to progress achieved so far (Table 8.5). The EU's PHARE programme for 1990 to 1998 amounted to EUR 700 million. Some foreign assistance is for environmental protection. The major donors of environmental aid are PHARE (EUR 66.5 million), the GEF (USD 6.5 million) and countries such as Germany, Japan, the Netherlands and the United States. In terms of environmental assistance received, Hungary is fourth among the Central and Eastern European countries (Table 8.6). It also *provides exchange of expertise* in the framework of

Table 8.5 **Official aid to Hungary**
(million USD current)

	1993	1994	1995	1996	1997
Bilateral aid	87	68	94	100	74
Multilateral aid	79	132	–338	97	78
Total aid	166	200	–244	197	152
of which: EU	*139*	*173*	*–275*	*154*	*120*
For reference:					
Total receipts[a]	3 955	2 365	3 795	555	1 610
1 per cent of GNP	3 729	4 010	4 193	4 168	4 319

a) Official aid flows + other official flows + private sector flows.
Source: OECD.

Table 8.6 **Environmental assistance,**[a] 1994-97

	EUR per capita	Total (million EUR)
Czech Republic	38.5	397
Lithuania	37.1	138
Slovakia	27.2	145
Hungary	20.4	209
Bulgaria	16.0	136
Poland	15.6	603
Romania	11.0	250
Russia	2.5	375
Total CEE + NIS	8.2	3 225

a) Commitments by donors and international financial institutions to the above countries.
Source: OECD.

some of its bilateral agreements with other countries in transition in Central and Eastern Europe.

Hungary is paying in due time its *obligatory contributions* to international organisations, secretariats and funds concerned with environmental protection (about HUF 120 million/year). Its contribution to the Multilateral Trust Fund of the Montreal Protocol was over USD 313 000 in 1995. It is also making voluntary contributions to promote international co-operation (payments to support the Danube Convention's Interim Secretariat, UNEP and activities under various conventions).

6. Environmental Performance

Since 1990, Hungary has acquired a *new international standing* through close co-operation and active participation in international fora. The *progress* achieved through international environmental co-operation is *remarkable*, considering that such co-operation had to be reoriented as a result of changes in the political systems of Central and Eastern Europe (new States, new economic approaches and new administrative structures). The progress made by Hungary at international level must also be evaluated against the fact that its major environmental laws were adopted in 1995 and 1996, and that a number of old laws still need to be updated to reflect its new environment policy.

Bilateral relations

Relationships with neighbouring countries are more effective and more positive than in previous decades. Significant new bilateral agreements concerning environmental protection, nature conservation and water management have been negotiated, and new initiatives are being taken to exchange data, reduce transfrontier pollution or act jointly to protect nature in border areas. Within a few years, the necessary legal and institutional mechanisms have been put in place to make *effective international co-operation* possible. Of particular significance are new co-operative activities with Slovakia and Romania. Co-operation on environmental protection of the Upper Tisza basin is progressing. The dispute between Slovakia and Hungary concerning hydroelectric dams on the Danube was submitted to the International Court of Justice. Implementation of the Court's judgement, in the mutual interest of the concerned parties, will take place in the near future. The significance of this judgement from the point of view of environmental protection goes well beyond the subject of the dispute.

OECD

Hungary joined the OECD in 1996. It has undertaken to seek compliance with all OECD Decisions and Recommendations relevant to the environment. The government has issued these texts in Hungarian and made available other important sources of information about environmental protection. Definite progress in this area was achieved with the adoption in 1996 of decrees concerning the transfrontier movement of hazardous waste and management of toxic substances. However, *there are still gaps concerning implementation of a number of OECD legal acts*, notably in the area of transfrontier movement of "green list" wastes and chemical safety. Much of the legislation which the government indicated to the OECD in 1995 was about to be submitted to Parliament in 1996 have not been submitted to Parliament. To overcome insufficient harmonisation of national legislation with OECD and EU requirements, an Interministerial Committee on Chemical Safety has been established. The Act on Disaster Prevention and Relief has been passed by Parliament. The current legal gap could be closed in the coming years through adoption of new acts on waste and chemical safety. Further efforts will also be needed to implement fully the recent OECD Recommendations on PRTRs and on environmental information.

European Union

Hungary, which is very keen to become a *Member State of the European Union*, hopes to benefit from EU funds to achieve harmonisation of its environmental legislation with that of the EU. It made significant progress in this direction with the adoption of framework laws on environmental protection (1995) and nature conservation (1996) and of the 1998 Environmental Action Plan, which deals extensively with implementation of EU acquis. The National Legal Harmonisation Programme is progressing, and *full transposition of the entire environmental acquis* is foreseen in 2000 to 2001. To be a realistic target, this self-imposed deadline would require necessary budgetary provisions as well as further strengthening of human resources and political support for the programme. According to the European Commission report of 1998, it is necessary that "the pace of transposition in environment picks up". The limited progress made recently, as well as recent administrative reorganisations, *do not support the view that the self-imposed 2001 deadline is likely to be met*. Serious obstacles of an overall legal, political and administrative nature remain before the acquis can be fully transposed. Integration of harmonisation activities between ministries, and close interministerial co-operation, are a precondition for solving interministerial problems associated with implementation of regulations on municipal waste, IPPC or hazardous installations (Seveso). Concerning the EU's IPPC directive, the integration of legal procedures

scattered among different departments represents a difficult challenge. Progress will depend on the government giving higher priority to environmental policies.

Long-term financing of all needed environmental infrastructure remains an open matter, bearing in mind the considerable costs implied by better sewerage and waste water treatment, better waste management and soil decontamination. Foreign support as well as economic growth will help, but most of the cost will ultimately fall on the user or polluter and not on the State. Thus it may be necessary to adopt laws specifying that municipalities and their constituencies, rather than the central budget and taxpayers in general, must assume the burden of pollution measures.

Multilateral agreements

Hungary has already signed nearly all pertinent multilateral environmental agreements. It is *ratifying these agreements very rapidly* and providing its share of the operating expenses associated with them. Hungary participates actively in the preparation of new agreements and in the committees and working parties operating within them. To a very great extent it has implemented the Espoo Convention on Environmental Impact Assessment in a Transboundary Context. Nevertheless, further decrees are needed to give full effect to this Convention.

