OECD Environmental Performance Reviews

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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 for this programme are:

– to help *individual governments* assess progress;

– to promote a continuous policy *dialogue among member countries*, through a peer review process; and

– to stimulate *greater accountability* from member countries' governments towards their public opinion, within developed countries and beyond.

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 and independent reviews have been conducted for all member countries as part of the first cycle of reviews. The OECD is now engaged in the second cycle of reviews directed at *promoting sustainable development*, with emphasis on implementation of domestic and international environmental policy, as well as on the integration of economic, social and environmental decision-making.

The report was peer-reviewed by the Working Party on Environmental Performance (Paris, January 2003). The conclusions and recommendations of the report are approved by the Working Party.

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GENERAL INTRODUCTION

This review of Poland's environmental performance *examines results* in the light of domestic objectives and international commitments. Three countries assisted particularly with this review: Portugal, the Slovak Republic and the United Kingdom.

The report is organised in three parts:

– Part I is entitled "Environmental Management" and focuses on air, water, and waste management, as well as nature and biodiversity;

– Part II is entitled "Sustainable Development" and focuses on environment and the economy, and sectoral integration (transport);

– Part III is entitled "International Commitments" and focuses on international co-operation.

The OECD extends its most sincere thanks to all those who helped in the course of this review, to the representatives of member countries to the Working Party on Environmental Performance, and especially to the examining countries (Portugal, the Slovak Republic and the United Kingdom) and their experts. The OECD is particularly indebted to the Government of Poland for its co-operation in expediting the provision of information and the organisation of the experts' mission to Warsaw, Gdańsk, and Kwidzyn, 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 20-22 January 2003 and approved its conclusions and recommendations. This report is published under the authority of the Secretary-General of the OECD.

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ABBREVIATIONS AND SIGNS

Abbreviations

BOD	Biochemical oxygen demand
BOS	Environmental Protection Bank
CFCs	Chlorofluorocarbons
CITES	Convention on International Trade in Endangered Species of World Fauna and Flora
CSO	Central Statistical Office
DAC	Development Assistance Committee (OECD)
EEZ	Exclusive economic zone
EIA	Environmental impact assessment
EMAS	Eco-Management and Auditing Scheme (EU)
EPR	Environmental Performance Review (OECD)
EQS	Environmental quality standard(s)
FAO	Food and Agriculture Organisation of the UN
GEF	Global Environment Facility
GHG	Greenhouse gas(es)
HCFCs	Hydrochlorofluorocarbons
HELCOM	Helsinki Commission – Baltic Marine Environment Protection
HFCs	Hydrofluorocarbons
IEA	International Energy Agency
IEP	Inspectorate for Environmental Protection
ISO	International Organisation for Standardisation
ISPA	Instrument for Structural Policies for Pre-accession (EU)
IUCN	International Union for the Conservation of Nature and Resources
LA21	Local Agenda 21
LPG	Liquid petroleum gas
MARPOL	International Convention for the Prevention of Pollution from Ships
MOE	Ministry of the Environment
Mtoe	Million tonnes of oil equivalent
NGO	Non-governmental organisation
NMVOC	Non-methane volatile organic compounds

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NO_x	Nitrogen oxides
ODA	Official development assistance
ODS	Ozone depleting substance
PAC	Pollution abatement and control
PAHs	Polycyclic aromatic hydrocarbons
PCDD/F	Polychlorinated debenzo dioxins and furans
p.e.	Population equivalent
PFCs	Perfluorocarbons
PHARE	EU pre-accession programme
PKP	Polish State Railways
POPs	Persistent organic pollutants
PPP	Polluter-pays principle
PPPs	Purchasing power parities
PSE	Producer support estimate
RZGWs	Regional Boards for Water Management
SACs	Special Areas of Conservation
SAPARD	Special Accession Programme for Agriculture and Rural Development (EU)
SMEs	Small and medium-sized enterprises
SPAs	Special Protection Areas
TAC	Total allowable catch
TFC	Total final energy consumption
TPES	Total primary energy supply
TSP	Total suspended particulate matter
Toe	Tonnes of oil equivalent
UN-ECE	UN Economic Commission for Europe
UNFCCC	UN Framework Convention on Climate Change
USAID	US Agency for International Aid
USD	United States dollar
VAT	Value added tax
VOCs	Volatile organic compounds

Signs

The following signs are used in Figures and Tables:

.. : not available

– : nil or negligible

. : decimal point

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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, the Slovak Republic, Switzerland and Turkey.

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

Country aggregates may include Secretariat estimates.
The sign * indicates that not all countries are included.

Currency

Monetary unit: zloty (PLN)
In 2001, PLN 4.10 = USD 1.

Cut–off Date

This report is based on information and data available up to December 2002.

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CONCLUSIONS AND RECOMMENDATIONS*

Since 1989 Poland's economy has undergone a profound *transformation* from a centrally planned to a market economy. Economic growth has been accompanied by restructuring of the economy (e.g. privatisation of many large industries, liberalisation of the electricity market). In 2001 the service sector accounted for 64% of GDP and industry for nearly 33%, with a shift towards less energy- and material-intensive industries and processing activities. After a two-year recession followed by a gradual economic recovery, the highest rate of GDP growth was reached in 1995 (6.9%); the growth rate subsequently slowed, to 4.3% in 2000 and 1.1% in 2001. There are currently serious concerns about the state of Poland's public finance.

Since the early 1990s Poland has made remarkable *environmental progress*, meeting most of its environmental targets and decoupling a number of environmental pressures from economic growth. This progress reflects both the reshaping of its economy and a strengthening of its environmental policies. Since the 1995 OECD Environmental Performance Review, the *EU accession process* has shaped Poland's approach to environmental management through the requirement to transpose European Directives. Yet in several respects the road towards environmental convergence within the EU is likely to be a long one. While pursuing sustainable development balancing economic, environmental and social concerns, Poland could still improve its ranking among OECD countries for a number of indicators of pollution intensity per unit GDP. *Priority environmental issues* include pollution prevention, waste water treatment, waste management, biodiversity and landscape conservation, and climate protection.

To meet these *challenges*, Poland will need to: i) expand its environmental infrastructure (e.g. for waste and waste water treatment) and continue implementing

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its January 2003 meeting.

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its environmental policies; ii) further integrate environmental concerns into economic and social decisions; and iii) reinforce its international co-operation on environmental issues.

This report examines progress made by Poland *since the previous OECD Environmental Performance Review* in 1995, and evaluates the extent to which the country's *domestic objectives and international commitments* are being met. It also reviews progress in the context of the *OECD Environmental Strategy*.* Some 46 recommendations are made that could help strengthen Poland's environmental performance in the context of sustainable development.

1. Environmental Management

Transition towards a market economy has led to *major institutional and economic structural changes* in the last ten years. Reforms initiated in the early 1990s provided opportunities to revise and implement environmental management and legislation, and to achieve greater integration of environmental concerns into other policies. Adopted in 1997, Poland's present Constitution states that the country will ensure "protection of the environment, while pursuing the principle of sustainable development". More recently the *EU accession process* has been the main driving force for further institutional and economic structural changes. The transposition of EU environmental legislation in particular has led to a range of new legislation.

Implementing environmental policies and strengthening environmental infrastructure

Poland's environmental management is founded on solid environmental institutions and competences. Two *national environmental policies* were adopted in 1991 and 2000 under fast-changing circumstances. The Second National Environmental Policy defines short-term (2000-02), medium-term (2002-10) and long-term (2010-25) objectives for management of natural resources, improvement of environmental quality, strengthening of policy instruments for environmental management, and co-operation on environmental issues of international concern. Together with economic structural changes, these efforts by Poland have contributed

* The Objectives of the "OECD Environmental Strategy for the First Decade of the 21st Century" are covered in the following sections of these Conclusions and Recommendations: maintaining the integrity of ecosystems (Section 1), decoupling of environmental pressures from economic growth (Sections 2.1 and 2.2), and global environmental interdependence (Section 3).

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to progress on a number of fronts (e.g. reductions of traditional air pollutant emissions, water withdrawal, nutrient discharges and non-municipal waste generation). Poland's *inspection and enforcement* capacity has been preserved (in the national Inspectorate for Environmental Protection), although follow-up by prosecutors could be strengthened. Expenditure on pollution abatement and control, which was between *1.5 and 2% of GDP* throughout the 1990s, has largely been financed by high pollution charges and fines (e.g. for air pollution) redistributed through the *National Fund for Environmental Protection and Water Management* (hereafter referred to as the National Fund for the Environment) and a number of other environment funds operating at regional and local levels. Between 1990 and 2000, Poland expanded its use of *economic instruments* to implement environmental policy and to recover the operational costs of environmental services (e.g. drinking water supply, waste water treatment). *Access to environmental services* varies significantly among regions; related investments should be targeted to ensure that basic social and health standards are met throughout the country. Increases in prices relating to household services (e.g. provision of water, energy and transport) have had a significant incentive effect, although with some regressive distributional consequences. In line with the Aarhus Convention, legal bases have been established for *access to information and to the courts*.

However, despite undeniable progress in reducing pollutant emissions and discharges to the environment, Poland lags behind most other OECD countries with respect to a number of environmental indicators. Having done a great deal to resolve environmental problems inherited from the past, Poland now aims at another level of environmental quality and at environmental convergence with other European countries. Considerable investment in *environmental infrastructure* is therefore still necessary. In particular, an environmental investment estimated between 1.2 and 2.7% of GDP per year will be required over ten years to comply with the terms of EU accession. Financing of this investment remains uncertain despite the support expected from European funds. Poland must clarify *environmental priority setting* and ensure that cost-effectiveness has a central place in decision criteria. On-going efforts to improve the transparency and accountability of decision-making by environment funds should be sustained. Introduction of the European system of integrated pollution prevention and control (IPPC) and the recent decentralisation of environmental management will necessitate further strengthening of environmental institutions. Consideration needs to be given to use of emissions trading schemes to help reduce Poland's high air pollutant emission intensities. Further efforts are also needed to ensure that local *spatial development plans* correspond with those established at the

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regional level, and that both types reflect national environmental objectives. Use of quantitative environmental indicators to inform the process of policy formulation, for communication with stakeholders as well as monitoring policy effectiveness, will also be important.

It is *recommended* to:

- further implement the *polluter pays and user pays principles* to make provision of environmental services more efficient and contribute to their financing, taking into account social considerations;
- increase and maintain *environmental expenditure* at levels necessary to implement the EU environmental acquis, using more private funding (e.g. user charges) and EU funding for environmental investments;
- further enhance the transparency, accountability and effectiveness of *environment funds* (national, regional and local);
- expand the use of *economic instruments* to improve the cost-effectiveness of environmental management; assess the potential role of *tradeable emissions permits*;
- further strengthen *enforcement* of environmental regulations, expanding the role and capacity of the Inspectorate for Environmental Protection and of prosecutors, in line with new responsibilities (e.g. implementation of IPPC, decentralisation of environmental management responsibilities);
- strengthen integration of environmental objectives into *spatial planning* and enhance the coherence of local and regional plans;
- strengthen the use of *quantitative indicators* to assess pressures on the environment and the effectiveness of policy responses.

Air

Since 1990 Poland has significantly reduced its emissions of air pollutants, which are now *strongly decoupled* from economic growth. While GDP increased by 43% from 1990 to 2000, SO_2 and NO_x emissions fell by 53 and 35%, respectively. Emissions of other pollutants such as NMVOCs, heavy metals and dioxins have also decreased significantly. This progress reflects: i) economic restructuring; ii) energy efficiency improvements and fuel switching (from coal to oil and natural gas); and, iii) environmental management. *Economic instruments*, including taxes, charges and fines, have played a major role in stimulating emission reductions. Poland has further strengthened *air legislation* in recent years in the context

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of the EU accession process; by the end of 2003 EU air legislation will have been completely transposed. Ambient air quality standards and emission standards for new and existing vehicles already conform to those of the EU. The *energy sector* has been partially reformed, with a contraction of primary energy supply, significant increases in household energy prices, some fuel switching from coal, and a new emphasis on renewable energy sources. Internalisation of environmental externalities in automotive fuel prices and vehicle excise duty has progressed, with tax differentiation roughly proportionate to emissions. Air quality monitoring systems have been modernised and pollutant coverage has been extended.

Despite these achievements, there is much room for further progress. *Emission intensities* of major air pollutants (per unit of GDP) are among the highest in the OECD (Poland ranks 28th for SO_x, 22nd for NO_x). Poland's energy intensity is also one of the highest (23rd); its energy supply structure is still heavily dependent on subsidised coal (62% of TPES in 2000). There is considerable scope to upgrade pollution control facilities, including through clean coal technologies and *cleaner processes*. Environmental externalities are not well internalised in industrial fuel prices. Pressures on air quality from *transport* are growing as the size of the vehicle fleet increases (doubling between 1990 and 2000) and a strong modal shift towards road transport continues.

It is *recommended* to:

- finalise and implement the national *air management strategy* and related sectoral *action plans*, with appropriate review mechanisms;
- continue efforts to reduce emissions of *SO_x, NO_x, NMVOCs, particulates and toxic organic chemicals* from both stationary and mobile sources, in order to meet national and international commitments and minimise local air pollution hotspots and chronic photochemical oxidant pollution;
- further enhance the role of *economic instruments* (e.g. emission trading, extended use of excise duty on non-automotive fuels) in the policy mix to improve the cost-effectiveness of environmental management;
- further integrate *environmental concerns into energy policies*, including through promotion of energy efficiency, progressive removal of environmentally harmful subsidies, and strengthening of incentives for cleaner production;
- accelerate the modernisation of *air quality monitoring* networks and streamline their administration.

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Water

Overall pressure on water quantities due to water abstraction decreased in the 1990s. This mainly reflected the decline and restructuring of industrial production, together with reduced water consumption for irrigation and municipal purposes. There has been *strong decoupling of water abstraction* from GDP growth, especially important in a country like Poland that is relatively poorly endowed with freshwater resources (Poland's per capita freshwater resources are only 40% of the OECD Europe average). In both urban and rural areas there has been significant progress in connecting the population to water supply and sewerage systems. Nutrient loading (e.g. nitrogen, phosphorous) of coastal waters from point sources has declined following the construction of waste water treatment plants. There has been progress within the overall *water management framework*, including the introduction of metering, reduction of leakages, and charging for both water abstraction and waste water discharges to surface waters. Preparatory work on transposition and implementation of EU water legislation is well advanced, with the adoption of the 2001 Water Act and the establishment of *Regional Boards for Water Management*. Flood management has also progressed since a major flood in 1997. A number of Polish rivers and lakes (e.g. in the north-eastern and eastern parts of the country) remain in a natural state, providing important wildlife habitats.

It is *recommended* to:

- mobilise *financing* needed to upgrade and extend both urban and rural sewerage, waste water treatment and drinking water supply infrastructure, giving consideration to greater involvement of the private sector;
- apply the *user pays and polluter pays principles* more fully for water services, taking into account social considerations;
- pursue implementation of EU legislation and *implementation of the new institutional framework* for water management established by the 2001 Water Act;
- focus water management *priorities*, with clear quantified objectives and time limits, while paying particular attention to minimising the costs of meeting environmental quality targets;
- continue to implement *flood prevention and mitigation* programmes and plans, in particular by protecting flood plains and natural buffer zones;
- introduce measures to promote use of *phosphate-free detergents* (e.g. product charges, phase-out).

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However, *surface water quality* is still generally unsatisfactory, especially in rivers and with respect to BOD. Relatively high investment in waste water treatment plants in the 1990s has not yet led to corresponding improvements in surface water quality, suggesting that cost-effectiveness has not been one of the most important criteria for these investments. A long list of priorities, partially driven by requirements for EU accession, will necessitate *large expenditure* for water management infrastructure although its financing remains uncertain. Integration of water management with other policy areas such as health protection needs to be strengthened. In particular, the quality of drinking water supplied by public networks must be improved to comply with European standards. Further efforts need to be made in *rural areas* to improve septic tank functioning, increase the number of connections to sewerage systems, and control nitrate contamination of wells.

Waste

Concerning non-municipal waste, *weak decoupling* of waste generation from economic growth has been observed and the waste recovery rate has increased, largely due to a structural shift toward less material-intensive economic activities (i.e. from heavy industries to services) but also to increased use of cleaner production processes. In preparation for EU accession, *waste legislation* has been strengthened with respect to management and disposal (e.g. introduction of a permitting system for waste generators and management operators). For hazardous waste, regulations have been made considerably tougher and a systematic approach is beginning to be taken (e.g. implementation of a computerised manifest system). Development of a system for safe disposal of PCBs and obsolete pesticides has been initiated. Poland has been actively using *economic instruments* for waste management by putting industrial waste disposal and municipal waste collection charges into effect. *Extended producer responsibility* has been introduced for some products (e.g. packaging, batteries, tyres). A legal framework for clean-up of contaminated land was recently established.

However, comparatively little progress has been made in the area of *municipal waste* management. Despite weak decoupling of municipal waste generation from economic growth between 1990 and 2000, the municipal waste *recovery rate* has remained negligible (under 5%). The great majority of municipal waste is still landfilled, much of it at sites that do not meet technical standards. Recycling markets are still in their infancy. *Hazardous waste* generation has continued to increase. Many *illegal dumping* sites pose threats to the environment. A

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large future financing gap is expected, in view of the need to augment and diversify waste treatment capacity to comply with EU Directives on waste management. How the projected clean-up of contaminated land will be financed is still unclear, especially in view of the very high expected cost and numerous competing priorities.

It is *recommended* to:

- implement the *national waste management plan*, establishing a mechanism for regular review of progress;
- strictly enforce technical standards for *landfills* and urgently close a number of substandard sites; reinforce enforcement of prohibitions against illegal dumping;
- review possible approaches to increasing *private and public financing* of the upgrading and expansion of waste management facilities; address the large financing gap expected due to implementation of EU waste legislation and domestic legislation on land contamination;
- continue to improve the system for regulating the movement and treatment of *hazardous waste*, expanding the capacity to destroy PCBs and obsolete pesticides;
- strengthen measures to increase *municipal waste recovery rates*, with stronger initiatives by authorities concerning separate collection and the creation of sustainable recycling markets.

Nature and biodiversity

Poland has a high level of biodiversity and a wide variety of habitats. *Protected areas* have increased significantly and now cover 9.7% of the country (32% if Protected Landscape Areas are included). The current quality of ecosystems results largely from historical circumstances, including the high rate of public ownership of forests and traditional low-intensity agriculture, dominated by small, privately owned farms. Poland's nature conservation achievements have nonetheless been impressive and the institutional and legislative framework for protected areas continues to improve. The comprehensive *Forestry Strategy* is making a major contribution; management plans are being developed for protected areas, and a legal and administrative structure has been established to integrate conservation plans for Landscape Parks with local spatial planning. There has been a major drive to develop a strategic approach to the integration of biodiversity into other sectors. The *National Biodiversity Strategy* is to be accompanied

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by more specific action plans and operational tasks. Significant progress has been made in preparing for implementation of the EU Habitats and Birds Directives, including a scientific inventory and new legislation to achieve transposition. The Ministry of Agriculture has developed specific *agri-environmental schemes*, especially for Natura 2000 sites, despite the failure of the EU SAPARD programme to provide timely support. Poland has ratified most global and regional conventions on wildlife, habitats, landscapes and biodiversity.