Regional co-operation in the *Danube basin* has made very significant progress since the adoption of the 1985 Bucharest Declaration on Danube water management and water protection. After many years of preparation, a Convention on Co-operation for the Protection and Sustainable Use of the Danube River was signed in Sofia in 1994. An international secretariat is already in operation, and comparable data are being exchanged. Legal instruments and institutions are now in place to better protect the Danube. Overall, Hungary's contribution to pollution loading of the Danube basin has been reduced by about 50 per cent. Despite the significant *reductions in pollution discharge* achieved in many countries, loading from land-based Danubian sources remains the major source of pollution of the Black Sea. Large pollution prevention investments aimed at reducing the pollution load are still needed in Hungary and other countries of the basin.

Hungary is a party to all UN-ECE agreements on *long-range transboundary air pollution*. It has satisfied and even exceeded all its international commitments concerning SO_2, NO_x and VOCs. This result is partly due to reduced energy use reflecting the decline in industrial production. Further investment to combat SO_x will be needed. The current NO_x emissions trend is a gradual increase in line with transport growth. Special measures will be required to avoid NO_x levels becoming too high.

Hungary has adopted both a national stabilisation target for CO_2 emissions in 2000 and a 6 per cent reduction target for GHG emissions in 2008 to 2012 under the *Kyoto Protocol*. The base period is 1985 to 1987, when energy consumption

peaked. Owing to the economic decline which started in 1989, Hungary's CO_2 emissions in 2000 will be lower than during the base period. Energy awareness campaigns, as well as a rapid increase in real fuel prices and a fall in disposable income, have led to a sizeable reduction in household energy consumption. Coal has partly been replaced by natural gas, and a number of energy-saving measures have been initiated, resulting in a decrease in CO_2 emissions compared with the "business as usual" scenario. Further increases in energy prices for households may take place; at the same time, energy prices for large users may decrease. The social consequences of a new tariff structure are not yet known, but need to be taken into account. Further efforts to improve energy efficiency and reduce energy wastage could benefit the economy. The potential for large-scale afforestation should be used in joint implementation activities. However, this endeavour should be kept within bounds since, under the circumstances, there is little need to carry out measures which would not be cost-effective on the basis of Europe-wide energy prices.

Hungary has rapidly implemented the *Montreal Protocol* and its amendments, and has adopted all necessary decrees to control imports of both ODS and ODS-containing equipment. It has met all its international commitments concerning CFCs, halons, carbon tetrachloride and methyl chloroform. For this purpose, Hungary used a GEF grant which helped industry bear the cost of a change from CFCs use. A *product charge* on refrigeration was created with a view to facilitating CFCs recovery. The newly established system should achieve good efficiency in avoiding illegal releases of existing CFCs.

Hungary adopted the *Rio Declaration on Environment and Development* and is supporting implementation of Agenda 21. The 1995 Act on General Rules of Environmental Protection implements most Rio principles, notably on EIA, the polluter pays principle, strict liability, access to information and public participation. A high-level consultative body, with the participation of industry, scientific circles and NGOs, is providing advice to the government on major issues, policies and laws concerning environmental protection. Various initiatives have been taken at the local level. However, it is far from clear whether Hungary seeks sustainable development rather than simply sustained economic growth. The support given to integration of environmental and other policies seems weak.

Hungary has succeeded in creating a *very favourable climate for foreign investment* and has benefited from significant foreign direct investment. Multinational companies introduce pollution control technologies and help decrease the pollution load from industry. Hungary is providing environmental assistance directly to some of its neighbours and voluntary contributions to international organisations. It has benefited from foreign support by the European Union (e.g. PHARE), GEF and many OECD bilateral donor countries.

ANNEXES

Annex I: Selected environmental data[1]

	HUN	CAN	MEX	USA	JPN	KOR	AUS	NZL	AUT	BEL	CZE	DNK
LAND												
Total area (1 000 km^2)	**93**	9 971	1 958	9 364	378	99	7 713	270	84	31	79	43
Major protected areas (% of total area)[2]	**9.1**	9.6	8.2	21.2	6.8	6.9	7.7	23.5	29.2	2.8	16.2	32.0
Nitrogenous fertiliser use (t/sq. km of arable land)	**5.4**	4.1	4.4	6.2	11.5	23.1	1.7	37.3	7.6	18.8	6.8	12.3
FOREST												
Forest area (% of land area)	**18.9**	45.3	33.4	32.6	66.8	65.2	19.4	29.5	47.6	22.2	34.1	10.5
Use of forest resources (harvest/growth)	**0.6**	0.4	0.2	0.6	0.3	0.1	..	0.6	0.6	0.9	0.7	0.6
Tropical wood imports (USD/cap.)[3]	**0.1**	0.8	0.1	1.6	18.4	11.1	4.6	2.7	0.2	11.8	0.1	4.4
THREATENED SPECIES												
Mammals (% of species known)	**71.1**	19.2	33.2	10.5	7.7	17.0	14.9	15.2	35.4	31.6	33.3	24.0
Birds (% of species known)	**18.8**	10.8	16.9	7.2	8.3	15.0	6.4	25.3	37.0	27.5	66.1	10.6
Fish (% of species known)	**32.1**	6.4	5.7	2.4	11.1	1.3	0.4	0.8	65.5	54.3	29.2	18.2
WATER												
Water withdrawal (% of gross annual availability)	**5.0**	1.7	17.4	19.9	20.8	35.6	4.3	0.6	2.7	42.5	15.6	15.7
Fish catches (% of world catches)	**–**	1.0	1.6	5.4	6.3	2.4	0.2	0.6	–	–	–	2.0
Public waste water treatment (% of population served)	**22**	78	22	71	55	53	..	80	75	27	59	87
AIR												
Emissions of sulphur oxides (kg/cap.)	**64.5**	88.9	23.2	69.0	7.3	32.9	100.7	12.5	7.1	23.7	68.0	20.7
" (kg/1 000 USD GDP)[4]	**8.0**	4.4	3.9	2.6	0.4	2.9	5.2	0.8	0.4	1.3	6.4	1.0
Emissions of nitrogen oxides (kg/cap.)	**19.4**	67.1	16.4	79.9	11.3	27.6	118.5	46.9	21.2	32.9	41.1	47.0
" (kg/1 000 USD GDP)[4]	**2.4**	3.4	2.8	3.0	0.6	2.5	6.1	3.1	1.1	1.8	3.8	2.2
Emissions of carbon dioxide (t./cap.)[5]	**5.7**	15.8	3.5	20.4	9.3	9.2	16.6	9.0	7.9	12.0	11.7	11.8
" (t./1 000 USD GDP)[4]	**0.71**	0.77	0.60	0.77	0.45	0.78	0.84	0.59	0.42	0.64	1.10	0.56
WASTE GENERATED												
Industrial waste (kg/1000 USD GDP)[4, 6]	**86**	..	60	..	57	71	119	33	75	75	353	25
Municipal waste (kg/cap.)[7]	**500**	490	300	720	400	400	690	350	510	480	310	560
Nuclear waste (t./Mtoe of TPES)[8]	**2.2**	5.6	0.3	1.0	1.9	2.1	–	–	–	1.4	1.1	–
NOISE												
Population exposed to leq > 65 dB (A) (million inh.)[9]	**..**	..	..	17.2	38.0	..	..	..	1.2	1.2	1.5	0.5

. . Not available.
– Nil or negligible.
* Figures in italics include: for Germany: western Germany only;
for United Kingdom: threatened species: Great Britain only.
water withdrawal and public waste water treatment: England and Wales only.

g) Data for Luxembourg are included under Belgium.