However, Poland's rich biodiversity will be at serious risk if adequate safeguards are not established quickly. Large-scale changes in land ownership and land use have been triggered by the transition to a market economy. *EU accession* is likely to lead to support for major infrastructure projects, and might lead to intensification of agriculture, both of which could impact negatively on biodiversity. Urbanisation and housing development pressures are increasing. There is a potentially serious lack of understanding concerning the degree of compliance necessary for *Natura 2000* and its implications for legal transposition into land use planning and other activities and for site identification,

It is *recommended* to:

- ensure proper implementation and monitoring of the *National Biodiversity Strategy*, including through strengthened institutional co-ordination at all administration levels and improved measurement of status and trends of biodiversity across the country;
- ensure that development projects and programmes respect *Natura 2000 designations and management concepts*, and redouble efforts to organise consultations at the local level on Natura 2000 proposals, especially when sites are outside existing protected areas;
- improve conservation in *Landscape Parks* through incentives and legal mechanisms to encourage private owners or leaseholders within these parks to respect biodiversity conservation objectives; ensure integration of Landscape Park conservation plans into local land use planning;
- develop diverse, thriving *rural economies* that value biodiversity (e.g. through green tourism, environmentally sound agriculture, efficient use of agri-environmental and less favoured area programmes); remove perverse incentives such as the reduced VAT on agricultural pesticides;
- establish protected areas in the *marine environment* and expand efforts to protect marine biodiversity.

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consultation and designation. While there is great emphasis on consultation at ministry level, consultations do not take place locally. There is already tension regarding selection of Natura 2000 sites between the national level (selection on scientific grounds) and the regional level (restriction of sites to existing protected areas or nature reserves). Potential local resistance to designation of sites outside existing protected areas appears to be underestimated. Although pesticide use in agriculture is currently low, the reduced VAT rate on pesticides is a perverse incentive in biodiversity terms. In the most widespread type of protected area, the *Landscape Park* (designated and managed by regional administrations), there are no mechanisms to encourage or compel private owners to conserve biodiversity. Protection of biodiversity in the marine environment is still at an early stage. Greater attention should be given to the potential of Poland's *green assets* to stimulate economic development and job creation (e.g. through eco-tourism, organic agriculture and renewable energy initiatives).

2. Towards Sustainable Development

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

Integration of environmental concerns into economic decisions

While GDP grew by 45% between 1990 and 2001, Poland *strongly decoupled* its emissions of several air pollutants (e.g. SO_x, NO_x, CO_2), its use of water resources, and its use of agricultural inputs (e.g. nitrogenous fertilisers, pesticides) from economic growth. Municipal waste generation, increasing at only one-fourth the rate of GDP during this period, was also weakly decoupled from economic growth. *Economic restructuring*, industry and energy sector reforms and *environmental policies* explain these trends. The ongoing privatisation process, combined with a high share of foreign direct investment, is accelerating the introduction of cleaner production processes and cleaner products. Poland has established a national policy and institutional *frameworks for sustainable development*. Strategies for economic and sectoral development (e.g. transport, rural development and agriculture) rather systematically integrate environmental objectives. Environmental objectives have also been

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integrated into certain areas of fiscal policy (e.g. through differentiated taxes on motor vehicles and their fuels). Environmental impact assessment is used to assess and mitigate the negative environmental impacts of major infrastructure projects (e.g. motorways).

Despite this progress, the *emission intensity* of Poland's economy remains among the highest in the OECD with respect to SO_x, NO_x and CO_2 emissions per unit GDP. Further measures are especially needed to reduce emissions from the energy and industry sectors (e.g. from large combustion plants). While there has been some reduction in use of coal, the *subsidisation of coal mining* distorts market signals; this has slowed progress on reducing discharges of saline effluents to surface waters, and on switching by stationary sources to less carbon-intensive fuels. Taxes on fuels used for stationary combustion are very limited so far, providing little incentive to conserve energy or to switch to less polluting forms of energy. The moderate fuel switching that has occurred has mainly resulted from modernisation, reinforced by air emission charges and fines. Pressures from *transport and agriculture* were relatively low between 1990 and 2000 (e.g. compared with the OECD and EU averages), but they are likely to increase

It is *recommended* to:

- further *decouple* environmental pressures from economic growth to reduce pollution intensity and improve resource efficiency of the economy;
- consider economic, environmental and social aspects in setting *national priorities* at the strategic, planning, programming and budgeting levels;
- at project level, ensure the integration of environmental concerns through EIA and spatial planning and develop *sharing of best practices* among regions and municipalities;
- continue to integrate environmental concerns into *sectoral fiscal and price signals*; extend the taxation of fuels used by stationary sources, differentiating tax rates to internalise environmental externalities;
- prioritise implementation of *cost-effective measures* to improve the energy efficiency of large stationary sources and to reduce the carbon intensity of the energy supply (e.g. through progressive removal of environmentally harmful subsidies);
- further promote capacity building and networking for *local development initiatives* integrating economic, social and environmental concerns (e.g. Local Agenda 21) in urban and rural development.

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markedly with the growth or intensification of these sectors. There has been little *integration of environmental concerns* into non-environmental chapters during the EU accession process. Polish authorities should better integrate these concerns into sectoral reforms and development projects, as well as into spatial planning. Continuing efforts towards efficient pricing of natural resources and environmental services would enable Poland to improve overall economic efficiency; social concerns (e.g. affordability) should be taken into account.

Sectoral integration: transport

In the 1990s, Poland progressively incorporated environmental concerns into its transport policies. It established a range of measures to make its transport system environmentally sustainable in the 2001 *National Transport Plan*. Air emissions from the transport sector were significantly reduced in the 1990s through tightened *emission and fuel quality standards* for motor vehicles. Leaded petrol now accounts for less than 10% of total petrol sales. A vehicle inspection system, including an emission test, was introduced in 1992. *Environmental impact assessment* has been used since the early 1990s for major transport infrastructure developments. Internalisation of environmental externalities has progressed in the Polish transport tax system (e.g. differentiation of the excise duty on diesel fuel by sulphur content and of the vehicle excise duty by engine size).

However, Poland's *road vehicle stock* increased rapidly since 1990 and is likely to continue to do so, as it remains among the lowest per capita in OECD countries. The rate of growth of road passenger and freight traffic volume far exceeded that of GDP in the 1990s. In contrast to the rapid increase in road transport, use of *public transport declined* significantly in the 1990s. With almost complete withdrawal of national administrative and financial support for local public transport, infrastructure and quality of service have deteriorated, accelerating the loss of modal share. The decline of rail passenger transport has also been significant (–67% since 1990), partially as a result of governance issues and low efficiency in service provision; a large modal shift towards road transport has resulted. Increasing the efficiency of rail transport could be expected to reduce costs and increase utilisation. The planned motorway network should be carried out in a way consistent with nature protection objectives (e.g. the Habitats Directive). Measures to alleviate *urban road traffic congestion*, including economic instruments (e.g. road charges, parking charges), are still limited.

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It is *recommended* to:

- fully implement exhaust emission control, automotive fuel quality control and in use-vehicle inspections to reduce *road vehicle emissions*;
- fully integrate environmental considerations into Poland's *road transport infrastructure* development (e.g. the Trans-European Network), using environmental impact assessment and strategic environmental assessment; in particular, ensure consistency with the Habitats Directive and with the sustainable development scenario of Poland's 2001 National Transport Plan;
- *establish priorities* for scheduling and financing transport infrastructure investments;
- implement *demand management measures* for both passenger and freight transport (e.g. park and ride, combined freight transport, tighter parking control in city centres);
- facilitate sharing of cities' experiences improving *urban public transport*, with appropriate national administrative support for local authorities;
- review and revise *transport taxes and charges*, with a view to better internalising the environmental externalities of various transport modes.

3. International Commitments

Poland has strengthened its *international environmental commitments* in a global context (e.g. ratification of the UNFCCC and its Kyoto Protocol), and in a European context during the EU accession process (e.g. transposition of EU Directives into national legislation). It has reduced its emissions of CO_2 from energy use by 16% since 1990 through economic restructuring, energy conservation and fuel switching. By participating in several pilot Joint Implementation projects, it has contributed to international experience with the *Kyoto flexible mechanisms*. Poland has reduced its contribution to regional transfrontier pollution in recent years, achieving large reductions in its emissions of *acidifying air pollutants* in line with the protocols to the UN-ECE Convention on Long-range Transboundary Air Pollution (i.e. Oslo, Sofia, Gothenburg, Aarhus), which it has signed but not yet ratified. It has considerably reduced pollutant loading to transboundary rivers and to the Baltic Sea. Poland has also updated its legal framework for *transfrontier shipments of hazardous waste* to be consistent with the Basel Convention, as well as strengthening and expanding its enforcement capacity.

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Poland has not yet adopted a coherent *national climate protection policy*, despite some steps to integrate climate protection concerns into energy policy. Such a policy would facilitate identification of the climate protection measures that would most cost-effectively reduce emissions of other air pollutants (e.g. SO_x, NO_x, VOCs) as well as GHGs, thus contributing to more efficient use of limited pollution control resources. Poland's emissions of acidifying pollutants (e.g. SO_x, NO_x) per unit of GDP remain among the highest in the OECD. To fully comply with its HELCOM commitments, it will need to further reduce *nutrient loading to coastal waters*, in particular by completing waste water treatment networks in the Vistula and Odra basins and by ensuring the use of port waste reception facilities. Given the overexploitation of a number of important fish stocks in the Baltic Sea, Poland should strengthen its management of *shared fish stocks* (i.e. through increased surveillance and inspection), and take further steps to reduce fishing fleet capacity.

It is *recommended* to:

- adopt and implement a coherent *national climate protection policy* which identifies priority policy measures based on their cost-effectiveness (e.g. in terms of cost per unit of avoided emissions) and is co-ordinated with energy and transport policies (e.g. taking ancillary benefits into account);
- ratify relevant Protocols to the UN-ECE Convention on *Long-range Transport of Air Pollutants*, and pursue their reduction targets (e.g. for SO_x, NO_x, VOCs, NH_3) through the national air management strategy;
- complete investment in *municipal waste water treatment* stations and strengthen measures to reduce nutrient run-off from agriculture, as necessary, to comply with pollution reduction commitments made in the framework of HELCOM;
- strengthen *monitoring and inspection of fish catches* (in harbours, on ships, by satellite) and work to improve information collection on by-catch and discards in offshore fisheries; take further steps to reduce fishing capacity;
- strengthen enforcement against *illegal trade* in ozone-depleting substances, endangered species and hazardous waste;
- ensure better integration of *environmental concerns into development projects* financed by international and EU funding.

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Part I

ENVIRONMENTAL MANAGEMENT

2

AIR MANAGEMENT*

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Poland:

- finalise and implement the national *air management strategy* and related sectoral action plans, with appropriate review mechanisms;
- continue efforts to reduce emissions of *SO_x, NO_x, NMVOCs, particulates and toxic organic chemicals* from both stationary and mobile sources, in order to meet national and international commitments and minimise local air pollution hotspots and chronic photochemical oxidant pollution;
- further enhance the role of *economic instruments* (e.g. emission trading, extended use of excise duty on non-automotive fuels) in the policy mix to improve the cost-effectiveness of environmental management;
- further integrate *environmental concerns into energy policies*, including through promotion of energy efficiency, progressive removal of environmentally harmful subsidies, and strengthening of incentives for cleaner production;
- accelerate the modernisation of *air quality monitoring* networks and streamline their administration.

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1995. It also reviews progress with respect to the objective "maintaining the integrity of ecosystems" of the 2001 OECD Environmental Strategy.

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Conclusions

Since 1990 Poland has significantly reduced its emissions of air pollutants, which are now *strongly decoupled* from economic growth. While GDP increased by 43% from 1990 to 2000, SO_2 and NO_x emissions fell by 53 and 35%, respectively. Emissions of other pollutants such as NMVOCs, heavy metals and dioxins have also decreased significantly. This progress reflects: i) economic restructuring, ii) energy efficiency improvements and fuel switching (from coal to oil and natural gas) and iii) environmental management. *Economic instruments*, including taxes, charges and fines, have played a major role in stimulating emission reductions. Poland has further strengthened *air legislation* in recent years in the context of the EU accession process; by the end of 2003 EU air legislation will have been completely transposed. Ambient air quality standards and emission standards for new and existing vehicles already conform to those of the EU. The *energy sector* has been partially reformed, with a contraction of primary energy supply, significant increases in household energy prices, some fuel switching from coal, and a new emphasis on renewable energy sources. Internalisation of environmental externalities in automotive fuel prices and vehicle excise duty has progressed, with tax differentiation roughly proportionate to emissions. Air quality monitoring systems have been modernised and pollutant coverage has been extended.

Despite these achievements, there is much room for further progress. *Emission intensities* of major air pollutants (per unit of GDP) are among the highest in the OECD (Poland ranks 28th for SO_x, 22nd for NO_x). Poland's energy intensity is also one of the highest (23rd); its energy supply structure is still heavily dependent on subsidised coal (62% of TPES in 2000). There is considerable scope to upgrade pollution control facilities, including through clean coal technologies and *cleaner processes*. Environmental externalities are not well internalised in industrial fuel prices. Pressures on air quality from *transport* are growing as the size of the vehicle fleet increases (doubling between 1990 and 2000) and a strong modal shift towards road transport continues.

1. Evaluation of Performance

1.1 Institutional and legislative framework and objectives

National policy

Poland's short, medium and long-term *air quality management objectives* for the 1990s were established in the First National Environmental Policy (1991). These objectives focused on conventional air pollutants and established national emission

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reduction targets for SO_2, NO_x and dust, to be met by 2000. The Second National Environmental Policy (2000) covered a wider range of air pollutants including NMVOCs, heavy metals and persistent organic pollutants; national emission reduction targets for SO_2, NO_x and dust were revised and targets for NMVOCs and ammonia were introduced, to be achieved by 2010. Increased emphasis was placed on use of cleaner fuels and processes rather than flue gas treatment. The Ministries of Industry and Environment agreed in 1996 on a medium-term national SO_2 emission reduction programme for power plants (Table 2.1). A *national air protection strategy* is under preparation. It should be deployed through action plans for all major sectors, with appropriate review mechanisms. Other national policy plans on energy (The Assumptions for Poland's Energy Policy), sustainable development (Poland 2025 – The Long-term Strategy for Sustainable Development) and land use (The Concept of the National Land Use Planning Policy) also contain objectives that take air quality improvement into account.

With a first wave of legislation in the early 1990s, ambient environmental quality standards (EQSs) were set for an extensive range of pollutants (currently numbering 46), from criteria air pollutants (e.g. SO_2, NO_2, PM_{10}) to toxic organic chemicals (e.g. benzene, tetrachloroethylene) and heavy metals (Table 2.2). Stricter standards are applied for areas under special protection such as National Parks and health resorts (spas). Development of Polish *legislation on air management* has recently been driven primarily by the EU accession process; a number of regulations and standards have been adjusted or introduced to comply with EU legislation, including the 1988 EU Directive on large combustion plants. In line with the EU's IPPC Directive, Poland began introducing an integrated permitting system in 2002 which will eventually cover about 2 500 installations. Polish standards for criteria air pollutants were generally stricter than those in EU Directives until 1998, when they were revised in line with then valid EU standards. New EU standards came into force in 1999; the EQS were revised accordingly in 2002 as part of the accession process.

In the Polish *four-tier government administration*, operating permits for stationary facilities are issued by voivodships (regions) for large polluters and by poviats (counties) for small and medium-sized ones. Country-wide technology and emission standards are set by the national government. However, local authorities can make these standards stricter for local polluters where necessary to meet EQS. Emission standards for new motor vehicles were introduced in 1993. Fuel quality standards for both stationary and mobile combustion have been in place since the early 1990s, and have recently been harmonised with EU standards.

As a party to the UN-ECE Convention on Long-range Transboundary Air Pollution, Poland shares the general objective of reducing national emissions of *transboundary air pollutants* (SO_2 NO_x, NH_3, VOCs, POPs and heavy metals). However, it has not rati-

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fied any of the protocols entailing emission ceiling obligations. Commitments to implement global agreements on the ozone layer and climate change generate national emission targets and policies, with potential ancillary benefits for local and regional air management (Chapter 8, Section 1.2 and 1.3).

1995 OECD Environmental Performance Review

The 1995 review specifically recommended that Poland:

– formulate implementation plans including intermediate target levels, cost-effective measures and mechanisms to increase financing of such measures, to improve air quality;
– reform the legal and regulatory system for air pollution control to improve its effectiveness and enforcement, in the context of harmonising air pollution regulations with EU Directives and of international commitments;

Table 2.1 **Selected national targets in air quality management**

Parameter[a]	Target	Reference
SO_2 emissions	–30% from 1980 level by 2000	First National Environmental Policy (1991)
	–56% from 1990 level by 2010	Second National Environmental Policy (2000)
	Capping at 1.4 Mt per year by 2020	Agreement by Ministers of Industry and Environment (1996)
SO_2 emissions from power plants	Capping at 0.7 Mt per year by 2010	Agreement by Ministers of Industry and Environment (1996)
NO_2 emissions	–10% from 1980 level by 2000	First National Environmental Policy (1991)
	–31% from 1990 level by 2010	Second National Environmental Policy (2000)
Dust emissions	–50% from 1980 level by 2000	First National Environmental Policy (1991)
	–75% from 1990 level by 2010	Second National Environmental Policy (2000)
NMVOC emissions	–4% from 1990 level by 2010	Second National Environmental Policy (2000)
Ammonia emissions	–8% from 1990 level by 2010	Second National Environmental Policy (2000)

a) Refers to national emissions, unless otherwise indicated.
Source: Inspectorate for Environmental Protection.

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Table 2.2 **Selected national ambient air quality standards (EQS)**

Pollutant	Parameter	Limit value	
		Until 1997	Since 1998
SO_2	$P_{99.8}$ of annual series[a] of 30-min means	600 µg/m³	500 µg/m³
	P_{98} of annual series[a] of daily means	200 µg/m³	150 µg/m³
	Annual mean[a]	32 µg/m³	40 µg/m³
NO_2	$P_{99.8}$ of annual series[a] of 30-min means	500 µg/m³	500 µg/m³
	P_{98} of annual series[a] of daily means	150 µg/m³	150 µg/m³
	Annual mean[a]	50 µg/m³	40 µg/m³
CO	$P_{99.8}$ of annual series[a] of 30-min means		20 mg/m³
	P_{98} of annual series[a] of daily means		5 mg/m³
	Annual mean[a]		2 mg/m³
PM_{10}	P_{98} of annual series[a] of daily means	120 µg/m³	125 µg/m³
	Annual mean[a]	50 µg/m³	50 µg/m³
TSP[b]	P_{98} of annual series[a] of daily means		150 µg/m³
	Annual mean[a]		75 µg/m³
Lead	P_{98} of annual series[a] of daily means	1 µg/m³	2 µg/m³
	Annual mean[a]	0.2 µg/m³	0.5 µg/m³
O_3	30-min mean	100 µg/m³	
	Daily mean	30 µg/m³	
	8-hr mean (10-18)		110 µg/m³
Benzene	$P_{99.8}$ of annual series[a] of 30-min means		20 µg/m³
	P_{98} of annual series[a] of daily means		4 µg/m³
	Annual mean[a]		5 µg/m³
Benzo(a)pyrene	$P_{99.8}$ of annual series[a] of 30-min means		12 ng/m³
	P_{98} of annual series[a] of daily means		5 ng/m³
	Annual mean[a]		1 ng/m³
Toluene	$P_{99.8}$ of annual series[a] of 30-min means		100 µg/m³
	P_{98} of annual series[a] of daily means		50 µg/m³
	Annual mean[a]		10 µg/m³

a) For a calendar year.
b) Total suspended particulate matter.
Source: Inspectorate for Environmental Protection.

– renew efforts to reduce environmental damage caused by the growing stock of motor vehicles to ensure that highly polluting and obsolete vehicles are rapidly eliminated from the market;

– integrate transport and environmental policies at the national and local levels for policy choices that affect public transport systems, traffic management and urban planning;

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– ensure that sectoral air pollution reduction plans are formulated with participation from relevant ministries, enterprises and other interested parties.

1.2 Air management

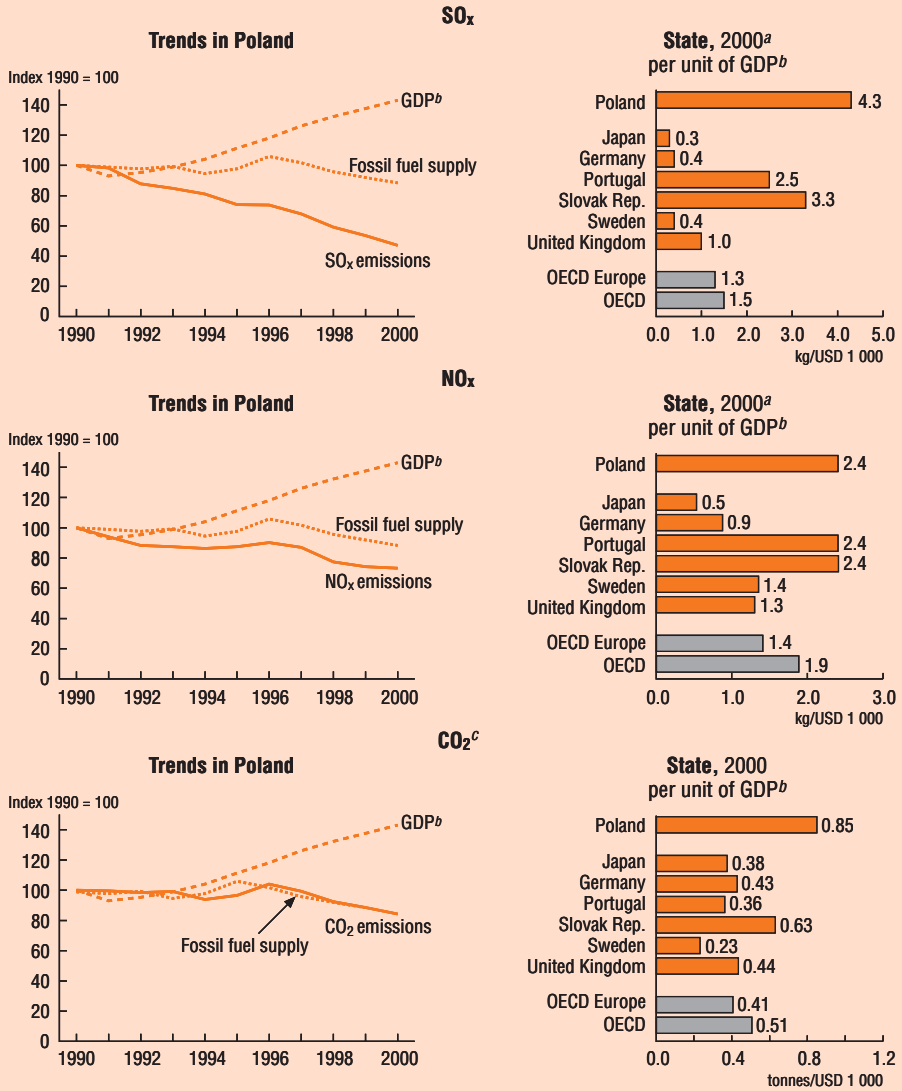
Trends in air emissions

Poland achieved *substantial emission reductions* in the 1990s for a range of pollutants including criteria air pollutants (e.g. SO_x, NO_x), POPs and heavy metals (Chapter 2, Section 2.1). Between 1990 and 2000, SO_2 emissions fell by 53%, NO_x emissions by 35%, NMVOC emissions by 28%, and dust emissions by 76%, meeting all reduction targets set by the First National Environmental Policy. Poland reversed the upward trend in emissions of NMVOCs and overcame the stagnation in SO_2 and NO_x emission levels during the latter half of the 1980s. This was achieved while GDP grew by an impressive 43%. Thus *strong decoupling* of these air emissions from economic growth took place in the 1990s (Figure 2.1). Emission reductions in the early 1990s mainly reflected economic recession (involving the closure of old and highly polluting facilities). Subsequent reductions were due to i) economic restructuring, ii) energy changes (fuel switching away from coal, improved fuel efficiency) and iii) environmental policies contributing to wider application of modern pollution control technologies. However, Poland's *air pollutant emission intensities* (kg/unit GDP) are still significantly higher than OECD averages (three times the SO_2 average and 20% higher than that for NO_x). These levels are the third and ninth highest among OECD countries, respectively, largely due to heavy reliance on coal for fuel supply (Chapter 2, Section 1.3). The energy sector is the largest producer of SO_2 (57% of national emissions) and CO_2 (58%) and the second largest producer of NO_x (31%) after the transport sector.

Between 1990 and 2000, national emissions of *dioxins and furans* decreased by 37%. Per capita dioxin emissions are around the OECD average. Emissions of four selected *polycyclic aromatic hydrocarbons* (PAHs) increased in the early 1990s but had returned to the 1990 level by 2000. Emissions of several *heavy metals* declined by 21 to 53% (Chapter 2, Section 2.1). Ammonia emissions decreased by 41%, reflecting a substantial decline in total numbers of livestock animals. Poland has not yet ratified any of the protocols requiring air emission reductions under the 1979 Geneva Convention on Long-range Transboundary Air Pollution. But it has met most of the targets of these protocols and is well on its way to meeting future targets. Once the EU accession process is completed, implementing the 2001 EU national emission ceiling Directive and the amended Directive on large combustion plants will be a challenge for Poland, particularly with respect to SO_2 emissions from power stations.

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Figure 2.1 **Air pollutant emissions**



a) Or latest available year.
b) GDP at 1995 prices and purchasing power parities.
c) Emissions from energy use only; excludes international marine and aviation bunkers.
Source: IEA-OECD.

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Trends in air quality

Ambient levels of *criteria air pollutants* in Poland generally declined in the 1990s and satisfied environmental quality standards (EQS) in major urban areas (Figure 2.2). However, there are still areas of exceedance for SO_2 (3% of all stations in 1999), mainly in the southern industrial zone (Silesian voivodship) where coal-fired power plants and heavy industries are concentrated. Concerning NO_2, EQS have been achieved at all stations in urban areas except roadside stations since 1998. EQS for particulate matter continued to be exceeded in many parts of Poland in the late 1990s (at 26% of all stations for PM_{10} and at 13% for total suspended particles in 1999). Monitoring indicates that there are many *roadside hotspots* where NO_2 and PM_{10} levels considerably exceed EQS, suggesting that there is a continuing need to reduce emissions from road transport. Ground-level ozone concentration frequently exceeded the EQS throughout the country in the 1990s, indicating the need for strengthened efforts to limit regional emissions of ozone precursors, especially NO_x from motor vehicles and NMVOCs from both motor vehicles and industrial use (e.g. solvents). Concentrations of some *toxic organic chemicals* remained very high in the 1990s (Chapter 2, Section 2.2), requiring additional emission reduction measures focusing more on specific sources.

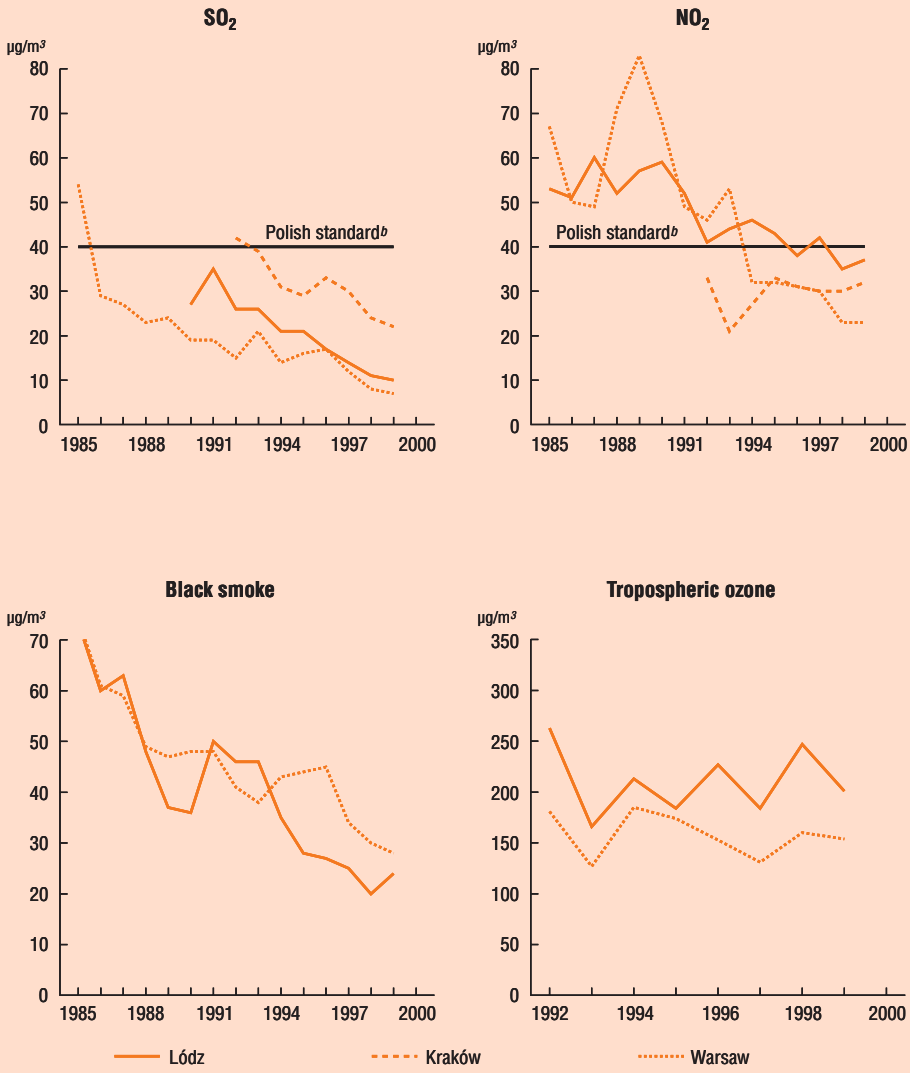
In the 1990s Poland's *air quality monitoring* system steadily improved in terms of geographical and pollutant coverage and monitoring instruments. However, manual measurement still dominates in the case of many pollutants. Planned large-scale modernisation of monitoring infrastructure should be implemented. Administration of the monitoring system could also be streamlined by merging the two current national networks and numerous local networks into a single network to ensure greater cost-effectiveness.

Policy measures for stationary sources: a mix of instruments

There was significant strengthening of *emission regulations* for stationary sources in Poland during the 1990s. While country-wide emission standards introduced in 1990 for SO_2, NO_x, CO and particles from new power generation processes were set at levels required by the EU Directive on large combustion plants, emission standards for existing processes were tightened only in 1998 and were less stringent than those for new processes. Standards were further strengthened in 2002, and extended to other sources (e.g. gas turbines, municipal and hazardous waste incinerators). Implementing the revised EU Directive on large combustion plants is a top priority of Polish air management policy. No national emission standards for VOCs exist; although voivodships and poviats have the authority to introduce such standards, few have done so. As a result of negotiations with the EU, Poland is committed to transpose the EU Directive on VOC emissions from storage and distribution of petrol by the end of 2005.

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Figure 2.2 **Trends in air quality,**[a] selected cities, 1985-1999



a) SO_2, NO_2 and particulates: annual averages of daily means. Tropospheric ozone: annual maxima of hourly values.
b) National ambient air quality standard since 1998 (annual mean).
Source: OECD; Inspectorate for Environmental Protection.

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Poland has used *emission fees* in air management since 1980. Fees are currently applicable to 62 air pollutants, ranging from conventional ones (e.g. SO_2, NO_x) to heavy metals and toxic organic chemicals (e.g. benzene, dioxins). Fees charged for petrol reloading facilities (amount of petrol reloaded) and fuel combustion facilities (amount of fuel used) are differentiated according to pollutant or source category (e.g. PLN 0.4 per kg of SO_2, PLN 210 per kg of benzene). *Fines* at rates ten times the emission fees are charged for non-compliance with emission standards. Payment of fines can be waived in exchange for investment in emission control, providing a considerable incentive to adopt end-of-pipe solutions. Coverage of pollutants, and fee levels, have remained virtually unchanged for a number of years but have been adjusted for inflation. Total revenue from air emission fees (PLN 761 million in 2000) accounted for about half the revenue from all emission fees, including fees for water discharges and waste disposal. In recent years, as emissions have decreased, revenue from fees has fallen accordingly. Substantial further declines in revenue are likely from mid-2001, as fee payments are now negotiable with authorities under the 2001 Environmental Protection Act. Revenue from fines on air emissions (PLN 4 million in 2000) has also been falling.

Public *citing of the worst polluters* ("List of 80"), introduced in 1989 by the Inspectorate for Environmental Protection has been a major incentive for large polluters to reduce emissions including those of air pollutants. Listed enterprises must prepare an action programme, with target dates to meet emission standards and other requirements of environmental regulations. The number of polluters that meet the criteria for being listed had fallen to about 40 by mid-2002. According to a report by the Inspectorate, the enterprises cited reduced particulate emissions by 67% and gaseous emissions by 44% in the first four years, far exceeding reduction rates reflected in national averages. A similar listing at voivodship level (initial listing of 787 enterprises, falling to 255 by the end of 2001) also supported air emission reduction efforts.

There was limited use of *voluntary agreements* for air management in Poland during the 1990s. Based on a 1996 agreement between the Ministries of Industry and Environment, by 2010 the power generation sector is expected to cap its SO_2 emissions at half the national ceiling established in the Second Sulphur Protocol under the Convention on Long-range Transboundary Air Pollution (0.7 Mt per year). So far, emissions have been reduced every year to a level about 20% above the UN-ECE target. Continuous efforts will be needed to close the gap.

Fuel quality standards were introduced in December 2002, by Ordinance of the Minister of Economy. Emission standards and the technical requirements of fuel combustion processes necessitate the use of fuels complying with these standards. Most heating plants and cogenerators without flue gas desulphurisation now burn low-sulphur coal (sulphur content 0.6-0.8%). Poland is expected to transpose EU fuel quality standards for heavy heating oil by 2006.

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About 60% of *pollution abatement and control (PAC) expenditure* by industry is devoted to air management (Table 6.4). In 2000 this expenditure totalled PLN 5.0 billion, 44% of which was for investment. Utilities and refineries were the largest investors, accounting for 55% of total investment by industry. Investment by metal and non-metallic mineral industries accounted for 10%. By 2002, SO_2 reduction processes at power plants (e.g. flue gas desulphurisation) and NO_x/dust reduction processes (e.g. low-NO_x burners, electrofilters) had been applied to the majority of Poland's total capacity. Over 63% of combined heat and power plants (calculated according to capacity) now incorporate NO_x reduction technologies.

Policy measures for mobile sources

Since 1992 Poland has introduced *automotive emission standards* by gradually adopting UN-ECE standards. These efforts were accelerated in the late 1990s to adjust Polish standards to those of the EU. Poland had adopted Euro III standards by 2000 (no later than these standards came into effect in the EU). *Automotive fuel quality* improved in the 1990s. As the vehicle fleet has been renewed, leaded petrol consumption has fallen (sales were below 10% of the total by early 2002). The sulphur content limit for petrol was reduced from 0.15 to 0.1% in 1992, that for diesel oil from 0.6% (low-sulphur oil) or 1% (high-sulphur oil) to 0.05% (all) progressively between 1992 and 2000. A 5% benzene content limit was introduced for petrol in 1992. Importing two-cycle engine vehicles and cars over ten years old was banned in 1993; importing vehicles without catalytic converters was banned in 1995. However, the *import of used cars* from the EU (200 000 cars per year according to current estimates) has been increasing, stimulated by progressive reduction of the import tax (currently 10%) since the mid-1990s as part of the EU accession process. These imports are delaying renewal of the fleet. As Poland must remove the import tax following EU accession, the incentive to import used cars will be even greater. From this point of view, requiring a vehicle inspection certificate for imported used cars in 2001 was a step in the right direction.

Conversion of cars to run on liquid petroleum gas (LPG) is mainly motivated by LPG's lower price (about one-third that of petrol). There were 730 000 *LPG-converted cars* in 2001. LPG refuelling infrastructure is well developed, with over 2 600 stations around the country. Development of other types of low-emission vehicle (e.g. CNG, electric, hybrid) use remains at a very early stage.

Funding and expenditure

Collected emission fees and fines are earmarked for national, regional and local *environmental funds*. Together with other revenue (e.g. loan repayment, foreign aid) environmental funds play a major part in financing environmental investment in

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Poland (Chapter 6, Section 3.3) . Until 2001, allocation of fees to national, regional and local funds depended on the pollutants' local, regional or national importance (e.g. allocation to the national fund was 100% for NO_x fees and 20% for SO_2 fees). The Environmental Protection Act introduced a uniform allocation for all pollutants except waste. Air projects have often benefited from large financing provided by the National Fund for Environmental Protection and Water Management. PLN 2.8 billion from this source accounted for about one-third of total expenditure in the period 1989-2000. It is estimated that funding up to 1998 contributed to emission reductions of 900 kt of SO_2, 30 kt of NO_x and 225 kt of dust per year (accounting for 82, 14 and 28%, respectively, of national annual reductions as of 1998). This system functions largely as a revenue-raising mechanism, but it also provides incentives for emission reduction.

Investments to prevent air pollution from *large combustion plants* have been mainly financed by retained earnings and bank credit. A recent survey by the Polish Power Grid Company indicates that the share of retained earnings (mainly depreciation, less profit) in financing environmental investments was the highest among industrial heating plants and municipal heating plants (about 50%). Combined heat and power plants have used their earnings to finance 42% of their environmental expenditure and base-load power plants only 28%. Bank credit dominated the external sources of finance, in particular among the base load power stations, where it financed up to 70% of the capital investment costs. Soft loans from environmental funds accounted for over 25% of financing of environmental investments at municipal heating plants and combined heat and power plants. Following a 1996 agreement between the Ministers of Industry and Environment, base-load power and heating plants are implementing a large-scale investment program to modernize technologies used, including for pollution abatement. This programme is financed mainly by bank credits, with as collateral the long term contracts for the sale of electricity to the Polish Power Grid Company. The investment made through this mechanism amounts to PLN 32 billion at current prices, out of which PLN 19 billion had already been spent before 2000. The last projects financed in this way are to be carried out in 2005.

Air protection was one of the highest priorities of the *EcoFund*, a debt-for-environment financial mechanism agreed by some of the creditor nations holding Polish foreign debts (Chapter 8, Section 1.1). Investments related to reducing air emissions accounted for about one-half of EcoFund expenditure in the period 1993-2000. Air projects so far have included closing down over 800 old coal-fired boilers and 12 000 tile stoves. By 2001, EcoFund projects are estimated to have brought about emission reductions of 100 kt of SO_2, 6 kt of NO_x and 200 kt of dust per year, and to have reduced hard coal consumption by 45 kt per year through energy-saving projects.

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1.3 Integration of air pollution objectives into energy policies

Trends in energy production and consumption

The *energy intensity* of the Polish economy (per unit of GDP) was reduced substantially in the 1990s. It fell by 37% between 1990 and 2000, reflecting a decline in energy intensive industry (e.g. iron and steel) as well as improved energy efficiency following modernisation of manufacturing and fuel combustion processes. However, Poland's energy intensity is still much higher than the OECD average (by 20%) and is one of the highest among OECD countries (Figure 2.3). In recent years, total final energy consumption (TFC) has fallen in the industry and residential sectors, and stabilised in the commercial sector. In the transport sector, TFC continued to increase in the 1990s, reflecting rapid expansion of road transport (Chapter 6, Section 3.2).