1. Data refer to the latest available year. They include provisional figures and Secretariat estimates. Partial totals are underlined. Varying definitions can limit comparability across countries.
2. Data refer to IUCN categories I to VI; AUS, HUN, TUR: national data.

Source: OECD Environmental Data, Compendium 1999.

Annex I: Selected environmental data[1]

FIN	FRA	DEU*	GRC	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	ESP	SWE	CHE	TUR	UKD*	OECD*
338	549	357	132	103	70	301	3	42	324	313	92	506	450	41	779	245	34 728
8.4	10.1	26.9	2.6	9.5	0.9	7.3	14.4	11.6	24.2	9.4	6.6	8.4	8.1	18.0	3.8	20.4	12.6
7.1	13.4	14.8	7.8	8.9	43.2	8.4	[a]	37.7	12.3	6.1	4.0	5.4	7.3	12.8	4.3	19.5	6.4
75.5	31.4	30.1	22.8	1.3	8.8	23.3	34.4	9.2	39.2	29.7	35.3	32.3	73.5	31.7	26.9	10.5	33.8
0.8	0.7	0.4	0.6	–	0.6	0.3	0.5	0.6	0.4	0.6	0.8	0.5	0.7	0.5	0.4	0.7	0.6
1.9	7.1	2.0	3.3	4.0	10.1	6.6	[a]	17.3	4.5	0.2	19.9	6.2	2.0	0.5	0.9	3.3	5.1
11.9	20.2	36.7	37.9	–	6.5	32.2	54.1	15.6	5.9	15.5	17.3	21.2	18.2	34.2	22.2	*22.2*	..
6.7	14.3	29.2	13.0	13.3	21.8	24.7	50.0	27.1	6.3	16.6	13.7	14.1	8.6	42.6	6.7	*6.8*	..
11.9	6.6	68.2	24.3	–	33.3	..	38.2	82.1	–	27.1	18.6	29.4	12.7	44.7	9.9	*11.1*	..
2.2	23.9	24.4	12.1	0.1	2.6	32.2	3.4	4.9	0.7	18.7	11.9	36.8	1.5	4.9	15.2	*14.6*	11.8
0.2	0.6	0.3	0.2	2.4	0.3	0.4	–	0.5	3.1	0.4	0.2	1.2	0.4	–	0.5	1.0	30.9
77	77	89	45	4	61	61	88	97	67	47	21	48	93	94	12	*88*	59
19.5	16.2	17.9	48.2	32.2	45.1	23.1	14.3	8.0	6.9	61.3	36.2	49.1	10.3	4.5	29.8	34.5	39.2
1.1	0.9	1.0	4.6	1.7	2.6	1.3	0.5	0.4	0.3	10.7	3.3	3.7	0.6	0.2	5.2	2.0	2.3
50.6	29.1	22.0	35.1	105.9	33.9	30.9	47.5	28.5	50.5	29.9	37.6	31.7	38.1	18.0	14.5	35.0	40.6
2.9	1.5	1.2	3.4	5.4	1.9	1.7	1.6	1.5	2.2	5.2	3.4	2.4	2.2	0.8	2.5	2.0	2.4
12.5	6.2	10.8	7.7	8.9	10.3	7.4	20.5	11.8	7.8	9.1	5.2	6.4	6.0	6.3	2.9	9.4	11.1
0.71	0.32	0.60	0.73	0.46	0.59	0.41	0.69	0.64	0.34	1.49	0.44	0.46	0.34	0.29	0.51	0.52	0.63
139	93	46	61	2	70	22	162	32	30	94	4	28	100	10	94	57	82
410	590	460	370	560	560	460	460	560	630	320	380	390	360	600	330	480	500
2.1	4.6	1.3	–	–	–	–	–	0.2	–	..	–	1.8	4.6	2.4	–	3.6	1.6
0.2	9.4	*9.5*	2.0	..	..	..	..	0.6	0.5	..	3.0	8.9	0.3	0.8	..	5.7	*124.0*

3. Total imports of cork and wood from non-OECD tropical countries.
4. GDP at 1991 prices and purchasing power parities.
5. CO_2 from energy use only; international marine bunkers are excluded.
6. Waste from manufacturing industries.
7. NZL: household waste only.
8. Waste from spent fuel arising in nuclear power plants, in tonnes of heavy metal, per million tonnes of oil equivalent of total primary energy supply.
9. Road traffic noise.

Annex II: Selected economic data and trends[1]