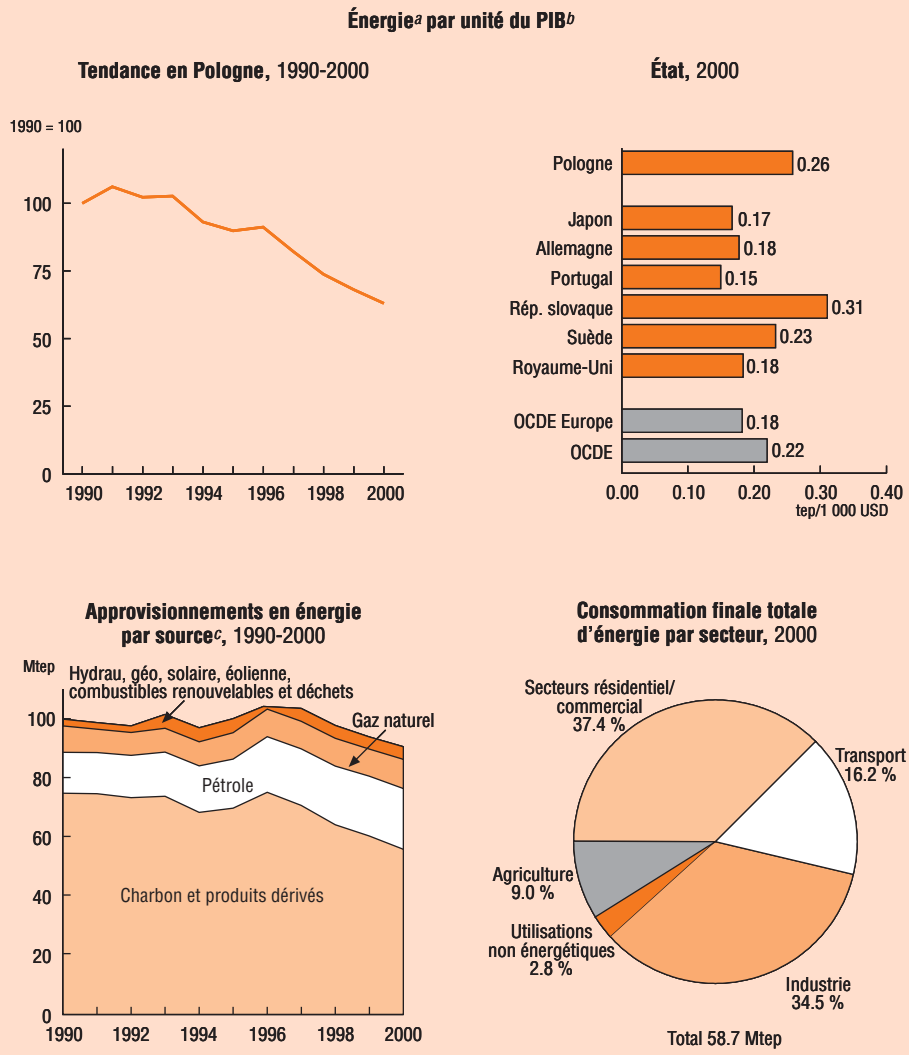
Primary energy supply, which contracted significantly during the last decade, is still dominated by domestic coal (i.e. hard coal and lignite). Between 1990 and 2000, total primary energy supply decreased by about 10%; the share of coal fell from 75 to 62%, while that of oil increased from 13 to 22% and that of natural gas from 9 to 11%. The share of renewables (mainly biomass) is increasing (4.7% in 2000) and should increase further (7.5% by 2010, 14% by 2020), according to the 2001 national programme on renewables. A 2000 regulation requires companies to ensure that some of the electricity or heat they purchase is generated by renewable sources or combined heat and power. All these trends contributed to considerable air emission reductions in the 1990s. Coal continues to be the main source of fuel for electricity generation, accounting for over 95%. The first natural gas power plant became operational in 1999. Poland does not have (and has decided that it will not have, at least until 2010) a nuclear power plant.

Energy prices and taxation

In the 1990s energy prices in Poland increased substantially as a result of a government policy, during the early transition period, of raising prices to world market levels and fully recovering the costs of fuel production through market liberalisation. The increase in *energy prices for households* (in real terms) was dramatic, with prices in 2001 66% higher for electricity and 179% higher for natural gas than in 1991. Thus PPP-adjusted energy prices for households are higher than the OECD averages: 44% higher for electricity, 80% higher for light fuel oil and 66% higher for natural gas in 2001 (Table 2.3). This has given households a strong incentive to use less energy. *Energy prices for industry* were 5 to 20% higher (depending on type of fuel) in 2001 than in 1991, but electricity, oil and natural gas prices remained significantly lower than in OECD Europe.

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Figure 2.3 **Energy structure and intensity**



a) Total primary energy supply.
b) GDP at 1995 prices and purchasing power parities.
c) Breakdown excludes electricity trade.
Source: IEA-OECD.

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Taxes on non-automotive fuels are very limited. Only light fuel oil for heating purposes is currently subject to an excise duty, which was introduced in 1999 (Table 6.2). Exemption of other fuels (particularly coal, in view of its high polluting characteristics and dominant share of energy supply) is undesirable environmentally. Consideration should be given to introducing taxes on these fuels, differentiated according to environmental impact.

Automotive fuels have long been subject to excise duty. In the 1990s they increasingly took environmental considerations into account. *Excise duty* increased sharply twice during the 1990s in real terms, for both petrol and diesel. The duty on petrol was set 10% lower for unleaded than leaded; this differentiation is to continue until the phase-out of leaded fuel is completed (the market share of leaded petrol fell below 10% by 2002). For diesel fuel the excise duty rate is differentiated according to sulphur content by up to 8% (Table 6.2). Liquid petroleum gas (LPG) for use as road fuel is exempt from excise duty;

Table 2.3 **Energy prices in selected OECD countries,** 2001

	Electricity		Oil		Natural gas	
	Industry (USD[c]/kWh)	Households (USD[d]/kWh)	Industry[a] (USD[c]/t)	Households[b] (USD[d]/1 000 l)	Industry (USD[c]/10^7 kcal)	Households (USD[d]/10^7 kcal)
Poland	0.045	0.170	105.4	783.4	173.3	653.1
Japan	0.143[e]	0.148[f]	217.2	331.6	452.7[f]	895.3[f]
Germany	0.141[f]	0.138[f]	. .	394.3	187.9[f]	425.6[f]
Portugal	0.066	0.200	213.7	. .	. .	. .
Slovak Republic	0.043	0.209	74.4[e]	1 380.8	106.6	382.6
Sweden	. .	. .	. .	633.2	. .	. .
United Kingdom	0.048	0.108	177.4	295.6	133.6	306.4
OECD Europe	0.052[f]	0.134[f]	195.7[f]	477.8	157.7[f]	405.0[f]
OECD	0.047[f]	0.107[f]	189.0	435.3	168.6[f]	392.7
Polish price/OECD Europe (%)	*71*[f]	*115*[f]	*58*[f]	*164*	*84*[f]	*144*[f]
Polish price/OECD (%)	*79*[f]	*144*[f]	*56*	*180*	*79*[f]	*166*

a) High-sulphur oil.
b) Light fuel oil.
c) At current exchange rates.
d) At current purchasing power parities.
e) 1999 data.
f) 2000 data.
Source: IEA-OECD.

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the retail price of this cleaner fuel is therefore very competitive and has contributed to the rapid increase in the number of LPG powered cars in Poland. Value added tax (VAT) was introduced in 1993 at 11% and raised to 22% the following year. Road fuel prices in Poland are among the highest in OECD countries when adjusted for purchasing power parities (Figure 7.2). However, internalisation of environmental externalities should be further developed through the automotive fuel duty system. Earmarking 30% of automotive fuel excise duty for road maintenance should only be considered a temporary measure.

1.4 Integration of air pollution objectives into transport policies

Trends in transport modes and emissions

Over the last ten years Poland has experienced a radical change in transport, with rapid growth in road transport and a significant decline in rail transport. In the case of *passenger transport*, total traffic volume (passenger-km) increased by 29% and private car traffic more than doubled between 1990 and 2001. Private vehicles have become the dominant mode (72% in 2001), as in many other OECD countries. The number of registered passenger cars increased by 100%, although per capita car ownership is still much lower than the OECD Europe average. Regarding *freight transport*, traffic volume (tonne-km) increased by 85% for road vehicles, far exceeding growth in GDP (Figure 7.2).

Between 1990 and 2000, *emissions from transport* decreased significantly: NO_x emissions from mobile sources fell by 35%, NMVOC emissions by 50%, CO emissions by 36% (Table 2.4) and lead emissions by 85%. In 2000, the transport sector was the largest source of national emissions of NO_x (37%) and NMVOCs (30%) and the second-largest for CO (23%). CO_2 emissions from road transport accounted for 9% of total CO_2 emissions in 2000 (Table 8.5). Overall, improved fuel efficiency has offset the rapid increase in road traffic.

Policy measures

Integration of air quality concerns into transport policy progressed in Poland in the 1990s. In the two national *transport plans* (1995 Transport Policy and National Transport Policy for 2001-2005) environmental issues are explicitly given priority. Major road construction has been subject to *environmental impact assessment* since 1990; transport infrastructure planning has been part of land use planning since 1994, with reduction of transport demand a primary objective. Use of *economic instruments* in transport policy to internalise environmental externalities was further developed in the 1990s (e.g. vehicle excise duty, annual vehicle tax on lorries and buses, fees on automotive fuels used by company cars, toll roads, parking charges). *Other instruments* that could reduce transport (particularly road traffic) demand (e.g. park and ride, combined freight transport) have not yet been much used in Poland (Chapter 7, Section 1.4).

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Table 2.4 **National atmospheric emissions by source**, 1990-2000

Source[a]		SO_2		NO_X		NMVOCs		CO	
		(kt)	(%)	(kt)	(%)	(kt)	(%)	(kt)	(%)
Stationary sources	1990[b]	3 100	*96.6*	800	*62.5*	474	*57.0*	3 279	*72.1*
	2000	1 470	*97.3*	524	*62.5*	422	*70.5*	2 658	*76.8*
Combustion in energy production/transformation	1990[b]	. .	. .	. .	. .	12	*1.4*	49	*1.1*
	2000	853	*56.5*	257	*30.7*	13	*2.2*	50	*1.4*
Industrial combustion	1990[b]	. .	. .	. .	. .	30	*2.6*	21	*0.5*
	2000	281	*18.6*	153	*18.3*	10	*1.7*	54	*1.2*
Non-industrial combustion[c]	1990[b]	. .	. .	. .	. .	141	*17.0*	2 387	*52.5*
	2000	310	*20.5*	97	*11.6*	100	*16.7*	1 688	*48.7*
Production processes	1990[b]	. .	. .	. .	. .	67	*8.1*	37	*0.8*
	2000	26	*1.7*	17	*2.0*	69	*11.5*	25	*0.7*
Solvent use	1990[b]	. .	. .	. .	. .	163	*19.6*	. .	. .
	2000	. .	. .	. .	. .	158	*26.4*	. .	. .
Miscellaneous[d]	1990[b]	. .	. .	. .	. .	61	*7.3*	785	*17.3*
	2000	. .	. .	. .	. .	72	*12.0*	841	*24.3*
Mobile sources	1990	110	*3.4*	480	*37.5*	357	*43.0*	1 268	*27.9*
	2000	41	*2.7*	314	*37.5*	177	*29.5*	805	*23.2*
Road transport	1990[b]	. .	. .	. .	. .	281	*33.8*	1 143	*25.1*
	2000	32	*2.1*	230	*27.4*	143	*23.9*	688	*19.9*
Other transport	1990[b]	. .	. .	. .	. .	76	*9.1*	125	*2.7*
	2000	9	*0.6*	84	*10.0*	34	*5.7*	117	*3.4*
Total	1990[b]	3 210	*100.0*	1 280	*100.0*	831	*100.0*	4 547	*100.0*
	2000	1 511	*100.0*	838	*100.0*	599	*100.0*	3 463	*100.0*
Change 1990[b]-2000 (%)		*–53*		*–35*		*–28*		*–24*	

a) Source categories defined by UN-ECE with some aggregations.
b) 1995 for CO.
c) Residential and commercial combustion and waste treatment.
d) Agriculture and fuel distribution.
Source: OECD.

2. Focus on Selected Topics

2.1 Steady declines in national air emissions

Criteria air pollutants

National *SO_2 emissions* declined by 53% between 1990 and 2000 (Table 2.4). The bulk of the reduction was achieved in the energy production/transformation sector (e.g. power stations and refineries), mainly through increased energy efficiency and wider use of *desulphurisation systems* at coal-fired power plants. Emission reductions

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in industrial and non-industrial (e.g. residential, commercial) combustion largely reflect fuel switching from coal to oil and gas.

National *NO_x emissions* decreased by 35% between 1990 and 2000 (Table 2.4). Reductions were mainly in the energy production/transformation sector and related to mobile sources. Use of low-NO_x burners at power plants, as well as increased fuel efficiency, contributed to reduced emissions from power generation. Despite the rapid increase in road traffic, the growth in the number of vehicles fitted with catalytic converters (1% of passenger cars in 1994 and 45% in 2000), combined with tighter emission standards, brought about a reduction in emissions from mobile sources.

National *NMVOC emissions* fell by 28% between 1990 and 2000 (Table 2.4). Reductions were mainly in the road transport sector, reflecting increased penetration of catalytic converters for petrol fuelled passenger cars. There was little change in the level of emissions associated with solvent use, leaving scope to reduce emissions by introducing technical standards.

National *CO emissions* declined by 24% between 1995 and 2000 (Table 2.4). Reductions were mainly in non-industrial combustion and road transport (through increased penetration of cars with catalytic converters). During the same period national *ammonia emissions* declined by 41%, largely resulting from a decrease in the number of livestock due to structural changes in the agricultural sector.

Poland's *CO_2 emissions* from fuel combustion fell by 15% between 1990 and 2000 (Table 8.5). Per unit of GDP, CO_2 emissions have decreased by 41% since 1990 (Figure 8.2). The bulk of reductions were made at power stations through improvements in energy conversion efficiency. Emissions from transport increased by 24%, less than the increase in road traffic, owing to improved motor fuel efficiency.

Organic and toxic pollutants

National emissions of *dioxins and furans* (in toxic equivalents) decreased by 37% between 1990 and 2000 (Table 2.5). National emissions of four selected *PAHs* increased rapidly between 1990 and 1995 (by about 50%) but then began to decrease, returning to approximately the 1990 level by 2000. Trends for dioxins/furans and PAHs mainly reflect falling hard coal consumption in the residential sector.

Emissions of *heavy metals* fell significantly (by over 30% for most metals) between 1990 and 2000 (Table 2.5). Fuel switching from coal to oil, increased use of natural gas and renewable energy in the manufacturing, residential and commercial sectors, and tightened controls on heavy industries are the main reasons. The greatest reductions were observed for lead (by 53%) as unleaded petrol progressively took over the market. A December 2002 Ordinance of the Minister of Economy virtually eliminated the commercial sale of leaded petrol from January 2003.

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Table 2.5 **Emissions of persistent organic and toxic pollutants,** 1990-2000

(tonnes)

	PCDD/F[a] (g TEQ)	PAHs[b]	Lead	Cadmium	Mercury	Arsenic	Chromium	Copper	Nickel	Zinc
1990	529	159	1 372	92	33	82	155	599	370	3 092
2000	333	167	648	50	26	50	84	375	251	2 173
Change 1990-2000 (%)	*–37*	*5*	*–53*	*–46*	*–21*	*–39*	*–46*	*–37*	*–32*	*–30*

a) Polychlorinated dibenzo dioxins and furans.
b) Polycyclic aromatic hydrocarbons, represented by four substances: benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene.
Source: Inspectorate for Environmental Protection.

2.2 Improvements in urban air quality

Criteria air pollutants

In the past ten years *ambient concentrations of SO_2* have continued to decline strongly in urban areas, in accordance with the national emissions trend. In 2000 the annual average ambient SO_2 concentration in urban areas was 9 µg/m^3, well below the Polish EQS (40 µg/m^3), and there were exceedances at only 3% of monitoring stations. Seasonal differences remain high (levels in winter are more than double those in other seasons) due to greater use of coal-fired heating systems in winter.

Ambient NO_2 concentrations in urban areas gradually increased until 1996 and then started to decrease. The net result was a decrease of over 10% since the early 1990s, reaching an annual average concentration of 19 µg/m^3, far below the EQS (40 µg/m^3). The limit value has not been exceeded at any monitoring station since 1998, except along roadsides.

Ambient concentrations of suspended particles (TSP and PM_{10}) have shown a trend similar to that for NO_2. Annual average concentration in urban areas was 43 µg/m^3 in 2000, thus respecting the EQS (Table 2.2). Although the number of monitoring sites at which the EQS is exceeded has fallen substantially since 1996, more such exceedances were observed in urban areas (e.g. Torun, Leszno) than for SO_2. Concentrations at roadside stations were among the highest. Seasonal differences in concentrations are substantial (i.e. higher in winter).

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Ambient CO concentrations in urban areas have fallen. The annual average was 0.8 mg/m^3 in 2000, far below the EQS (2 mg/m^3).

Photochemical and toxic pollution

Ground-level ozone concentrations are closely correlated with weather conditions, but also depend on availability and transport of NO_x and VOCs. EQS exceedances have recently occurred at all monitoring stations. Monitoring stations at which the EQS was exceeded more than 10% of the time accounted for nearly half the total number of exceedances in 1999, demonstrating the chronic nature of the problem in some areas.

While the number of monitoring sites varies significantly depending on the pollutants being monitored, *concentrations of some toxic organic chemicals* were high in the 1990s. Regarding benzene, benzo(a)pyrene, phenol and formaldehyde, for example, the EQS (annual mean) was exceeded at 47, 100, 93 and 64% of all sites, respectively, in 1999. *Ambient levels of heavy metals* did not exceed EQSs for most species.

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3

WATER MANAGEMENT*

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Poland:

- mobilise *financing* needed to upgrade and extend both urban and rural sewerage, waste water treatment and drinking water supply infrastructure, giving consideration to greater involvement of the private sector;
- apply the *user pays and polluter pays principles* more fully for water services, taking into account social considerations;
- pursue implementation of EU legislation and *implementation of the new institutional framework* for water management established by the 2001 Water Act;
- focus water management *priorities*, with clear quantified objectives and time limits, while paying particular attention to minimising the costs of meeting environmental quality targets;
- continue to implement *flood prevention and mitigation* programmes and plans, in particular by protecting flood plains and natural buffer zones;
- introduce measures to promote use of *phosphate-free detergents* (e.g. product charges, phase-out).

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1995. It also reviews progress with respect to the objective "maintaining the integrity of ecosystems" of the 2001 OECD Environmental Strategy.

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Conclusions

Overall pressure on water quantities due to water abstraction decreased in the 1990s. This mainly reflected the decline and restructuring of industrial production, together with reduced water consumption for irrigation and municipal purposes. There has been *strong decoupling of water abstraction* from GDP growth, especially important in a country like Poland that is relatively poorly endowed with freshwater resources (Poland's per capita freshwater resources are only 40% of the OECD Europe average). In both urban and rural areas there has been significant progress in connecting the population to water supply and sewerage systems. Nutrient loading (e.g. nitrogen, phosphorous) of coastal waters from point sources has declined following the construction of waste water treatment plants. There has been progress within the overall *water management framework*, including the introduction of metering, reduction of leakages, and charging for both water abstraction and waste water discharges to surface waters. Preparatory work on transposition and implementation of EU water legislation is well advanced, with the adoption of the 2001 Water Act and the establishment of *Regional Boards for Water Management*. Flood management has also progressed since a major flood in 1997. A number of Polish rivers and lakes (e.g. in the north-eastern and eastern parts of the country) remain in a natural state, providing important wildlife habitats.

However, *surface water quality* is still generally unsatisfactory, especially in rivers and with respect to BOD. Relatively high investment in waste water treatment plants in the 1990s has not yet led to corresponding improvements in surface water quality, suggesting that cost-effectiveness has not been one of the most important criteria for these investments. A long list of priorities, partially driven by requirements for EU accession, will necessitate *large expenditure* for water management infrastructure although its financing remains uncertain. Integration of water management with other policy areas such as health protection needs to be strengthened. In particular, the quality of drinking water supplied by public networks must be improved to comply with European standards. Further efforts need to be made in *rural areas* to improve septic tank functioning, increase the number of connections to sewerage systems, and control nitrate contamination of wells.

1. Evaluation of Performance

The institutional framework for water management has evolved in Poland with two major reforms, one in the early 1990s and one a decade later (Chapter 3, Section 2.1).

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1.1 Policy objectives in the 1990s

National environmental policies

The *First National Environmental Policy (1991)* provided the basis for rational use and management of water resources in the 1990s. Government objectives were: decentralising water management; reducing allowable pollutant discharges; strengthening economic instruments; reinforcing water retention capacities; restricting use of deep groundwater; improving flood protection; and increasing use of rivers for energy production and transport. These objectives were translated into short- and medium-term priorities. *Short-term priorities* were concerned with eliminating drinking water shortages in urban areas, constructing waste water treatment plants, modernising networks, increasing water storage capacities, and making water management more efficient. *Medium-term priorities* were a 50% reduction of untreated discharges of waste water by 2000 and an increase in the share of biological/chemical treatment; improvement of rural drinking water quality and supply; reduction of the impact of saline water discharges; restriction of all deep groundwater use by industry, except for food and pharmaceutical production; and greater use of rivers for transport.

With the *Second National Environmental Policy (2000)* these objectives were revised and updated. They now include: eliminating water shortages, particularly in urban agglomerations; implementing river basin programmes for construction and modernisation of the system of waste water treatment plants; reforming the water management system, including raising charges for water use to a more realistic level; implementing a programme for intensive afforestation of watershed areas and of areas unsuitable for agriculture; limiting the volume of untreated municipal waste water and industrial effluents discharged to ambient waters, and increasing the use of high-efficiency sewage treatment methods; limiting the use of underground water resources by industry to the minimum necessary (e.g. by the food and pharmaceutical industries); and ensuring that water supplies conform to adequate sanitary standards for consumption and production in rural areas. These objectives have been translated into a long list of *short-term* (2000-02), *medium-term* (2002-10) and *long-term priorities* (2010-25), some with quantitative targets. These priorities are largely influenced by EU water legislation (Chapter 3, Section 2.2). However, they are too numerous and should be reduced to a set of well defined areas.

1995 OECD Environmental Performance Review

The 1995 review recommended that Poland:

– continue efforts to reduce pollution from municipal and industrial sources;

– give high priority to the rapid adoption of the proposed new water law and continue the rapid implementation of river basin management;

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– reassess priorities for the completion of unfinished waste water treatment plants;

– ensure that new waste water treatment capacity is accompanied by the necessary sewerage network; examine and improve the efficiency of existing waste water treatment plants;

– continue efforts to improve the quality of drinking water supply in rural areas, and reduce leakage in the transport of drinking water in urban areas;

– consider, over the medium term, a gradual increase in water prices, as well as a rapid introduction of metering systems to link water bills more closely to actual water consumption.

1.2 Performance with respect to strategic objectives

Water quality

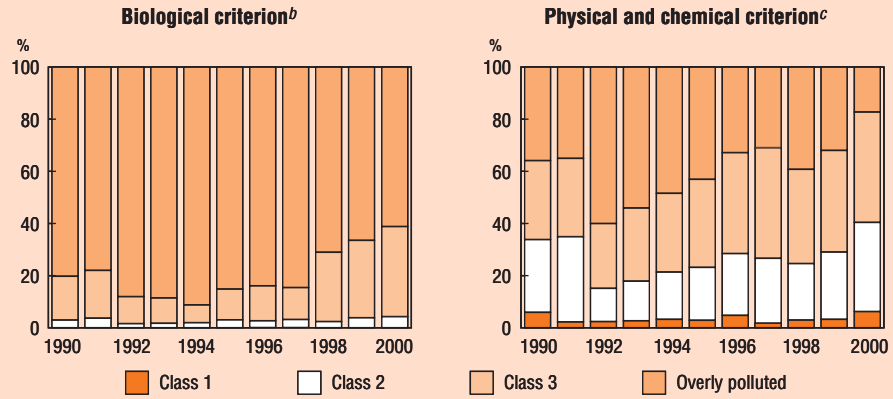
Rivers and lakes are routinely and comprehensively monitored. Their classification comprises, in decreasing order of quality, classes I to III. Monitoring is carried out for 23 physical, chemical and biological parameters. Classification criteria tend to be stricter than those of the EU. Furthermore, under the Polish system classification of a water body is downgraded if there is a deficiency with respect to even one parameter.

Since the mid-1990s some 6 200 km of the largest rivers were monitored annually. *Progress in improving the biological, physical and chemical quality of surface waters has been uneven.* Overall, monitoring data indicate an improvement in *river water quality* in recent years, in terms of physical and chemical criteria. However, results of water quality assessment according to biological criteria continue to be unsatisfactory, with 61% of waters considered excessively polluted (Figure 3.1). The main reason is the delay in constructing waste water treatment plants in large agglomerations. Only about half the Polish population is connected to a sewerage system or treatment plant, much less than in other OECD countries (Figure 3.2); Warsaw still discharges 55% of waste water directly to rivers without treatment.

There appears to be general progress regarding clean up of *lakes*, but, as in the case of rivers, pollution from untreated sewage and release of excessive nutrients continue to be problematic. Water quality in most monitored *retention reservoirs* is unsatisfactory, mainly due to the biogenic content of flood deposits, which stimulate eutrophication.

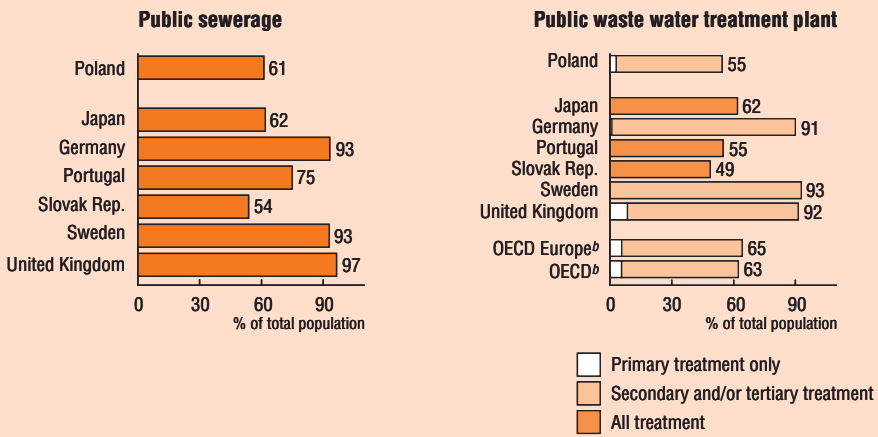
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Figure 3.1 **River water quality in Poland,**[a] 1990-2000



a) Sections of rivers are designated as belonging to one of four quality classes. Class I is the highest quality.
b) Based on results for E. coli.
c) Based on testing for 23 physical and chemical properties.
Source: CSO.

Figure 3.2 **Population connected to sewerage,** 2001[a]



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

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In the last ten years *groundwater* quality has not changed substantially; 60.9% of all groundwater resources were of highest quality, 15.3% of medium quality and 23.8% of low quality in 2000.

Pollutant discharges to the *Baltic Sea* from municipal sewage systems in Poland decreased between 1988 and 1995, but this was less the case for inputs from agriculture (Figure 8.3). Poland's continuing high levels of discharges of nitrogen, phosphorus and phosphates increase eutrophication of coastal waters (Chapter 8, Section 1.4).

Relatively high *investment in waste water treatment* plants in the 1990s has not led to corresponding improvement in surface water quality. This suggests that resources have not always been targeted at projects that would be likely to produce the greatest environmental benefits.

Drinking water

In 2000, 92% of the urban population was connected to *public water supply* networks. However, in April 2002 results of a control of the quality of piped drinking water and of wells in 20 municipalities showed that two-thirds of samples taken did not conform to Ministry of Health standards. Efforts need to be made to comply with the EU Directive on drinking water. In 1997, only 61% of the rural population had piped water supply; the remainder consumed well water. Analysis of shallow groundwater by the Ministry of Agriculture, including 3 550 *tests for nitrate levels*, showed that 24% of wells controlled had high nitrate content (over 50 mg/l).

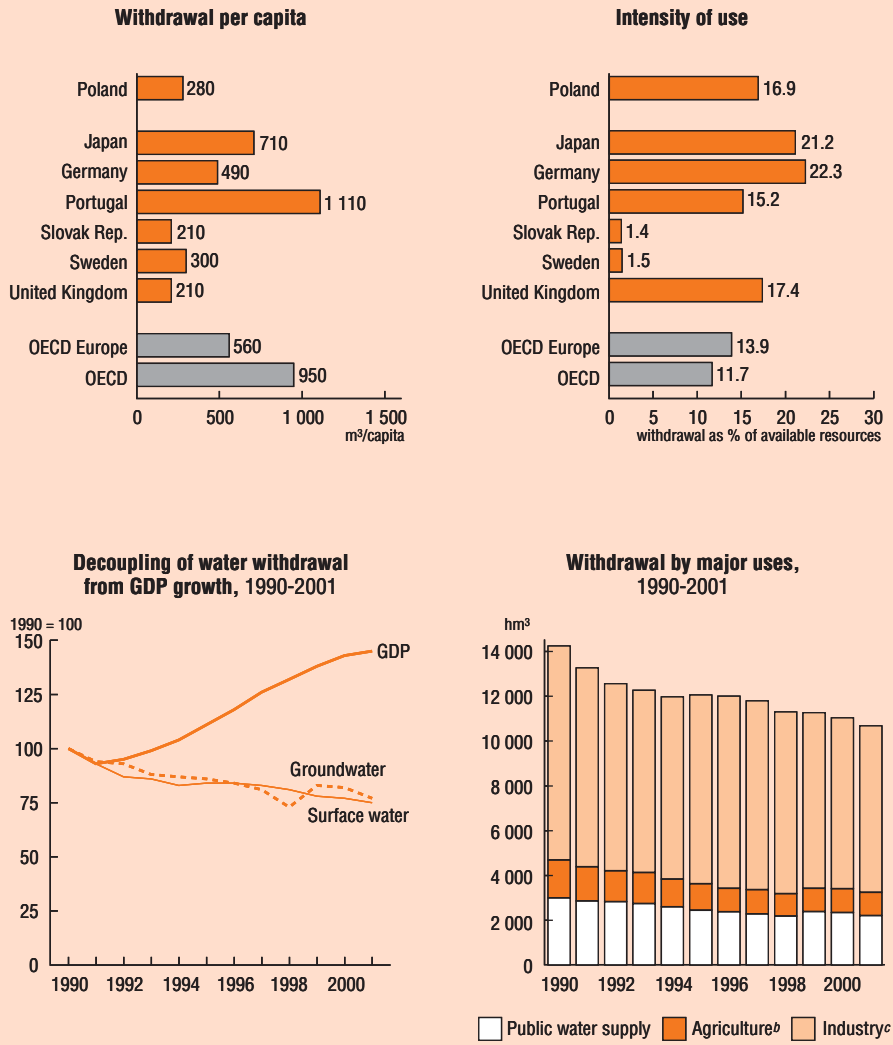
Use of water resources

Poland is *poorly endowed with freshwater resources.* Average surface water resources are 63.1 billion m^3/year, or some 1 630 m^3 per capita, compared with a European average of about 4 000 m^3 per capita. This is mainly due to low precipitation, but surface water resources are also very irregularly distributed and the capacity of retention reservoirs does not exceed 6% of annual run-off.

Intensity of water use is 22% above the OECD Europe average (Figure 3.3), particularly in urban areas; leakage occurs in distribution networks, and water use by industry and households has been wasteful. *Water withdrawal* is 70% by industry (of which 87% for cooling water), 20% by municipal water supply systems, and 10% by agriculture and forestry. Surface water from rivers and lakes meets over 80% of existing needs; groundwater resources, mainly used for public supply of good quality potable water, are currently estimated at 16 billion m^3. Approximately 35% of underground resources are deep waters.

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Figure 3.3 **Water use**, 2001[a]



a) Or latest available year.
b) Withdrawal for irrigation of arable land and forest (area > 20 ha) and for filling of fish ponds (area > 10 ha).
c) Mining and quarrying, manufacturing (including cooling), electrical cooling and construction.
Source: OECD; CSO.

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On the whole, water withdrawal pressures decreased during the 1990s, mainly due to the restructuring of industrial production and reduced consumption for irrigation and municipal purposes. Thus *water withdrawal was strongly decoupled from GDP growth* (total water withdrawal fell by 25% between 1990 and 2001) (Figure 3.3). This decline reflects economic restructuring (in industry) as well as sharp reductions in irrigation and municipal water use. Consumption of public water supply by households decreased from 74.1 m^3 per inhabitant in 1992 to 47.5 m^3 in 2000 in urban areas, and from 23.09 m^3 per inhabitant in 1992 to 22.1 m^3 in 1997 in rural areas. Progress in reducing municipal water use has mainly been achieved through controlling water losses (still at 18% of total water supplied to municipalities), introduction of metering and a gradual increase in water prices.

Unlike some other OECD countries, where rivers have been transformed by man to the extent that there is a tendency to renaturise them, Polish *rivers and lakes* (e.g. in the north-east and east) are *ecosystems* that have been preserved to a large extent in their natural state. Exceptional natural and landscape amenities are found in the valleys of the Central Vistula and the Bug, Narew, Biebrza, San and Pilica rivers, the estuary of Warta River, and along the rivers of the Mazurian and in the coastal region. To protect the unique amenities of river valleys and lakes, lowland national parks have been established (the Biebrza, Narew, Drawa and Wigry Parks). In the Pan European Strategy of Biological and Landscape Diversification, worked out by the Council of Europe in co-operation with Polish researchers, protection of the Bug and of Vistula River systems has been adopted as a priority objective.

Pollution pressures on water resources

Concerning *municipal waste water*, the share of the urban population connected to sewerage infrastructure increased from 81.5% in 1992 to 83% in 2000. The share of the rural population using a sewerage system increased from 4.7% in 1995 to 11.5% in 2000. The share of the population connected to public *waste water treatment plants* increased from 35% in 1992 to 55% in 2001; this national connection rate is still well below the OECD average (Figure 3.2). The share of the urban population connected to public waste water treatment increased from 57% in 1992 to 80% in 2000; the share of the rural population served by waste water treatment plants increased from 4% in 1996 to 11% in 2000. Between 1992 and 2000, over 300 sewage treatment stations (including more than 100 biological ones) were put into operation every year. Discharge of municipal waste water to ambient waters has decreased from 2 300 hm^3 in 1990 to 1 494 hm^3 in 2001. More than 100 Polish towns have no waste water treatment plant. Many existing waste water treatment plants suffer from hydraulic overloading or have only mechanical treatment. The investment intensity per unit of GDP was among the highest in OECD countries until 1999; however, very significant efforts will still be necessary to comply with the EU urban waste water treatment Directive.

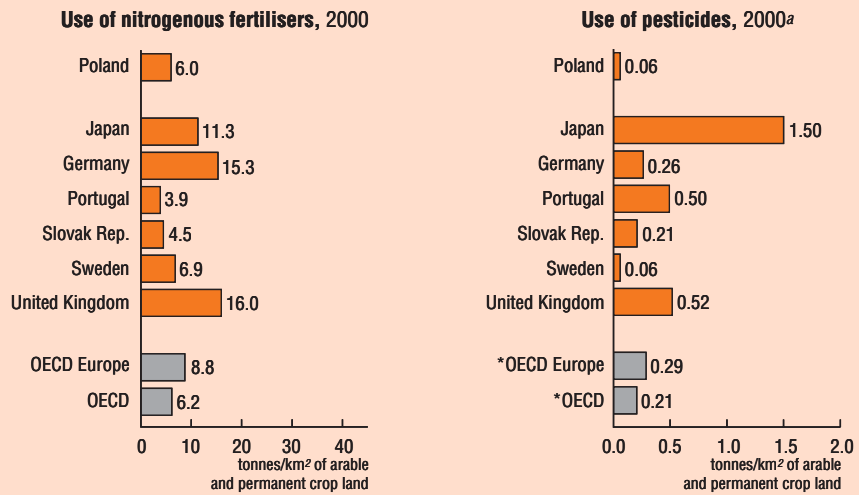
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Concerning *industry*, in the early 1990s there was a decrease in *the volume of industrial effluent requiring treatment*, mainly due to contraction of industrial output. Stabilisation was observed in the period 1995-98, at the level of 1 100 hm^3. In 2000 the volume was 1 007 hm^3. Major improvements have been made in the chemical and pulp and paper industries. However, close to half of 2 700 large industrial plants have no waste water treatment plants and 123 of the industrial treatment plants in operation have insufficient output.

Saline effluent remains of concern in the *coal mining* sector. Several thousand tonnes of salt per day is discharged to the Vistula and Odra river basins, resulting in considerable costs to industries and infrastructure downstream, and damage to ecosystems. Despite adoption by the government of the 1998-2002 Coal Mining Sector Programme, which includes targets of removing salt before waste water is discharged and reducing the amount of waste stored on the surface, little progress has been made.

Concerning *agriculture*, the intensity of fertiliser and pesticide use in Polish agriculture, and the intensity of livestock operations, are still several times lower than the OECD averages (Figure 3.4). Poland recently transposed the EU Directive on protec-

Figure 3.4 **Agricultural inputs**



a) Or latest available year.
Source: OECD; FAO.

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tion of waters against nitrates from agriculture, which will require best-practice techniques for fertiliser use, and thus help limit nutrient run-off.

Leaks from insecure septic tanks are an important source of *microbiological contamination* of water by rural households. Untreated urban sewage is responsible for excessive *algae growth* in rivers and lakes, mainly due to phosphorous based detergents. Measures such as a product charge should be adopted, with a view to eventually phasing out these detergents.

1.3 Use of economic instruments

Economic instruments used in Poland to manage water resources comprise charges, fines, subsidies and tax relief. There are *charges* for intake of surface and groundwater, as well as for sewage discharges to water or to soil. *Fines* are levied for inappropriate use of the environment, including illegal water intake, exceedance of the permissible volume of water to be abstracted, and non-compliance with limit values specified for sewage discharges. *Subsidies* in the form of budgetary grants and preferential credits are provided by the national, regional, county, and municipal funds for environmental protection and water management, and the EcoFund foundation which manages expenditure for debt-for-environment swaps (Chapter 8, Section 1.1). *Tax relief* can apply to certain investment expenses and donations for environmental protection; a reduced VAT rate is granted to manufacturers of certain products and to companies that provide services related to environmental protection. Other charges introduced in the Water Law of 2001 include those for use of inland waterways and water installations owned by the State; access to fishing areas; use of water bodies owned by the State Treasury (projects associated with hydro-engineering, water transport, extraction of stone, gravel, sand and other materials, or removal of plants from water); construction of transport, industrial or agricultural infrastructure; and use of recreational facilities and amenities.