	HUN	CAN	MEX	USA	JPN	KOR	AUS	NZL	AUT	BEL	CZE	DNK
TOTAL AREA (1 000km^2)	**93**	9 971	1 958	9 364	378	99	7 713	270	84	31	79	43
POPULATION												
Total population, 1998 (100 000 inh.)	**101**	306	1 001	2 702	1 264	464	187	38	82	102	103	53
% change (1980-1998)	**–5.3**	24.4	43.6	18.7	8.2	21.7	27.3	20.9	8.8	3.6	–0.3	3.5
Population density, 1998 (inh./km^2)	**109.0**	3.1	51.1	28.9	334.6	467.2	2.4	14.1	97.9	334.1	130.6	123.0
GROSS DOMESTIC PRODUCT[2]												
GDP, 1998 (billion USD)	**87**	637	609	7 350	2 544	507	384	56	157	198	107	114
% change (1980-1998)	**..**	55.3	45.9	63.6	64.6	254.2	81.4	50.2	48.8	37.8	..	50.4
per capita, 1998 (1 000 USD/cap.)	**8.5**	20.8	6.1	27.2	20.1	10.9	20.5	14.7	19.2	19.4	10.4	21.5
INDUSTRY[3]												
Value added in industry (% of GDP)	**32**	27	26	26	37	43	26	26	30	28	37	24
Industrial production –												
% change (1980-1998)	**14**	51	60	65	45	382	53	34	65	33	–10	66
AGRICULTURE												
Value added in agriculture												
(% of GDP)[4]	**7**	2	6	2	2	6	3	7	1	1	4	4
ENERGY SUPPLY												
Total supply, 1997 (Mtoe)	**25**	238	142	2 162	515	176	102	17	28	57	41	21
% change (1980-1997)	**–12.3**	23.3	43.1	19.3	48.6	327.6	44.4	80.3	18.4	23.9	–13.7	7.0
Energy intensity, 1997												
(Toe/1 000 USD)	**0.31**	0.38	0.24	0.31	0.20	0.33	0.28	0.30	0.18	0.30	0.37	0.19
% change (1980-1997)	**..**	–18.2	2.8	–24.2	–12.3	13.7	–16.3	19.2	–17.8	–7.5	..	–26.8
Structure of energy supply, 1997 (%)[5]												
Solid fuels	**19.1**	15.7	10.4	26.9	18.3	19.5	46.8	12.3	21.9	15.9	53.2	37.4
Oil	**27.8**	33.5	62.4	39.6	52.7	61.4	35.0	37.7	43.4	42.5	19.5	44.0
Gas	**38.6**	29.3	20.4	23.5	10.7	7.6	16.6	28.2	23.5	19.8	18.8	17.8
Nuclear	**14.5**	8.9	1.9	8.0	16.1	11.4	–	–	–	21.7	8.0	–
Hydro, etc.	**0.1**	12.5	4.9	1.9	2.2	0.1	1.5	21.9	11.1	0.1	0.5	0.8
ROAD TRANSPORT[6]												
Road traffic volumes, 1997												
billion veh.-km	**27**	274	54	4 090	756	67	180	28	58	83	30	42
% change (1980-1997)	**39.6**	33.1	27.7	67.5	94.2	673.2	56.5	71.5	63.9	72.9	42.9	61.2
per capita (1 000 veh.-km/cap.)	**2.6**	9.0	0.6	15.3	6.0	1.5	9.7	7.7	7.2	8.1	2.9	8.0
Road vehicle stock, 1997												
10 000 vehicles	**263**	1 786	1 330	21 022	6 921	1 014	1 099	211	459	491	366	207
% change (1980-1997)	**123.7**	35.2	128.1	34.9	86.7	1 822.0	51.2	34.3	63.3	41.1	89.4	25.4
per capita (veh./100 inh.)	**26**	59	14	79	55	22	59	57	57	48	36	39

.. Not available.
– Nil or negligible.
* Figures in italics include western Germany only.
1. Data may include provisional figures and Secretariat estimates. Partial totals are underlined.
2. GDP at 1991 prices and purchasing power parities.

Source: OECD Environmental Data, Compendium 1999.

Annex II: Selected economic data and trends[1]

FIN	FRA	DEU*	GRC	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	ESP	SWE	CHE	TUR	UKD	OECD*
338	549	357	132	103	70	301	3	42	324	313	92	506	450	41	779	245	34 728
52	588	823	106	3	37	577	4	157	44	387	100	398	89	73	648	591	11 079
7.9	9.1	5.1	9.4	21.1	8.8	2.2	16.8	11.0	8.5	8.8	1.8	6.3	7.1	14.7	45.8	4.9	15.2
15.2	107.1	230.5	79.9	2.7	52.6	191.5	164.9	378.1	13.7	123.5	108.7	78.6	19.8	177.4	83.1	241.3	31.9
94	1 169	1 522	114	6	71	1050	13	299	103	247	122	572	160	156	378	1 093	19 919
51.4	42.9	*44.9*	36.4	58.3	142.9	36.8	129.7	52.8	69.6	..	61.6	58.1	32.4	26.7	130.2	53.0	*59.5*
18.3	19.9	18.5	10.8	20.0	19.1	18.2	31.0	19.1	23.3	6.4	12.2	14.4	18.0	21.3	5.8	18.5	18.0
30	26	29	20	22	39	31	21	27	32	39	35	32	27	..	31	28	29
88	21	*25*	19	..	321	27	61	36	117	..	75	39	61	37	227	34	*49*
4	2	1	12	9	5	3	1	3	2	8	4	3	2	..	14	2	3
33	248	347	26	2	12	163	3	75	24	105	20	107	52	26	71	228	5 068
30.1	30.2	–3.7	60.1	58.6	47.2	17.8	–6.8	15.2	28.7	–15.7	98.2	56.5	26.7	25.7	127.6	13.3	24.7
0.37	0.22	0.23	0.23	0.44	0.20	0.16	0.27	0.26	0.24	0.45	0.17	0.19	0.33	0.17	0.19	0.21	0.26
–10.0	–6.0	*–29.5*	21.5	5.2	–33.1	–12.7	–57.1	–21.7	–22.5	..	27.4	2.7	–1.6	1.2	1.6	–24.5	*–19.5*
39.2	10.0	25.9	37.1	2.4	25.0	8.0	11.8	13.8	9.2	72.6	23.1	20.2	20.9	5.7	39.7	18.4	23.9
31.7	34.8	40.1	60.4	34.0	52.4	58.5	66.7	37.4	34.9	18.3	70.6	53.1	31.1	50.0	43.4	36.4	42.1
9.0	12.4	20.7	0.7	–	22.2	29.7	21.2	47.8	16.4	8.9	0.4	10.5	1.4	8.6	11.7	33.7	20.6
16.8	40.7	12.8	–	–	–	–	–	0.9	–	–	–	13.4	35.1	24.8	–	11.3	10.6
3.3	2.2	0.5	1.8	63.5	0.5	3.8	0.3	0.1	39.5	0.2	5.9	2.9	11.5	11.0	5.2	0.2	2.8
46	472	619	55	2	29	474	4	109	31	125	51	154	71	50	46	445	8 472
72.4	59.5	53.2	171.5	98.9	58.0	109.1	59.0	60.9	63.2	180.4	137.4	118.4	60.3	38.1	214.0	84.1	72.0
9.0	8.1	7.5	5.3	6.6	8.0	8.2	8.4	7.0	7.0	3.2	5.1	3.9	8.0	6.9	0.7	7.6	7.7
222	3 124	4 403	344	15	131	3 389	27	648	217	1 010	394	1 866	404	360	465	2 982	55 170
60.6	43.9	60.2	171.8	56.9	63.2	74.9	85.9	42.0	55.2	229.4	227.3	108.2	31.3	48.4	297.3	71.8	58.6
43	53	54	33	56	36	59	64	41	49	26	40	47	46	50	7	51	50

3. Value added: includes mining and quarrying, manufacturing, gas, electricity and water and construction; HUN, POL: as % of total of branches at basic prices; production: excludes construction; WDEU: % change 1980-1997.
4. Agriculture, forestry, hunting, fishery, etc. HUN, POL: as % of total of branches at basic prices.
5. Breakdown excludes electricity trade.
6. Refers to motor vehicles with four or more wheels, except for Japan and Italy, which include three-wheeled goods vehicles.