Until 2001, charges paid by municipalities and water utilities were only one-fifth those paid by enterprises. They provided little incentive to treat sewerage. The *new system of charges* for water intake and for sewage discharge (to water or soil), established by the Environmental Protection Act (2001), no longer differentiates among users. Charges for water intake vary according to the quality and type of water abstracted and the part of the country. Charges for sewage discharges to water or soil depend on pollution content (Table 3.1) and in certain cases on the temperature of the discharges. The system provides revenue earmarked for environment funds. The new charges provide much stronger *price signals* regarding the true costs of using the environment, and therefore may stimulate improvements in environmental performance.

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In practice, the *collection rate for charges* is high for water intake (well over 90%) but low for waste water discharges (about 50%) due to the very low rate of collection of charges for saline water discharges by coal mines (some 50 to 60% of all the charges imposed). So far this new system of fees has worked reasonably well with respect to revenue raising, but less well as a means of providing price signals since charges for municipal waste water treatment plants were relatively low (e.g. several times lower than those in Slovenia or the Czech Republic).

Table 3.1 **Water resource charges**

For water intake[a]	Groundwater		
	Basic fee	8	groszy[b]/m^3
	Surcharge depending on quality	2-16	groszy[b]/m^3
	Surface water		groszy[b]/m^3
	Basic fee	4	groszy[b]/m^3
	Surcharge depending on quality and region	2-13	groszy[b]/m^3
For effluent discharge to water or soil[a]	BOD_5	3.0	PLN/kg
	COD	1.2	PLN/kg
	Suspended matter	0.37	PLN/kg
	Volatile phenols	32	PLN/kg
	Hazardous substances		
	Heavy metals (mercury, cadmium, zinc, copper, nickel, chrome, lead, arsenic, vanadium, silver)		
	Organic compounds (hexachlorobenzene)	87.5	PLN/kg

a) As specified in the ordinance of 9 October 2001.
b) 1 groszy = PLN 0.01.
Source: MOE.

1.4 Water pricing

Prices of water piped to households have increased considerably in the 1990s. In 1992 they were estimated at between USD 0.15 and 0.35 per m^3; in 1998 they varied between USD 0.19 and 1.42, averaging USD 0.42. This trend has been accompanied by development of the metering system, particularly in new dwellings (which must be equipped with individual metering systems), and by a considerable drop in water consumption by households (from 500/600 litres per person per day in 1992 to 129 litres in 1998 in urban areas; in part reflecting a decrease in system leakage). Prices of *waste water collection and treatment* are estimated at between USD 0.19 and

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USD 1.47 per m^3 for households, averaging USD 0.85. Overall, the *total price* of water supply and waste water treatment was estimated at USD 1.27 per m^3 in 1998; in that year households spent 1.4% of their budget on water and sewerage.

With respect to *cost recovery*, although water users should cover the investment and maintenance costs of water supply installations (as well as sewage collection and treatment), in practice they pay operating and maintenance costs and pay only partially for capital costs. In large cities the trend is to make water users pay both operating/maintenance and capital costs; however, in some smaller municipalities capital costs are partially or totally subsidised by municipal budgets. Despite plans to increase water and sewage services and to develop a rational and stable price policy, decisions on price setting often remain highly politicised; for example, municipalities are reluctant to increase the prices on water services before local elections. This instability has a negative impact on effective management of water companies and deters private companies from entering the water services market.

In 1998 the price of water purchased from the municipal network by *industrial users* varied between USD 0.43 and USD 2.16 per m^3, averaging USD 0.87; prices for industrial waste water sources were between USD 0.20 and USD 2.58 per m^3, averaging USD 0.94. Prices for industrial users were nearly 50% higher than corresponding prices for households, implying some degree of cross-subsidisation.

Concerning *agriculture*, State-owned agencies provide water for irrigation at no charge. Farmers are exempt from the obligation to obtain a permit and pay water abstraction fees, provided their surface water abstraction is less than 50 m^3 a day and groundwater abstraction less than 15 m^3 a day. These exemptions are limited to total abstraction of 18 250 m^3 per year.

Complying with EU water legislation will imply a further *heavy investment in infrastructure* (e.g. water supply and sanitation), which will impact water prices. Available studies suggest that a higher level of cost recovery for expanded environmental infrastructure should not create an excessive burden on the majority of households, provided investment programmes are cost-effective and the implementation period is sufficiently long. For example, the World Bank concluded that under a low-cost scenario with investment through 2015 (as agreed for the urban waste water treatment Directive), *changes in household water and waste water bills* should have a limited impact on most households. Another study concluded that if all costs (annualised capital cost, operating and maintenance costs) were translated into higher tariffs, water and sanitation bills would be unaffordable for under 10% of the population. However, even the most optimistic scenarios indicate that some *vulnerable groups* would need assistance. Targeted income support, rather than blanket price subsidies, would provide the right incentives for consumers to reduce water consumption and would be more affordable for local budgets.

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1.5 Investment expenditure

Poland has successfully mobilised financial resources to address water pollution control and water supply management. Investment in *water pollution control* (sewerage and waste water treatment) increased by nearly 40% in real terms between 1990 and 2000, and represented 50% of all pollution abatement and control investment in 2000 (Table 6.4). Investment in *water supply management* (water intake and supply systems, water reservoirs, flood embankments) also increased but at a more moderate rate; emphasis has shifted from investment in water intake and water supply systems (before 1996) to investment in construction or modernisation of purification plants and the regulation and consolidation of rivers and streams (Table 3.2). After a major *flood* in 1997, there was increased investment in embankments and pumping stations in areas which experienced subsidence and depression (Chapter 3, Section 2.3). Since 1998 the shares of investment in water pollution control and water supply management in total

Table 3.2 **Investment outlays on waste water and water management,**[a] 1992-2000

(PLN million)

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Waste water management	663.0	777.5	1 001.9	1 160.5	2 160.5	2 982.5	3 425.8	3 765.2	3 341.2
of which:									
Municipal treatment plants	–	–	–	1 103.0	968.6	1 277.5	1 325.7	1 471.0	3 341.2
Sewerage systems	–	–	–	–	962.6	1 330.5	1 567.1	1 752.3	1 902.2
Closed circuits	–	–	–	–	23.3	48.3	46.4	140.0	45.8
Water management	632.8	790.3	979.6	999.4	1 415.0	1 783.5	1 748.2	1 766.7	1 652.7
of which:									
Water intakes and supply systems	507.3	616.3	765.8	765.0	880.6	1 129.0	936.1	832.8	851.8
Water treatment stations	–	–	–	–	206.9	210.0	214.1	232.5	196.8
Reservoirs and dams	86.3	127.0	142.4	165.1	205.1	249.6	196.9	232.1	205.8
River regulation and consolidation	23.5	27.8	45.6	32.0	49.2	77.1	197.6	240.8	154.9
Flood embankments and pumping stations	15.7	19.5	25.8	39.1	49.9	105.5	203.5	228.5	243.4

a) At current prices.
Source: CSO.

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investment in the national economy fell, although in absolute terms investments in municipal sewerage systems and waste water treatment plants continued to grow.

In 2000 *financing of water management investment* (PLN 1.65 billion) was by companies or municipalities (45.4%), central budget funds (9.6%), Voivodship budgets (9.7%), municipality budgets (1.3%), environmental funds (8.9%), foreign assistance (13.1%), domestic credits and loans (4.1%) or other sources (7.9%). In 1999 *financing of sanitation investment* was as follows: investment expenditure in sewerage systems (PLN 1.42 billion) was mainly by companies or municipalities (56%) and investment in waste water treatment plants (PLN 1.36 billion) was mostly financed by environmental funds (43.6%).

With total revenue from charges and fines already declining, it will be increasingly difficult for the environmental funds to secure a large share of the financing of the waste water treatment plants. This is particularly true with respect to meeting the *costs of implementing the urban waste water Directive*, which will require adoption of highly efficient technologies to remove total nitrogen and phosphorus in waste water from agglomerations of over 10 000 p.e. The Directive requires use of such highly efficient technologies only if treated water is discharged to water bodies sensitive to eutrophication; for other types of water, lower levels of treatment are considered sufficient. In the absence of a thorough analysis of water bodies' sensitivity, the government considers the whole country to be sensitive. Thus, to achieve at least a 75% reduction of the total nitrogen and total phosphorus load, it will be necessary to construct, modernise or expand sewage systems and waste water treatment plants in 1 479 agglomerations by the end of 2015 (Chapter 3, Section 2.2). Needed investment for construction, modernisation and expansion of sewerage systems has been estimated at PLN 18.3 billion; for waste water treatment plants required investment has been estimated at PLN 12.3 billion. Concentrating on *cost-effective investment* efforts (i.e. at plants where abatement costs are the lowest and environmental benefits the highest) would help minimise the burden. Raising tariffs, particularly municipal tariffs, for water consumption and release of waste water would also be essential. Bringing cost recovery ratios closer to international standards would not only further reduce water usage; it would also satisfy a necessary condition for attracting private and foreign funding.

2. Focus on Selected Topics

2.1 Institutional framework for water management

The 1974 Statute on Water was superseded by the 2001 *Water Act*, which provides the main legal basis for water management. Under the new law, which embodies the concept of sustainable development, water management is based on two main principles:

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a rational, integrated approach to the management of surface and groundwater resources with respect to water quantity and quality; and common interest in maximising benefits, to be achieved through co-operation among public administrative authorities, end-users and local communities. The Water Act contributes to transposition of EU Water legislation (Chapter 2, Section 2.2).

The transformation of the centralised water management system to a *decentralised river basin management structure* was begun with a 1991 institutional reform, which created seven Regional Boards for Water Management (RZGWs). RZGWs are regional government administrative organisms which execute ordinances of the Minister of the Environment concerning water conservation and management, as well as those concerning conservation of State-owned waters and implementation of water related investments of national significance. In February 2000 the Minister of the Environment established the *Office of Water Management*. Its activities aim at harmonising the operation of the RZGWs and assisting the organisation of actions targeted at rational use, preservation and protection of water resources. The administration of State-owned surface waters, which is not the responsibility of the RZGWs, is carried out by the Provincial Boards of Land Improvement and Water Facilities and the Agency of State Farmlands. The National Parks administer waters located on their territory; the State Forestry enterprise "National Forests" administers certain water areas within its forest zones.

The *water resources management system* comprises both central and local government administrative bodies. Planning, executive and investment tasks are the responsibility of local governments: voivodships (regional), poviats (county) and gminas (municipal). Planning instruments include the strategy of provincial development, provincial programmes for sustainable development and environmental protection, and, principally, local town and communal land use plans worked out by and within communities. Executive tasks concerning the legal status of water resources use (e.g. issuance of permits) are carried out by the voivodships, as well as by heads of poviats (as tasks assigned by the central government). Supervision of compliance with regulations and monitoring is the responsibility of the Chief Inspectorate for Environmental Protection. At Voivodship level, environmental inspection is the domain of the Provincial Inspector of Environmental Protection. The Provincial Inspectorate deals with proceedings brought against any industrial plant that is hazardous to health or life and/or causes environmental damage, and may issue fines for misuse of the environment and for exceeding pollution limit values specified in administrative decisions.

Protecting water resources and drinking water quality is therefore the task of seven Regional Boards for Water Management, while water permitting, investment programmes and financing are managed within administrative borders. The *multiplication of public actors* increases the risk of duplicating functions and diluting responsibilities,

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while impeding the coherence and evolution of regional environmental policies. For example, there are no links between the management plans elaborated by RZGWs and the financing priorities established by the various environment funds. It is also unclear how co-ordination with the Ministry of Health is to be ensured at the technical level.

2.2 Transposing EU water legislation

Progress has been made towards transposing EU legislation through adoption of the 2001 *Water Law* and related ministerial regulations. The Act on Collective Water Supply and Sewage Discharges contributes to the transposition of the Directives on drinking water and urban waste water treatment. A strategy for implementing the EU water Directives has been developed; in particular, there are plans: i) to provide *waste water treatment plants* and *sewerage* systems to 1 479 agglomerations with over 2000 p.e (according to the definition of Directive 91/271/EEC) by the end of 2015; ii) to eliminate gradually, within five years of accession, certain *hazardous substances* used in manufacturing processes or in enterprises, and to reduce quantities of hazardous substances in waste water (according to the emission standards of Directive 76/464/EEC); iii) to protect water resources against *nitrates* from agricultural sources (to be achieved mainly through applying good agricultural practices), while zones endangered by nitrates according to criteria in Directive 91/676/EEC might be delimited in some areas with specific water protection programmes concerned with nitrates; and iv) to provide *drinking water of adequate quality* (Directive 75/440/EEC) through implementing all the above Directives.

All tasks related to protecting the quality of water resources will be carried out based on the 2001 Water Act and the 2001 Environmental Protection Act, taking into account the provisions of the EU Water Framework Directive. Poland's *administrative capacity* to implement EU water Directives remains a matter of concern. The voivodships and poviats still need to be strengthened. Staff resources are limited, and awareness of the requirements of EU Directives should be improved. Poland also needs to strengthen its water quality monitoring capacity. Monitoring infrastructure and equipment should be upgraded and modernised. Co-ordination of monitoring and reporting procedures will also have to be improved, and monitoring data used more efficiently for permitting and inspection.

2.3 Flood hazards

It is estimated that *7% of Polish territory* is vulnerable to flooding. Between 1958 and 2001, the largest and most severe floods occurred in 1960, 1970, 1980, 1987, 1997 and 2001. Annual costs of flood damage in the period 1991-98 were estimated at PLN 1.3 billion. The total damage of the 2001 flood is estimated at PLN 3.0 billion.

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The *flood in July 1997* , following heavy rainfall in southern Poland, caused extensive damage in the Odra River basin (PLN 5.8 billion) and Vistula River basin (PLN 2.0 billion), the equivalent of 1.6% of GDP. In the Upper Vistula basin there was over 120 mm of rain; in the Odra basin the heaviest rainfall was in the Bystrzyca, Kaczawa, Bober and Kwisa basins, ranging from 150 to 300 mm.

Following the 1997 flood a nation-wide programme was initiated to help reconstruct towns and settlements and modernise infrastructure. The government adopted a *National Programme of Reconstruction and Modernisation*, and a USD 200 million loan agreement was signed with the World Bank. This programme had three parts: short-term actions to address the direct effects of flooding, eliminate hazards and provide basic assistance to victims; medium-term projects involving aid to agriculture, repairs to public buildings and housing, and basic repair and maintenance of facilities; and long-term reconstruction and modernisation activities in affected areas, principally concerning water quality control, hydro facilities, public utilities, a reforestation programme, communications, transportation, and up-to-date natural disaster warning systems.

At the initiative of civil service agencies and local governments, many local and regional *flood protection and prevention plans* have been developed since 1997. Their implementation receives financial support from the Government Plenipotentiary Agency for Removal of Flood Effects. The government has given this agency a wide range of powers to initiate and co-ordinate actions in this domain.

As less than 1% of the population was insured against flood damage in 1997, the government is contemplating the establishment of an *obligatory insurance system* throughout the territory of Poland. A draft of such a project being elaborated by an inter-ministerial committee is expected to be ready by the end of 2003, with a view to enforcement in 2005.

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4

WASTE MANAGEMENT*

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Poland:

- implement the *national waste management plan*, establishing a mechanism for regular review of progress;
- strictly enforce technical standards for *landfills* and urgently close a number of substandard sites; reinforce enforcement of prohibitions against illegal dumping;
- review possible approaches to increasing *private and public financing* of the upgrading and expansion of waste management facilities; address the large financing gap expected due to implementation of EU waste legislation and domestic legislation on land contamination;
- continue to improve the system for regulating the movement and treatment of *hazardous waste*, expanding the capacity to destroy PCBs and obsolete pesticides;
- strengthen measures to increase *municipal waste recovery rates*, with stronger initiatives by authorities concerning separate collection and the creation of sustainable recycling markets.

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1995. It also reviews progress with respect to the objective "maintaining the integrity of ecosystems" of the 2001 OECD Environmental Strategy.

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Conclusions

Concerning non-municipal waste, *weak decoupling* of waste generation from economic growth has been observed and the waste recovery rate has increased, largely due to a structural shift toward less material-intensive economic activities (i.e. from heavy industries to services) but also to increased use of cleaner production processes. In preparation for EU accession, *waste legislation* has been strengthened with respect to management and disposal (e.g. introduction of a permitting system for waste generators and management operators). For hazardous waste, regulations have been made considerably tougher and a systematic approach is beginning to be taken (e.g. implementation of a computerised manifest system). Development of a system for safe disposal of PCBs and obsolete pesticides has been initiated. Poland has been actively using *economic instruments* for waste management by putting industrial waste disposal and municipal waste collection charges into effect. *Extended producer responsibility* has been introduced for some products (e.g. packaging, batteries, tyres). A legal framework for clean-up of contaminated land was recently established.

However, comparatively little progress has been made in the area of *municipal waste* management. Despite weak decoupling of municipal waste generation from economic growth between 1990 and 2000, the municipal waste *recovery rate* has remained negligible (under 5%). The great majority of municipal waste is still land-filled, much of it at sites that do not meet technical standards. Recycling markets are still in their infancy. *Hazardous waste* generation has continued to increase. Many *illegal dumping* sites pose threats to the environment. A large future financing gap is expected, in view of the need to augment and diversify waste treatment capacity to comply with EU Directives on waste management. How the projected clean-up of contaminated land will be financed is still unclear, especially in view of the very high expected cost and numerous competing priorities.

1. Evaluation of Performance

1.1 Objectives and institutional framework

National policies

A range of primary and secondary environmental legislation (e.g. 2001 Environmental Protection Act, 2001 Waste Act) constitutes the *regulatory framework for waste management*. Major legislative developments occurred twice in the late 1990s. The 1997 Waste Act introduced, *inter alia*, a permitting system for management of hazardous waste and for waste generating economic activities,

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whereas land-use planning was the only instrument used to approve such activities before. The 2001 Waste Act, together with other waste laws enacted in the same year (Table 6.3), have ensured full harmonisation with EU legislation; the permitting system has been extended to management of non-hazardous waste. The 2001 Act also introduced an obligation for public administration to draw up waste management plans, more stringent requirements for waste landfills and incineration plants, and special measures for the management of certain types of waste (e.g. PCBs, waste oils). Extended producer responsibility was introduced by a separate law enacted in 2001 (Chapter 4, Section 2.1).

In the Polish four-tiered government administration, *municipal waste* management is the responsibility of the local level of government (gminas). As part of the transition process to a market economy, day-to-day operation of municipal waste management (i.e. collection, treatment and disposal) was privatised in 1993. However, many "privatised" operators are still mainly owned by gminas. The 2001 Act requires more direct involvement of gminas in municipal waste management. Regarding *non-municipal waste*, the second level of government (voivodships) controls large waste generators while the third level (poviats) controls small and medium waste generators through a permitting system.

The first and second national environmental policies outline *national waste management objectives*. While the First National Environmental Policy (1991) provided very general objectives, the 1994 Executive Programme for the First National Environmental Policy set out a range of tasks, mainly related to investment in waste management facilities, to be implemented by 2000. The Second National Environmental Policy (2000) presents a set of comprehensive and detailed objectives to be achieved in short-term (2000-02), medium-term (2003-10) and long-term (2010-25) perspectives (Table 4.1). Responding to these ambitious objectives, and as required by the 2001 Waste Act, a national waste management plan is to be adopted by the end of 2002, followed by regional and local plans by mid-2004. An attempt should be made to estimate the costs and benefits of reaching the various objectives with a view to establishing priorities for the implementation of the most cost-effective.

1995 OECD Environmental Performance Review

The *1995 OECD Environmental Performance Review* recommended that Poland:

– rapidly finalise, enact and implement waste management legislation and corresponding regulations to establish a clear framework at national and local levels;

– continue monitoring efforts, particularly to assess hazardous waste disposal sites, and take measures where necessary without delay;

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Table 4.1 **Selected national waste management policy objectives**

Source	Time frame	Objectives
First National Environmental Policy (1991)	By 1995	Radical reduction of solid waste burden
	By 2000	Proper processing or safe storage of all hazardous waste
		Reduction of all industrial waste requiring storage/landfilling by 20% and increasing its utilisation rate
		Creation of a system of separate collection and recycling of municipal waste; introduction of composting, incineration and biogas production
Executive Programme for the First National Environmental Policy (1994)	By 2000	Construction of 2 municipal waste incineration plants with a capacity of 600 tonnes/day each
		Construction of 10 municipal waste composting plants with a capacity of 100 tonnes/day each
		Implementation of separate municipal waste collection and management in 20 urban areas
		Construction of 10 large county (poviat) landfills for municipal waste
		Ensuring that all municipalities (gminas) have their own landfills or access to inter-gmina landfills for municipal waste
		Construction of 3 regional disposal plants for hazardous industrial waste
		Organisation of 20 regional disposal systems for hospital waste
		Wide public awareness campaign on waste management
Second National Environmental Policy (2000)	2000-02	Development of waste management strategies and plans at national, regional and local levels
		Creation of new administrative structure for permit issuing, regulating and monitoring of waste and waste management facilities
		Development of economic instruments for waste management
		Implementation of systems for comprehensive registration of wastes and waste management methods
		Identification of environmental risks of old landfills, upgrading of landfills in operation and reclamation of degraded land
		Development of national inventory of waste utilisation and disposal sites and installations
		Reduction of volume of waste sent to landfills
		Capping annual municipal waste generation at 300 kg per capita
	2003-10	Doubling of recovery and reuse of industrial waste compared with 1990
		Country-wide implementation of separate collection of municipal waste
		Creation of material recovery systems for glass, paper, plastics, rubber, aluminium cans; increasing recovery rate for paper and glass to 50% each
		Development of recovery system for packaging waste
		Construction of integrated management infrastructure for hazardous waste (e.g. waste oil, batteries)

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Table 4.1 **Selected national waste management policy objectives** *(cont.)*

Source	Time frame	Objectives
		Introduction of registration system for facilities handling over 500 litres of waste oil per year
		Elimination of PCBs and obsolete pesticides
		Creation of markets for recovered materials
		Development of integrated network of waste processing facilities, especially for hazardous waste
		Development and systematic implementation of national strategy for reduction of biodegradable waste
		Completion of programme for hospital waste incineration
	2010-25	Full disposal of stored hazardous waste
		Reduction of stored industrial and municipal waste
		Organisation of efficient material recovery system using best available techniques

Source: MOE.

– encourage generation reduction, reuse and adequate treatment of industrial and hazardous waste;

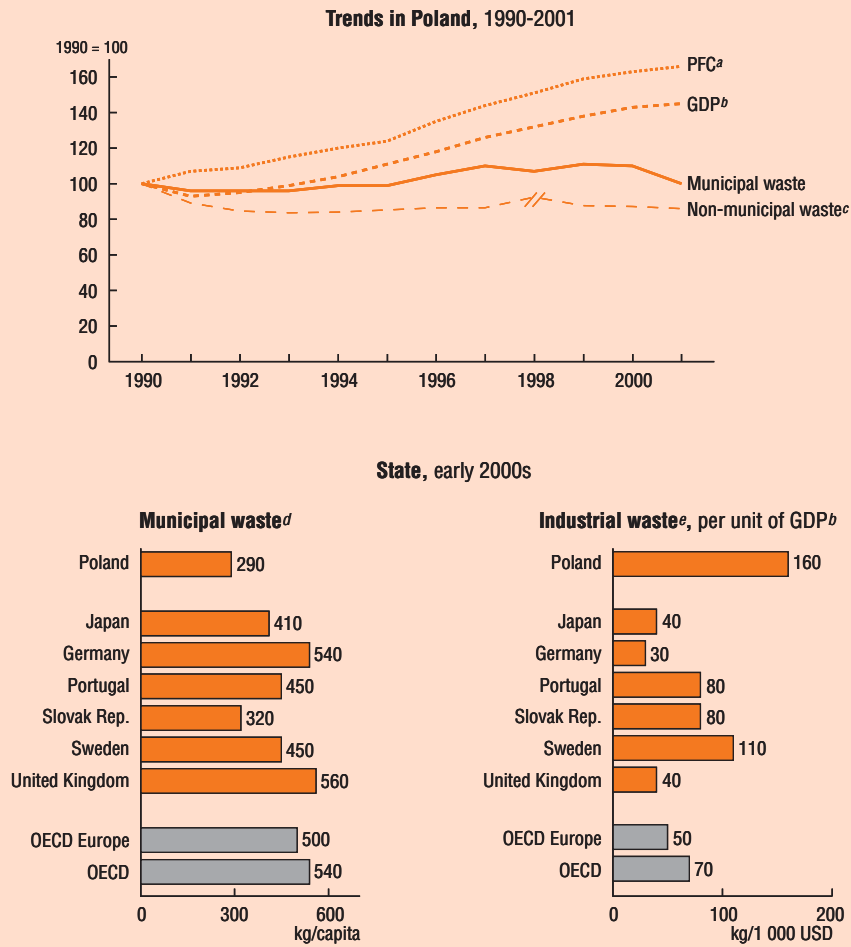
– increase opportunities for public involvement in waste management plans, improve access to information, and reinforce the system of accountability for waste generators.

1.2 Waste generation trends

Municipal waste accounts for 8% of total waste generation in Poland. Its generation increased in the mid-1990s but levelled off by 2000 at around 11 Mt, resulting in a 10% overall increase from the 1990 level, while GDP grew by 45%. Thus *weak decoupling* of municipal waste generation from economic growth was achieved in the 1990s. Per capita, 290 kg of municipal waste was generated in 2001, 42% below the OECD Europe average (Figure 4.1). However, generation is forecast to increase rapidly between 2000 and 2020. About 70% of municipal waste consists of household waste, with a growing share of plastic packaging. The remaining 30% comes from public buildings and services and street waste, *inter alia*. Per capita, waste generation in large cities is up to three times higher than in rural areas, reflecting differences in income levels.

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Figure 4.1 **Waste generation**



a) Private final consumption.
b) GDP at 1995 prices and purchasing power parities.
c) Change in classification in 1998.
d) In interpreting national figures, it should be borne in mind that survey methods and definitions of municipal waste may vary from one country to another. 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.
e) Refers to waste generated by the manufacturing industry; national definitions may differ.
Source: OECD.

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Non-municipal waste generation decreased in the early 1990s (by 16% between 1990 and 1993), but has remained stable at around 120 Mt per year since the mid 1990s (Figure 4.1). Consequently, *strong decoupling* from economic growth has been achieved. Coal mining waste contributes the largest share of non-municipal waste (28% in 2000), followed by waste from the non-ferrous metallurgy industry (23%), ash and slag from power plants (7%) and hard coal fly-ash (4%). Volumes of these main components fell in the 1990s. They are likely to continue to fall due to declining coal production, increased use of better quality fuel for power generation, and reduced production in the steel industry combined with cleaner production processes. By sector, manufacturing industries generate the largest portion (43% in 2001), followed by mining/quarrying (32%) and energy production (15%). Per unit of GDP, Polish industries' waste generation is significantly higher than the OECD Europe average, suggesting there is substantial room to reduce generation (Figure 4.1). Generation of *hazardous waste* increased in the 1990s. The 1998 change in waste classification (for consistency with the EU classification) reduced the official level of generation to one-quarter of its previous level; 1.6 Mt or 1% of total non-municipal waste was categorised as hazardous waste in 2000.

Data collection and management are well organised in Poland. Companies generating over 1kt/year of non-municipal waste have a legal obligation to report generation data to the Central Statistical Office (CSO). Databases on waste generation at both national and Voivodship levels are being created and should be operational by 2003.

1.3 Municipal waste management

Recovery and disposal trends

In Poland in the 1990s, little progress was made on *municipal waste recovery*. In 2001 about 4% (by weight) of municipal waste was separately collected for composting and combustion, and only 1% was collected for recycling (of paper, glass and plastics). Thus municipal waste is still mainly disposed of by *landfilling*. Although finding sites for new landfills is not generally difficult, it is becoming harder for large cities (e.g. Warsaw). The large number of illegal dumping sites for municipal waste (over 1 650 sites in 2000, mostly containing under 50 m^3 of waste) is a matter of serious concern which needs to be addressed urgently. Incineration capacity for municipal waste is very limited: the first and currently only municipal waste incineration plant started operating in 2000; plans to construct others face strong public opposition. Considering the present extremely low recovery rate for municipal waste, meeting EU obligations (limiting biodegradable municipal waste sent to landfill under the EU landfill Directive, increasing recycling rates for packaging under the EU packaging and packaging waste Directive) will be very challenging.

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Policy measures

Poland has a long history of *charging users for municipal waste management services*. In principle these services are provided on a commercial basis; each generator (e.g. households, commercial businesses) directly pays a private company carrying out municipal waste management. In practice, these companies are still largely owned by municipalities and the level of charges (and therefore cost recovery) is entirely left to each municipality. As waste management companies seek to minimise costs, waste often ends up in the cheapest landfills, undermining progress towards national waste management goals.

The 2001 Waste Act attempts to correct this situation by increasing municipalities' involvement in municipal waste management. They may now take over operation from private companies with the introduction of a garbage tax if this tax is accepted by referendum. Measures to ensure that waste management companies increase recovery rates and carry out appropriate disposal should be tried first (e.g. by setting minimum obligatory recovery rates) before take-over by municipalities. To encourage waste minimisation, use of a per volume rate would be extended from people living in houses to include residents of apartment buildings (e.g. by using pre-paid garbage bags).

Most cities have *programmes to promote separate collection* of municipal waste (e.g. recycling banks on the street). The number of sorting stations and composting plants has gradually increased. These programmes have not yet brought about an increase in the share of recovered municipal waste at national level. Much more substantial increases in paper/cardboard recycling and composting will be necessary to reduce the amount of biodegradable municipal waste sent to landfills, as required by the EU landfill Directive.

Significant additional measures adopted in recent years should stimulate a rapid increase in *recovery and recycling*. A *product charge on plastic packaging* was introduced in 2001 to provide an economic incentive for manufacturers to use more recyclable material for packaging. Gminas were given statutory responsibility in 2001 for separate collection of municipal waste. Since 2002, based on *extended producer responsibility*, manufacturers of certain types of products have been responsible for their collection, recovery and disposal at the end of their life cycle (Chapter 4, Section 2.1). *Deposit-refund* has existed for some glass and plastic bottles since the 1980s, based on agreements between producers and retailers (e.g. nearly 100% recovery of 0.5 litre glass beer bottles); a similar system was introduced for lead-acid batteries in 2002.

Recycling firms have gained momentum in Poland in recent years (e.g. the Recycling Centrum for glass packaging, the Foundation for Recovery of Aluminium Tins), particularly since the introduction of extended producer responsibility for

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some products. However, these firms are still in their infancy in terms of scale and financial stability, and government policy has been not to interfere in the recycling market. Greater public sector involvement may be necessary to develop recycling markets in Poland (e.g. through national programmes for R&D and public awareness raising, and temporary limited financial support for the installation of recycling facilities).

Technical conditions and maintenance of landfills for municipal waste are generally unsatisfactory. As of 2000, less than half of landfills were equipped with leachate and rainwater drainage systems; only 21% had gas venting or recovery capability. Only 70% of landfills kept records on deposited waste. A comprehensive set of technical standards and maintenance procedures to minimise environmental risks associated with landfill sites should be developed and strictly enforced. Current regulations do not allow authorities to impose fines for *illegal dumping of municipal waste*, although littering may be sanctioned by police. Considering in particular that municipal waste management operations have been privatised, these regulations should be changed in line with those for non-municipal waste.

A large *financing gap* will need to be overcome to comply with the EU Directives on waste management in the next ten years, mainly due to the investment needed to conform to the landfill Directive (Chapter 4, Section 2.2). As the cost estimate so far is limited to only a few Directives, it should be revised to cover all waste management Directives. An increase in expenditure from national sources (i.e. state and local budgets, environmental funds) should then be considered, together with funds from foreign sources.

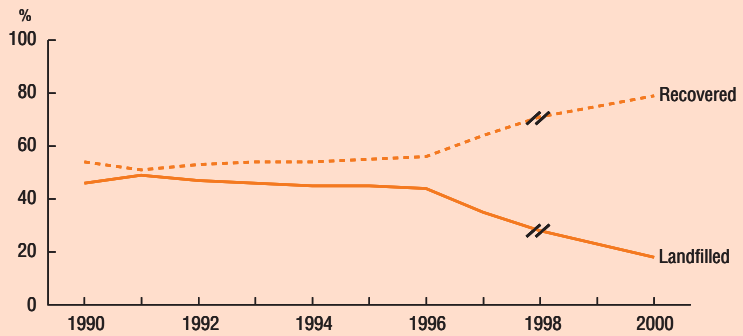
1.4 Management of non-municipal waste

Recovery and disposal trends

In the 1990s, *recovery* of non-municipal waste increased while the share sent to landfills fell (Figure 4.2). By 2000 the amount of non-municipal waste sent to landfills was one-third of the 1990 level and only 18% was sent to landfills; 2% of the total volume receives physical/chemical treatment or is incinerated. The recovery rate for non-municipal waste increased from 54 to 77% between 1990 and 2000. Among large generators of non-municipal waste, recycling rates in the mining/quarrying and utility sectors have significantly increased in recent years whereas progress by other large generators (e.g. metal and food industries) has been slow. *Landfills* for non-municipal waste covered over 11 300 ha in 2000; these landfills are owned and maintained by large industries. The proportion (and volume) of *hazardous waste* sent to landfills continued to decline in the 1990s, reaching 6% (96 kt) in 2000. For hazardous waste, neutralisation and separate disposal from non-hazardous waste are compulsory in order to minimise adverse environmental impacts; regulations are generally well observed.

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Figure 4.2 **Management of non-municipal waste,** 1990-2000[a]



a) Change in classification in 1998.
Source: CSO.

Policy measures

Waste minimisation efforts in industry increased during the 1990s. Since the early 1990s the introduction of cleaner production processes (e.g. low-waste technologies) has gained momentum. To date there have been almost 600 cleaner production demonstration and pilot projects. Since 1992 the Industrial Waste Minimisation Programme has been implemented in Poland by the World Environment Centre (WEC). This programme has involved 18 large companies in different sectors (e.g. chemical, non-ferrous metallurgy, food) and about 50 projects to date. In addition to environmental benefits these projects have provided substantial economic benefits. The 2001 Environmental Protection Act introduced *resource efficiency standards* concerning amounts of waste generated per unit raw material or fuel used, or product manufactured. So far Poland has been reluctant to set quantitative targets for generation of non-municipal waste at national and sectoral levels, or for recovery of non-municipal waste at sectoral level. Such targets should be considered for a national waste management plan and its implementation programmes.

The *condition of landfills* for non-municipal waste is far from satisfactory. Most do not meet EU technical standards, although the compliance rate of non-municipal sites is generally higher than municipal sites. Government authorities expect full compliance by 2009. There are about 250 closed dumping sites for hazardous waste (mainly obsolete pesticides). Technical requirements for landfills are patchy and there

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are no solid legal provisions to be enforced. The ongoing preparation of regulatory standards to meet EU requirements should be facilitated and these standards should be rigorously enforced as soon as possible.

There has been a *waste disposal charge* for non-municipal waste since 1989. Rates are differentiated according to three risk categories determined by the waste's hazard and origin (PLN 7.8, 12.1 and 101.5 per tonne in 2001). While this is a one-off charge, an annual charge for landfilled waste was introduced in the mid-1990s; these rates too are differentiated according to three risk categories (PLN 0.234, 0.363 and 3.045 per tonne per year). Introduction of the latter charge significantly strengthened the *economic incentive* to minimise waste generation and increase waste recovery. It even led to the recuperation of already landfilled waste for recovery, as the charge must be paid every year as long as the waste remains in the landfill. Daily *fines* for illegal disposal are equal to 5% of the annual waste disposal charge.

Revenue from the waste disposal charge was PLN 165 million in 1999, or about 10% of the total from all emission charges (including those on air emissions and discharges to water). This revenue is allocated among *national, regional and local environmental funds* and used with other revenue types (e.g. loan repayment, foreign assistance) to support a range of environmental projects through low-interest loans, credits and grants (Chapter 6, Section 3.3). The national fund (National Fund for Environmental Protection and Water Management) spent a total of PLN 393 million (PLN 280 million in loans and PLN 113 million in grants) to support 429 waste management projects between 1989 and 2000, accounting for 4% of total expenditure by this fund. Achievements of these projects include 2.4 million tonnes/year of waste recovery capacity, 162 kt/year of composting capacity and 20 million m^3 of landfill capacity, as well as sound disposal of 2.2 kt of hazardous waste. The *EcoFund*, a debt for environment swap (Chapter 8, Section 1.1), began to fund waste management projects in 1998 (contributing 5% of total non-municipal waste expenditure in 2000).

Pollution abatement and control (PAC) expenditure on waste management (public and private) in 2000 totalled PLN 1.8 billion, of which 73% was by industry. Energy, mining/quarrying, metal and non-metallic minerals are the largest contributors, accounting for one-third of PAC expenditure on waste management by industry. Waste management accounted for about 16% of PAC expenditure by industry in 2000 (Table 6.4).

Public *listing of the worst polluters* (the "List of 80"), introduced in 1989, requires listed polluters to prepare implementation programmes for reducing the environmental burden they generate. It is a major incentive for large industries to reduce their waste generation as well as their air and water pollutant emissions (Chapter 2, Section 1.2). Voluntary initiatives have also been developed independently by some

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industry sectors (e.g. Responsible Care in the chemical industry; disposal of mining waste and furnace ash in mines) and some individual companies (e.g. through ISO 14001 implementation).

The total number of *illegal waste disposal cases* has decreased since the late 1990s. The number of fines for illegal waste disposal fell by 68% between 1998 and 2001. Measures to prevent and discourage illegal disposal were strengthened in 1997 by penalising waste generators (rather than waste disposers), thereby encouraging generators to choose reliable waste management operators. These measures were further strengthened in 2001 by making it possible to penalise waste recipients.

1.5 Hazardous waste management

A strategic approach to facilitating sound treatment and disposal of hazardous waste was launched in the 1990s. *The Hazardous Waste Management Programme for Poland*, carried out in 1994-96, assessed the situation and made proposals for hazardous waste management, including adoption of cleaner production principles, use of economic incentives, and introduction of modern waste collection and disposal technologies. Moreover, hazardous waste management should be an important component of subsequent national, regional and local overall waste management plans.

Hazardous waste management regulations were strengthened in the 1990s. In 1997 a *permitting system* for waste management firms handling hazardous waste was introduced; four years later the system was extended to firms handling non-municipal waste. The obligation for manufacturers and importers of toxic substances to collect and safely dispose of packaging of these substances was introduced in 1997. A *deposit-refund scheme for packaging of hazardous substances* (e.g. pesticides) was introduced in 2002; it is too early to assess the programme's effectiveness. A *computer-assisted programme for recording hazardous waste*, introduced in three Voivodships in 1991, now exists in every Voivodship. This programme helps authorities develop and update inventories of hazardous waste landfills. The introduction of a "manifest" system (attaching information to each hazardous waste shipment concerning generator and content) linked to the computerised recording programme could contribute to the prevention of inappropriate treatment or illegal disposal.