Annex III.A: Selected multilateral agreements (worldwide)

Y = in force S = signed R = ratified D = denounced

			CAN	MEX	USA	JPN	KOR	AUS
1949	Geneva	Conv. – Road traffic	Y	R		R	R	R	R
1960	Geneva	Conv. – Protection of workers against ionising radiations (ILO 115)	Y		R		R		
1963	Vienna	Conv. – Civil liability for nuclear damage	Y		R				
1988	Vienna	Joint protocol relating to the application of the Vienna Convention and the Paris Convention	Y						
1997	Vienna	Protocol to amend the Vienna convention							
1963	Moscow	Treaty – Banning nuclear weapon tests in the atmosphere, in outer space and under water	Y	R	R	R	R	R	R
1970	Bern	Conv. – Transport of goods by rail (CIM)	Y						
1971	London, Moscow, Washington	Conv. – Prohib. emplacement of nuclear and mass destruct. weapons on sea-bed, ocean floor and subsoil	Y	R	R	R	R	R	R
1971	Ramsar	Conv. – Wetlands of international importance especially as waterfowl habitat	Y	R	R	R	R		R
1982	Paris	Protocol	Y	R	R	R	R		R
1987	Regina	Regina amendment							
1971	Geneva	Conv. – Protection against hazards of poisoning arising from benzene (ILO 136)	Y						
1972	London, Moscow, Washington	Conv. – International liability for damage caused by space objects	Y	R	R	R	R	R	R
1972	Paris	Conv. – Protection of the world cultural and natural heritage	Y	R	R	R	R	R	R
1973	Washington	Conv. – International trade in endangered species of wild fauna and flora (CITES)	Y	R	R	R	R	R	R
1974	Geneva	Conv. – Prev. and control of occup. hazards caused by carcinog. subst. and agents (ILO 139)	Y				R		
1977	Geneva	Conv. – Protec. of workers against occup. hazards in the working env. due to air poll., noise and vibrat. (ILO 148)	Y						
1979	Bonn	Conv. – Conservation of migratory species of wild animals	Y						R
1991	London	Agreem. – Conservation of bats in Europe	Y						
1992	New York	Agreem. – Conservation of small cetaceans of the Baltic and the North Seas (ASCOBANS)	Y						
1983	Geneva	Agreem. – Tropical timber	Y	R		R	R	R	R
1994	New York	Revised agreem. – Tropical timber	Y	R		R	R	R	
1985	Vienna	Conv. – Protection of the ozone layer	Y	R	R	R	R	R	R
1987	Montreal	Protocol (substances that deplete the ozone layer)	Y	R	R	R	R	R	R
1990	London	Amendment to protocol	Y	R	R	R	R	R	R
1992	Copenhagen	Amendment to protocol	Y	R	R	R	R	R	R
1997	Montreal	Amendment to protocol	Y	R				R	R
1986	Vienna	Conv. – Early notification of a nuclear accident	Y	R	R	R	R	R	R
1986	Vienna	Conv. – Assistance in the case of a nuclear accident or radiological emergency	Y	S	R	R	R	R	R
1989	Basel	Conv. – Control of transboundary movements of hazardous wastes and their disposal	Y	R	R	S	R	R	R
1995		Amendment							
1990	London	Conv. – Oil pollution preparedness, response and co-operation (OPRC)	Y	R	R	R	R		R
1992	Rio de Janeiro	Conv. – Biological diversity	Y	R	R	S	R	R	R
1992	New York	Conv. – Framework convention on climate change	Y	R	R	R	R	R	R
1997	Kyoto	Protocol		S	S	S	S	S	S

Annex III.A: Selected multilateral agreements (worldwide)

Y = in force S = signed R = ratified D = denounced

NZL	AUT	BEL	CZE	DNK	FIN	FRA	DEU	GRC	**HUN**	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	ESP	SWE	CHE	TUR	UKD	EU
R	R	R	R	R	R	R		R	**R**	R	R	R	R	R	R	R	R	R	R	S	R	R	
		R	R	R	R	R	R	R	**R**			R		R	R	R	R	R	R	R	R	R	
			R						**R**							R		S				S	
		S	R	R	R	S	S	S	**R**			R		R	R	R	S	S	R	S	S	S	
			S						**S**			S				S							
R	R	R	R	R	R		R	R	**R**	R	R	R	R	R	R	R	S	R	R	R	R	R	
	R	R	R	R	R	R	R	R	**R**		R	R	R	R	R	R	R	R	R	R	R	R	
R	R	R	R	R	R		R	R	**R**	R	R	R	R	R	R	R	R	R	R	R	R	R	
R	R	R	R	R	R	R	R	R	**R**	R	R	R	S	R	R	R	R	R	R	R	R	R	
R	R	S	R	R	R	R	R	R	**R**	R	R	R	S	R	R	R	R	R	R	R	R	R	
									R														
			R		R	R	R	R	**R**			R						R		R			
R	R	R		R	R	R	R	R	**R**	S	R	R	R	R	S	R		R	R	R		R	
R	R	R	R	R	R	R	R	R	**R**		R	R	R	R	R	R	R	R	R	R	R	R	
R	R	R	R	R	R	R	R	R	**R**		S	R	R	R	R	R	R	R	R	R	R	R	
		R	R	R	R	R	R		**R**	R	R	R			R		R		R	R			
		R	R	R	R	R	R		**R**			R			R		R	R	R			R	
		R	R	R	R	R	R	R	**R**		R	R	R	R	R	R	R	R	R	R		R	R
		S	R	R		S	R		**R**		R		R	R	R		S		R			R	
		S		R		S	R							R					R			R	S
R	R	R		R	R	R	R	R			R	R	R	R	R		R	R	R	R		R	R
R	R	R		R	R	R	R	R			R	R	R		R		R	R	R	R		R	R
R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R	R	R	R	R	R	R	R	R	R
R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R	R	R	R	R	R	R	R	R	R
R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R	R	R	R	R	R	R	R	R	R
R		S					R		**R**				R		R			R	R				
R	R	R	R	R	R	R	R	R	**R**	R	R	R	S	R	R	R	R	R	R	R	R	R	
R	R	R	R	S	R	R	R	R	**R**	S	R	R		R	S	R	S	R	R	R	R	R	
R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R	R	R	R	R	R	R	R	R	R
		S		R	R								R		R			R	R			R	R
				R	R	R	R	R		R		S		R	R	S		R	R	R		R	
R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R	R	R	R	R	R	R	R	R	R
R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R	R	R	R	R	R	R		R	R
S	S	S	S	S	S	S	S	S			S	S	S	S	S	S	S	S	S	S		S	S

Annex III.A: Selected multilateral agreements (worldwide) (cont.)

Y = in force S = signed R = ratified D = denounced

		CAN	MEX	USA	JPN	KOR	AUS
1993 Paris	Conv. – Prohibition of the development, production, stockpiling and use of chemical weapons and their destruction	Y	R	R	S	R	S	R
1993 Geneva	Conv. – Prevention of major industrial accidents (ILO 174)	Y						
1994 Vienna	Conv. – Nuclear safety	Y	R	R	R	R	R	R
1994 Paris	Conv. – Combat desertification in those countries experiencing serious drought and/or desertification, particularly in Africa	Y	R	R	S	R	R	S
1996 The Hague	Agreem. – Conservation of African-Eurasian migratory waterbirds							
1997 Vienna	Conv. – Supplementary compensation for nuclear damage				S			S
1997 Vienna	Conv. – Joint convention on the safety of spent fuel management and on the safety of radioactive waste management		R		S		S	S
1997 New York	Conv. – Law of the non-navigational uses of international watercourses							

Source: IUCN; OECD.

Annex III.A: Selected multilateral agreements (worldwide) (cont.)

Y = in force S = signed R = ratified D = denouncedd

NZL	AUT	BEL	CZE	DNK	FIN	FRA	DEU	GRC	**HUN**	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	ESP	SWE	CHE	TUR	UKD	EU
R	R	R	R	R	R	R	R	R	**R**	S	R	R	S	R	R	R	R	R	R	R	S	S	
		S												R					R				
	R	R	R	R	R	R	R	R	**R**	S	R	R	R	R	R	R	R	R	R	R	R	R	
	R	R		R	R	R	R	R	**R**	R	R	R	R	R	R		R	R	R	R	R	R	R
		S					S		**S**		S			S									
			S									S											
	S	S	R	R	S	S	R	S	**R**		S	S	S	S	R	S		R	R	S		S	
					R		S		**R**				S		R		S						

Annex III.B: Selected multilateral agreements (regional)

Y = in force S = signed R = ratified D = denounced

			CAN	MEX	USA	JPN	KOR	AUS
1950	Paris	Conv. – Protection of birds	Y					
1957	Geneva	Agreem. – International carriage of dangerous goods by road (ADR)	Y					
1975	New York	Protocol	Y					
1958	Geneva	Agreem. – Adoption of unif. cond. of approv. and recipr. recogn. of approv. for motor veh. equip. and parts	Y					
1958	Bucharest	Conv. – Fishing in the waters of the Danube	Y					
1960	Paris	Conv. – Third party liability in the field of nuclear energy	Y					
1963	Brussels	Supplementary convention	Y					
1964	Paris	Additional protocol to the convention	Y					
1964	Paris	Additional protocol to the supplementary convention	Y					
1982	Brussels	Protocol amending the convention	Y					
1982	Brussels	Protocol amending the supplementary convention	Y					
1988	Vienna	Joint protocol relating to the application of the Vienna Convention and the Paris Convention	Y					
1968	Strasbourg	Agreem. – Restriction of the use of certain detergents in washing and cleaning products	Y					
1983	Strasbourg	Protocol	Y					
1968	Paris	Conv. – Protection of animals during international transport	Y					
1979	Strasbourg	Protocol	Y					
1969	London	Conv. – Protection of the archaeological heritage	Y					
1972	London	Conv. – Conservation of Antarctic seals	Y	R	R	R		R
1979	Bern	Conv. – Conservation of European wildlife and natural habitats	Y					
1979	Geneva	Conv. – Long-range transboundary air pollution	Y	R	R			
1984	Geneva	Protocol (financing of EMEP)	Y	R	R			
1985	Helsinki	Protocol (reduction of sulphur emissions or their transboundary fluxes by at least 30%)	Y	R				
1988	Sofia	Protocol (control of emissions of nitrogen oxides or their transboundary fluxes)	Y	R	R			
1991	Geneva	Protocol (control of emissions of volatile organic compounds or their transboundary fluxes)	Y	S	S			
1994	Oslo	Protocol (further reduction of sulphur emissions)	Y	R				
1998	Aarhus	Protocol (heavy metals)		R	S			
1998	Aarhus	Protocol (persistent organic pollutants)		R	S			
1980	Madrid	Conv. – Transfrontier co-operation between territorial communities or authorities	Y					
1980	Bern	Conv. – International carriage of dangerous goods by train (COTIF).						
1989	Geneva	Conv. – Civil liab. for damage caused during carriage of dang. goods by road, rail, and inland navig. (CRTD)						
1990	Geneva	Conv. – Safety in the use of chemicals at work (ILO 170)	Y		R			
1991	Espoo	Conv. – Environmental impact assessment in a transboundary context	Y	R	S			
1992	Helsinki	Conv. – Transboundary effects of industrial accidents		S	S			
1992	Bucharest	Conv. – Protection of the Black Sea against pollution	Y					
1992	Bucharest	Protocol (combatting pollution by oil and other harmful substances in emergency situation)	Y					
1992	Bucharest	Protocol (protection of the Black Sea marine Environment against pollution from dumping)						
1992	Bucharest	Protocol (protection of the Black Sea marine Environment against pollution from land based sources)						

Annex III.B: Selected multilateral agreements (regional)

Y = in force S = signed R = ratified D = denounced

NZL	AUT	BEL	CZE	DNK	FIN	FRA	DEU	GRC	**HUN**	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	ESP	SWE	CHE	TUR	UKD	EU
	S	R				S		S		R		R	R	R			S	R	R	R	R		
	R	R	R	R	R	R	R	R	**R**			R	R	R	R	R	R	R	R	R		R	
	R	R		R	R	R	R		**R**			R	R	R	R	R	R	R	R	R		R	
	R	R	R	R	R	R	R		**R**			R	R	R	R	R	R	R	R	R		R	
									R														
	S	R		R	R	R	R	R				R	S	R	R		R	R	R	S	R	R	
	S	R		R	R	R	R					R	S	R	R			R	R	S		R	
	S	R		R	R	R	R	R				R	S	R	R		R	R	R	S	R	R	
	S	R		R	R	R	R					R	S	R	R			R	R	S		R	
	S	R		R	R	R	R	R				R	S	R	R		R	R	R	S	R	R	
	S	R		R	R	R	R					R	S	R	R			R	R	S		R	
		S	R	R	R	S	S	S	**R**			R		R	R	R	S	S	R	S	S	S	
		R		R		R	R					R	R	R				R		R		R	
				R			S						R	R				R		S		R	
	R	R		R	R	R	R	R		R	R	R	R	R	R		R	R	R	R	R	R	
	R	R		R	R	R	R	R		R	R	R	R	R	R		R	R	R	R		R	
	R	R		R		R	R	R		R		R	R				R	R	R	R		R	
S		R				R	R					R			R	R						R	
	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	R	R	R	R	R	R	R	R	**R**		R	R	R	R	R	R	R	R	R	R		R	R
	R	R	R	R	R	R	R		**R**			R	R	R	R				R	R			
	R	S	R	R	R	R	R	R	**R**		R	R	R	R	R	S		R	R	R		R	R
	R	S	R	R	R	R	R	S	**R**			R	R	R	R		S	R	R	R		R	S
	R	S	R	R	R	R	R	R	**S**		R	R	R	R	R	S		R	R	R		R	R
	S	S	S	S	S	S	S	S	**S**	S	S	S	S	S	S	S	S	S	S	S		S	S
	S	S	S	S	S	S	S	S	**S**	S	S	S	S	S	S	S	S	S	S	S		S	S
	R	R		R	R	R	R		**R**		R	R	R	R	R	R	R	R	R	R			
									R														
							S																
															R				R				
	R	R	S	R	R	S	S	R	**R**	S	S	R	R	R	R	R	S	R	R	R		R	R
	R	S		S	S	S	R	R	**R**			S	R	S	R	S	S	R	S	R		S	R
																					R		
																					R		
																					R		
																					R		

Annex III.B: Selected multilateral agreements (regional) (cont.)

Y = in force S = signed R = ratified D = denounced

			CAN	MEX	USA	JPN	KOR	AUS
1992	Helsinki	Conv. – Protection and use of transboundary water courses and international lakes	Y					
1992	La Valette	European Conv. – Protection of the archaeological heritage (revised)	Y					
1992	Vienna	Agreem. – Forecast, prevention and mitigation of natural and technological disasters						S
1993	Lugano	Conv. – Civil liability for damage resulting from activities dangerous to the environment						
1994	Lisbon	Treaty – Energy Charter						S
1994	Lisbon	Protocol (energy efficiency and related environmental aspects)						S
1994	Sofia	Conv. – Co-operation for the protection and sust. use of the Danube river						
1998	Aarhus	Conv. – Access to environmental information and public participation in environmental decision-making						
1998	Strasbourg	Conv. – Protection of the environment through criminal law						

Source: IUCN; OECD.

Annex III.B: Selected multilateral agreements (regional) (cont.)

Y = in force S = signed R = ratified D = denounced

NZL	AUT	BEL	CZE	DNK	FIN	FRA	DEU	GRC	**HUN**	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	ESP	SWE	CHE	TUR	UKD	EU
	R	S		R	R	R	R	R	**R**			R	R	R	R	S	R	S	R	R		S	R
			S	S	R	R	S	S	**R**		R	S	S	S	R	R	R	S	R	R	S	S	
									S			S				S							
	S	S		S	S	S	S	S		S		S	S	S			S						
	S	S		S	S	S	S	S		S	S	S	S	S		S	S	S	S	S	S	S	S
	S						S		**R**														
	S	S	S	S	S	S	S	S	**S**	S	S	S	S	S	S	S	S	S	S	S		S	S
	S	S		S	S	S	S	S		S			S						S				

Annex IV

CHRONOLOGY OF SELECTED ENVIRONMENTAL EVENTS (1991-99)

1991

February	• Inauguration of the Fertő-Hanság National Park. • Signature of Espoo Convention on Environmental Impact Assessment in a Transboundary Context.
May	• Report on environmental damage caused by former Soviet Union military sites. Estimated clean-up cost is HUF 60 billion (approximately USD 1 billion in 1991).
June	• Launching of Partners in Transition Programme with the OECD.
November	• Ratification of Sofia Protocol on the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes (Convention on Long-Range Transboundary Air Pollution). Hungary undertakes that NO_x emissions in 1994 will not exceed the 1987 level. • Signature of Geneva Protocol on the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes (Convention on Long-Range Transboundary Air Pollution).
December	• Signature of Association Agreement with the European Union. • Adoption of Short and Medium-term Environmental Action Plan.

1992

January	• Revision of regulation on hazardous wastes.
March	• Act on Environmental Product Charge on Fuels.
February	• Launching of Danube Basin Environmental Protection Programme.
May	• Convention on Control of Transboundary Movements of Hazardous Wastes and their Disposal enters into force (Basel Convention).
June	• Signature of UN Convention on Biological Diversity. • Signature of UN Framework Convention on Climate Change.
August	• Bilateral Convention between Hungary and Ukraine on Co-operation for the Protection of the Environment and Regional Policy.
October	• Act on Protection of Personal Data and Release of Data of Public Interest.

December
- Act on Separate State Funds. This Act impacts on the Central Environmental Protection Fund.

1993

February
- Programme for water supply and for rehabilitation of Lake Velencei.

March
- Establishment of "Green Spider" information network. Today, over 200 NGOs are connected to this network.

June
- Government Decree on environmental impact assessment of certain activities.

November
- Adoption of the inter-ministerial Clean Air Protection Action Plan (1994-98).
- Ratification of the London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer.

1994

January
- Environmentally friendly product labelling introduced.
- Act on Promulgation of the Association Agreement with the European Union.

February
- Ratification of UN Framework Convention on Climate Change.
- Ratification of UN Convention on Biological Diversity.
- Ratification of Helsinki Convention on Protection and Use of Transboundary Watercourses and International Lakes.
- Establishment of a regional centre for co-ordination of industrial accident prevention in Central and Eastern Europe.

March
- Adoption of National Environmental and Nature Conservation Policy Concept.

April
- Hungary officially requests EU membership.
- Inauguration of Fertö-Hans ág-Neusiedlersee-Seewinkel National Park on both sides of the Austria-Hungary border.

May
- Ratification of Copenhagen Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer.
- Resolution No. 28/1994 of the Constitutional Court prohibits reprivatisation of land previously in co-operative ownership. Parliament requested to pass a law to remedy the situation.

June
- Adoption of Action Plan for protection of the ecological state and improvement of water quality of Lake Balaton.
- Signature of Sofia Convention on Co-operation for the Protection and Sustainable Use of the Danube River.
- Ratification of Helsinki Convention on Transboundary Effects of Industrial Accidents.
- Ratification of Agreement on Conservation of Bats in Europe.
- Adoption of National Development Programme following Parliamentary elections in May. The NDP includes an environmental chapter.
- OECD Council Decision to start negotiations on Hungary's accession.

October	• Bilateral Convention between Hungary and Slovenia on Co-operation in Water Management.
December	• Signature of Protocol on Further Reduction of Sulphur Emissions Ceilings and Percentage Emission Reduction (Convention on Long-Range Transboundary Air Pollution).

1995

February	• Signature of Lisbon Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects.
May	• Act on General Rules of Environmental Protection, which replaces the 1976 Act on the Protection of the Human Environment. • Act on Compulsory Use of Certain Local Public Services. This Act concerns municipal solid and liquid waste collection and disposal services.
June	• Act on Environmental Product Charges.
October	• Ratification of Sofia Convention on Co-operation for the Protection and Sustainable Use of the Danube River.
November	• Ratification of Geneva Protocol on Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes (Convention on Long-Range Transboundary Air Pollution). • Act on Restoration of Nature Conservation Areas. • Finalisation of the Environmental Memorandum (OECD).
December	• Creation of National Centre for Industrial Accident Prevention. • Caves of the Aggtelek and Slovak Karst included in the UNESCO World Heritage List.

1996

January	• Introduction of EMAS and ISO 14000. As of today, 26 firms have been certified. • Creation of a separate budget within the Central Environmental Protection Fund for supporting environmental industry.
April	• Inauguration of the Duna-Dráva National Park. • Establishment of National Environmental Protection Council, a consultative and advisory body to the government. Environmental NGOs, industry and scientists participate equally in its work.
May	• Hungary becomes the 27th OECD Member country.
June	• Nature Conservation Act. • Act on Forests and Forest Protection. • The government provides a new building for the Regional Environmental Centre in Szentendre, in recognition of its environmental protection activities. • National Environmental Remediation (Clean-up) Programme adopted.

July
- Establishment of Regional Development Councils.
- Establishment of National Regional Development Council, a co-ordinating and advisory body to the government.
- Adoption of guiding principles of the Sewage Collection and Treatment Programme.
- Convention on Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention) introduced into the Hungarian legislation system and the rules of implementation issued.
- Government Decree on Hazardous Waste.

October
- Government Decree on National Environmental Programme.

December
- Pannonhalma abbey and its immediate natural environment included in the UNESCO World Heritage List.
- Ministerial commissioner appointed to implement a six-year programme of purchasing private land previously under co-operative ownership.
- Act on Nuclear Energy.
- Adoption of a six-year environmental information programme.

1997

January
- Inauguration of the Körös-Maros National Park.
- Introduction of new computerised information system (HAWIS) for processing data on hazardous waste (with Swiss support).

April
- Opening of UNEP Global Resources Information Database (GRID) Centre in Budapest (with Swiss support), the twelfth GRID centre in the world.
- Hungary adds six new wetland sites to the Ramsar Convention's List of Wetlands of International Importance, and extends the area of two existing ones.

May
- Bilateral Convention between Hungary and Romania on Environmental Co-operation.

June
- Opening of Public Service Office in Ministry for Environment to provide environmental information to the public.

July
- Ratification of Espoo Convention on Environmental Impact Assessment in a Transboundary Context.
- Act on Protection and Development of the Built Environment.
- Hungary becomes the 24th IEA Member country.

August
- Introduction of new conditions for using environmentally friendly labelling.

September
- Adoption of National Environmental Programme, and National Environmental Health Action Programme, for 1997 to 2002.
- Inauguration of the Balaton Uplands National Park.
- International Court of Justice issues decision on the Bős-Nagymaros Dam System. According to this decision, the Slovak and Hungarian partners must pursue bilateral negotiations.

October	• To celebrate the 25th anniversary of the Paris Convention on the Protection of the World Cultural and Natural Heritage, Ministry for Environment organises an International Conference on Implementation of the World Heritage in Budapest. Hungary elected member of the World Heritage Committee.
November	• Inauguration of Duna-Ipoly National Park. • Bilateral Convention between Hungary and Ukraine on Co-operation in the Management of Transfrontier Water Resources.
December	• Responsibility for nature conservation shifts from the former Nature Protection Directorates to network for nature conservation consisting of nine National Park Directorates. • Submission of National Regional Development Concept to Parliament. This concept integrates environmental policy into regional development.

1998

January	• Opening of Regional Public Service Offices in 15 cities. • Publication of National Profile on the Sound Management of Chemicals, as requested by the International Forum on Chemical Safety.
February	• First conference of EU IMPEL Programme for associated countries organised in Hungary.
March	• Act on Protection of Animals. • Act on Promulgation of the OECD Convention and its supplementary protocols.
May	• Parliamentary elections. • Official accession to AC-IMPEL Network. • Approval of National Programme on the Adoption of the EU Acquis, followed by its submission to the European Commission.
July	• Newly elected government transfers responsibility for regional policy from the Ministry of Environment and Regional Policy (which becomes the Ministry for Environment) to the Ministry of Agriculture and Regional Development.
October	• Central Environmental Protection Fund merged into the Central Budget. • Hungary joins NATO-CCMS multilateral co-operation in the field of cleaner technology-cleaner products.
December	• Signature of Aarhus Protocols on Heavy Metals and Persistent Organic Pollutants (Convention on Long-Range Transboundary Air Pollution). • Signature of Aarhus Convention on Access to Environmental Information and Public Participation in Environmental Decision-Making.

1999

January/ February	• EU screening of Hungarian environmental legislation.
February	• Bilateral Agreement between Hungary and Slovakia on Co-operation in Environmental Protection and Nature Conservation.

March	• Hungary becomes NATO Member country.
June	• Act on Disaster Prevention and Relief.
July	• Submission of position papers to the European Commission for negotiation on environmental protection. • Ratification of Amendment to Montreal Protocol on Substances that Deplete the Ozone Layer. • Ratification of New York Convention on Law of the Non-navigable Uses of International Watercourses. • Ratification of Paris Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa.

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