Progress has been made with respect to disposal of persistent organic pollutants (POPs). Programmes to remove *obsolete pesticides* from existing dumping sites and to incinerate or store them appropriately were launched in the 1990s. A rough inventory of such obsolete pesticide dumps prepared in the early 1990s is currently being improved. Large-scale destruction of these pesticides has already started: about 20%

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(2 650 tonnes) were destroyed between 1999 and 2000 in the most environmentally risky dumping cases. Poland completed transposition of the EU Directive on PCB disposal in 2001. While an inventory of remaining stocks of *PCB waste* is currently under preparation, disposal of some of this waste has already begun. However, domestic capacity for disposal and decontamination of PCB waste is insufficient. This problem needs to be resolved (Chapter 4, Section 2.3).

Major developments regarding *hospital waste* management took place in the 1990s. With financial support from the National Fund for Environmental Protection and Water Management, 23 regional incinerators for hospital waste were built between 1994 and 1999 to replace over 300 small incinerators without pollution control equipment. However, seven of the new modern incinerators never became operational due to construction defects and high toxic emission levels. The incineration capacity is too large compared with actual requirements (the average utilisation rate is 30%). Public opposition to construction of hospital waste incinerators was aroused and a plan to build ten more was abandoned. Strict emission control and rigorous enforcement should be applied to those incinerators in use to increase public confidence.

1.6 Transboundary movements of waste

Poland has strengthened its international and bilateral co-operation on trans-boundary movements of waste. It became a party to the Basel Convention in 1992 and is currently preparing to ratify the amendment banning exports of hazardous waste from OECD to non-OECD countries. The strong pressures experienced in the early 1990s due to hazardous waste flows from Germany have eased since Poland became a party to the Basel Convention and established a legal framework to comply with it. Poland entirely prohibited the import of hazardous waste until 2001, when some recoverable types of hazardous waste began to be allowed to be imported. *Illegal import* of waste to Poland has clearly decreased but still continues. A total of 42 Mt of waste (including 10 Mt of hazardous waste) was prevented from being illegally imported to Poland in the 1990s.

The recent strengthening of Polish waste management regulations may lead to an increase in waste exports. However, no case of *illegal export* of hazardous waste from Poland for final disposal has been reported so far. Legally authorised export of hazardous waste for safe disposal is limited to certain types of waste and specific countries (e.g. asbestos and pesticides to Germany, PCBs to France). In 1999 this amounted to 14 kt. Poland is currently focusing on its eastern borders, as the potential for illegal trade in waste is greater there due to misunderstandings related to different waste management requirements.

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1.7 Remediation of contaminated sites

Although there are no official statistics on *land contamination* in Poland, it is estimated that there are 8 600 km^2 of contaminated closed industrial sites, of which 20% are highly contaminated. In addition, over 700 km^2 of agricultural forest land has been identified as contaminated through application of waste as fertiliser, waste dumping, former Soviet military installations or nearby industrial activity.

Development of policies for remediation of contaminated sites has been slow. There has been a focus on agricultural/forest land and on closed waste dumping sites, but little attention has been paid to closed industrial sites. Although threshold values for pollutant concentrations in soil were published in 1994, they only concern oil-related pollutants, and are non-binding; they are used as "guidelines" for administrative actions (e.g. clean-up of former military installations, environmental impact assessment). The only legal requirement so far has concerned maximum levels of contaminants in waste or waste water applied to agricultural land.

The 2001 Environmental Protection Act introduced a holistic approach and a *legal framework* for monitoring soil contamination and remediating contaminated sites, with clarified liabilities based on the polluter pays principle. Under the Act, soil quality standards extend the range of pollutants (e.g. pesticides, heavy metals) beyond those covered previously by the "guidelines"; they are differentiated according to three land types. Regular monitoring, development and maintenance of an inventory of contaminated sites are to be carried out by each county (poviat). However, means of financing the clean-up costs are not identified. Implementing these regulations will be a considerable challenge for Poland.

2. Focus on Selected Topics

2.1 Facilitating recycling: extended producer responsibility

In 2001 Poland enacted an innovative law (based on the principle of *extended producer responsibility*) to substantially facilitate recycling of certain types of waste. The 2001 Act on Economic Operators' Obligations in Managing Certain Types of Waste and on the Product and Deposit Charges (the so-called "Obligation Act") requires manufacturers or importers of certain types of products to collect, recover and dispose of these products at the end of their lifecycle. Manufacturers may collect the waste themselves, commission other companies to do so, or join (by paying fees) an organisation carrying out the work. Manufacturers that fail to meet minimum recovery and recycling levels stipulated in the Act must pay based on the difference between the level required and that actually

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achieved at a rate designated for each type of product ("*product charge*"). The revenue from charges for each type of product is earmarked for recovery/recycling projects related to that type of product through national, regional and local environmental protection funds.

The charge rates are set so that it will be less costly to carry out recovery/recycling than to pay charges, providing a *strong economic incentive* for manufacturers to improve recovery/recycling rates. Currently 17 types of products including packaging, tyres, refrigeration equipment containing CFCs or HCFCs, lamps, lubricating oil and batteries are subject to this regulation. Consideration is being given to extending this system to cover printed paper. The legislation is partly intended to meet EU recovery/recycling requirements, notably for packaging waste. Consistent with legislative developments in the EU, extension of the system to electronic and electrical equipment waste as well as end-of-life vehicles is also planned. Minimum recovery and recycling levels are established for each year up to 2007, with these levels progressively increasing (Table 4.2). By early 2002 at least five recovery/recycling organisations had been established for packaging waste alone, while one or two organisations are expected to be created soon for each type of product subject to the regulation. Collection of charges is to begin in January 2003.

2.2 Cost estimation for implementing EU Directives on waste management

In 1999 the Ministry of the Environment estimated the *public investment cost of complying with the EU Directives* on landfill, hazardous waste, combustion of hazardous waste and disposal of PCBs. As this estimate focused on the cost to the public sector, industrial waste management was not included except in the case of hazardous waste. Other EU Directives on waste management (e.g. concerning packaging waste, batteries and end-of-life vehicles) were not taken into account, but this estimate gives an idea of the magnitude of costs in this policy area.

Total *necessary public investment outlays* are estimated at PLN 4.05 billion (PLN 120-150 million per year) for the period 1998-2012 (Table 4.3). This is 63% more than a scenario that assumes the continuation of current municipal waste management policy (i.e. very low recovery rates), which would not comply with the EU waste Directives. The expected *financing gap* would amount to about half the cost, on the assumption that current expenditure levels (e.g. from Polish national and local budgets, environmental funds and foreign aid) continue. A substantial increase in financing will therefore be necessary.

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Table 4.2 **Minimum recovery and recycling levels,**[a] 2002-07

(%)[b]

	2002		2003		2004		2005		2006		2007	
	RCO[c]	RCY[d]	RCO[c]	RCY[d]	RCO[c]	RCY[d]	RCO[c]	RCY[d]	RCO[c]	RCY[d]	RCO[c]	RCY[d]
Packaging												
Plastic	. .	7	. .	10	. .	14	. .	18	. .	22	. .	25
Aluminium receptacles (capacity less than 300 litres)	. .	15	. .	20	. .	25	. .	30	. .	35	. .	40
Tinplate and lightweight sheet metal	. .	6	. .	8	. .	11	. .	14	. .	18	. .	20
Paper and cardboard	. .	37	. .	38	. .	39	. .	42	. .	45	. .	48
Glass	. .	13	. .	16	. .	22	. .	29	. .	35	. .	40
Wood and textile	. .	5	. .	7	. .	9	. .	11	. .	13	. .	15
Composite material	. .	5	. .	8	. .	12	. .	16	. .	20	. .	25
Equipment containing CFCs/HCFCs												
Air conditioning	15	15	20	20	25	25	30	30	45	45	50	50
Commercial refrigeration and freezing systems and heat pumps[e]	20	20	30	30	40	40	50	50	60	60	70	70
Household refrigerators and freezers[e]	15	15	20	20	25	25	30	30	40	40	50	50
Batteries												
Lead-acid	AN[f]	AC[g]	AN[f]	AC[g]	AN[f]	AC[g]	AN[f]	AC[g]	AN[f]	AC[g]	AN[f]	AC[g]
Large Ni-Cd	20	20	30	30	40	40	50	50	60	60	70	70
Small Ni-Cd	10	10	15	15	25	25	35	35	45	45	50	50
Galvanic cells	5	5[h]	7	7[h]	10	10[h]	15	15[h]	30	30[h]	50	50[h]
Lubricating oils	30	15[i]	37	17[i]	40	19[i]	45	22[i]	50	25[i]	50	25[i]
Discharge lamps (not including compact fluorescent lamps)	7	7	12	12	18	18	25	25	32	32	40	40
Tyres	25	. .	35	. .	50	. .	60	. .	70	. .	75	. .

a) Requirements under the 2001 Act on Economic Operators' Obligations in Managing Certain Types of Waste and on Product and Deposit Charges.
b) Waste product recovered/recycled, as % (by weight) of production.
c) Recovery rate.
d) Recycling rate.
e) CFCs and HCFCs used as foaming agents in equipment insulation should also be recovered/recycled.
f) All notified waste products to be recovered.
g) All collected waste products to be recycled.
h) Does not apply to zinc and carbon cells or alkaline cells.
i) Also applicable to regenerated waste oil.
Source: MOE.

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Table 4.3 **Estimated public investment outlays for meeting EU Directives,**[a] 1998-2012

(EUR million)[b]

	Base case scenario[c]		Maximum case scenario[d]	
	Annual outlay	Total outlay 1998-2012	Annual outlay	Total outlay 1998-2012
Necessary investment				
Municipal waste management	139.8-168.3	2 306	244.7-278.8	3 871
Hazardous waste management	0-14.1	176	0-14.1	176
Total	139.8-180.4	2 482	244.7-291.0	4 048
Secured financing				
State and local budgets[e]	77.7	1 166	77.7	1 166
Polish environmental funds[f]	0-0.5	6	0-2.5	35
EU funds[g]	0-60	840	0-60	840
Total	77.7-138.2	2 012	77.7-140.2	2 036
Financing gap	15.8-62.1	470	120.2-150.8	2 012

a) EU Directives on landfill, hazardous waste, combustion of hazardous waste and PCB disposal.
b) At 1997 prices.
c) Assuming continuation of current policy for municipal waste management thus in non-compliance with the EU landfill Directive, but complying with EU Directives on hazardous waste, combustion of hazardous waste and PCB disposal.
d) Fully complying with the EU Directives on landfill, hazardous waste, combustion of hazardous waste and PCB disposal.
e) Assuming constant expenditure at the 1999 level throughout period of estimation.
f) Assuming constant annual expenditure (EUR 0.5 million for base case and EUR 2.5 million for maximum case) between 1999 and 2010.
g) Assuming constant annual expenditure (EUR 60 million in both scenarios) between 1999 and 2012.
Source: MOE.

2.3 Elimination of PCB waste

The 2001 Environmental Protection Act, the 2001 Waste Act and several other acts promulgated in 2001 completed the transposition of the EU Directive on PCB disposal. Whereas previous regulations only applied to used PCBs and equipment containing PCBs, the *new legal framework* extended the regulations to those still in use. An inventory of the remaining stock of PCBs and equipment containing over 50 ppm of these substances is currently under preparation; some studies indicate that substantial amounts of PCBs are either in use or stored (Table 4.4).

So far very little PCB oil has been disposed of in Poland. A small number of capacitors have been exported to France for disposal at incineration plants capable of sound decomposition of halogenated organic substances. While domestic *capacity for*

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disposal of PCB contaminated oil is adequate, no installation for destruction or decontamination of equipment containing PCBs exists. The government envisages setting up such installations in Poland in the near future to meet the 2010 EU deadline for completing disposal of PCB waste. The total *cost of disposal and decontamination* of the remaining stock of PCB oil and equipment containing PCBs is estimated at PLN 215 million (Table 4.4). An additional PLN 46.5 million is envisaged for strengthening institutional structures, training of personnel, upgrading of laboratories, etc. The government considers that 73% of the total cost could be borne by companies holding PCB waste, while the rest would be financed by public resources (17% by environmental funds, 9% by EU pre-accession and structural funds and 1% by the central budget) in view of difficulties establishing the liability of holders of PCB waste in some cases, and so as not to discourage submissions of in-use equipment containing PCBs and PCB waste for disposal.

Table 4.4 **Projected cost of disposal/decontamination of remaining PCB waste**

	Stock[a] (tonnes)	Management method (I/D)[b]	Unit cost of management (1 000 PLN/tonne)	Total cost of management (1 000 PLN)
PCB oil removed from transformers	1 000	I	17	17 000
PCB oil removed from power capacitors and other equipment	1 000	I	17	17 000
Waste oil and liquid contaminated by PCBs during decontamination process	1 000	I	7.5	7 500
Power capacitors	7 500[c]	I	20	150 000
Metallic materials from power capacitors and other equipment	500	D	6	3 000
Transformers and other equipment	3 000[d]	D	6	18 000
Non-metallic materials from transformer dismantling process	120	I	20	2 400
Total				214 900

a) Estimation from several studies generally accepted by the Polish government.
b) I = Incineration; D = Decontamination.
c) Estimated weight of 250 000 power capacitors, assuming average unit weight is 30 kg.
d) Estimated weight of 3 000 transformers, assuming average unit weight is 1 tonne.
Source: MOE.

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5

NATURE AND BIODIVERSITY*

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Poland:

- ensure proper implementation and monitoring of the *National Biodiversity Strategy*, including through strengthened institutional co-ordination at all administration levels and improved measurement of status and trends of biodiversity across the country;
- ensure that development projects and programmes respect *Natura 2000 designations and management concepts*, and redouble efforts to organise consultations at the local level on Natura 2000 proposals, especially when sites are outside existing protected areas;
- improve conservation in *Landscape Parks* through incentives and legal mechanisms to encourage private owners or leaseholders within these parks to respect biodiversity conservation objectives; ensure integration of Landscape Park conservation plans into local land use planning;
- develop diverse, thriving *rural economies* that value biodiversity (e.g. through green tourism, environmentally sound agriculture, efficient use of agri-environmental and less favoured area programmes); remove perverse incentives such as the reduced VAT on agricultural pesticides;
- establish protected areas in the *marine environment* and expand efforts to protect marine biodiversity.

* The present chapter reviews progress in the 1990s, and particularly since the previous OECD Environmental Performance Review of 1995. It also reviews progress with respect to the objective "maintaining the integrity of ecosystems" of the 2001 OECD Environmental Strategy.

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Conclusions

Poland has a high level of biodiversity and a wide variety of habitats. *Protected areas* have increased significantly and now cover 9.7% of the country (32% if Protected Landscape Areas are included). The current quality of ecosystems results largely from historical circumstances, including the high rate of public ownership of forests and traditional low-intensity agriculture, dominated by small, privately owned farms. Poland's nature conservation achievements have nonetheless been impressive and the institutional and legislative framework for protected areas continues to improve. The comprehensive *Forestry Strategy* is making a major contribution; management plans are being developed for protected areas, and a legal and administrative structure has been established to integrate conservation plans for Landscape Parks with local spatial planning. There has been a major drive to develop a strategic approach to the integration of biodiversity into other sectors. The *National Biodiversity Strategy* is to be accompanied by more specific action plans and operational tasks. Significant progress has been made in preparing for implementation of the EU Habitats and Birds Directives, including a scientific inventory and new legislation to achieve transposition. The Ministry of Agriculture has developed specific *agri-environmental schemes*, especially for Natura 2000 sites, despite the failure of the EU SAPARD programme to provide timely support. Poland has ratified most global and regional conventions on wildlife, habitats, landscapes and biodiversity.

However, Poland's rich biodiversity will be at serious risk if adequate safeguards are not established quickly. Large-scale changes in land ownership and land use have been triggered by the transition to a market economy. *EU accession* is likely to lead to support for major infrastructure projects, and might lead to intensification of agriculture, both of which could impact negatively on biodiversity. Urbanisation and housing development pressures are increasing. There is a potentially serious lack of understanding concerning the degree of compliance necessary for *Natura 2000* and its implications, both for legal transposition into land use planning and other activities and for site identification, consultation and designation. While there is great emphasis on consultation at ministry level, consultations do not take place locally. There is already tension regarding selection of Natura 2000 sites between the national level (selection on scientific grounds) and the regional level (restriction of sites to existing protected areas or nature reserves). Potential local resistance to designation of sites outside existing protected areas appears to be underestimated. Although pesticide use in agriculture is currently low, the reduced VAT rate on pesticides is a perverse incentive in biodiversity terms. In the most widespread type of protected area, the *Landscape Park* (designated and managed by regional administrations), there are no mechanisms to encourage or compel private owners to conserve biodiversity. Protection of biodiversity in the marine environment is

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still at an early stage. Greater attention should be given to the potential of Poland's *green assets* to stimulate economic development and job creation (e.g. through eco-tourism, organic agriculture and renewable energy initiatives).

1. Evaluation of Performance

1.1 Objectives

National policy and strategy

The *Second National Environmental Policy* (2000) includes nature and biodiversity targets for the short (2002), medium (2010) and long (2025) terms. Among these are: adopting *a National Strategy for the Protection and Rational Use of Biological Diversity*, the main vehicle for implementing the Convention on Biological Diversity; a programme for implementing the EU birds and habitats Directives; a system for monitoring the state of biodiversity and developing indicators; new safeguards for unprotected areas; and extensive biodiversity policies for forestry. The Second National Environmental Policy also aims to integrate biodiversity into other sectors of the economy.

Agreement on the *National Strategy* has taken longer than originally anticipated, but its adoption by the Council of Ministers is anticipated by the end of 2002. Meanwhile, specific action plans and operational tasks under the Strategy are being developed.

1995 OECD Environmental Performance Review

The 1995 review specifically recommended that Poland:

- develop management plans for each protected area and landscape park as well as guidelines for sustainable use of key ecosystems;
- critically assess the staff and funding levels needed to manage the expanded protected areas and to implement the relevant international conventions, using diversified funding mechanisms and improved capacity at local level;
- increase integration of biodiversity concerns in agricultural and forestry policies;
- develop rural and nature tourism to provide economic development and environmental protection in relevant areas.

1.2 The state of nature and biodiversity

Poland has a *high level of biodiversity* and a wide variety of habitats. This is partly due to its position in a region where the geographical ranges of numerous animal species and vegetation communities overlap; also of importance are historical

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circumstances and related economic and social patterns, such as high rate of public ownership of state forests and low-intensity traditional agriculture dominated by small, privately owned farms. In a period of rapid structural change, Poland has a special responsibility to preserve this European heritage by ensuring that nature is managed in a sustainable manner. Poland's biodiversity and landscape amenities are also *major assets* for its future economic development.

Diversity of fauna and flora

There are over 33 000 known *species of fauna* in Poland, although there could be as many as 47 000. Among known species, 31 000 are invertebrate. There are 89 indigenous mammal species and 232 breeding bird species; a full 15% of these species are threatened (Figure 5.1). Among mammals, the bats and carnivores, as well as mammals occurring in wetlands, are particularly vulnerable. Birds in wetland habitats are most at risk. Furthermore, 10% of all freshwater fish are classified as "critically endangered", "endangered" or "vulnerable".

In the past, *notable successes* have been achieved in restoring populations of important species. Poland has saved the European bison from extinction. About one-third of the world population currently survives in Poland (600-700 animals). The national beaver population has increased from 1 500 in 1980 to about 24 500 today. Poland has the largest wolf population in Europe (over 1 000). It also has the largest population of the globally endangered white stork (almost 45 000 pairs).

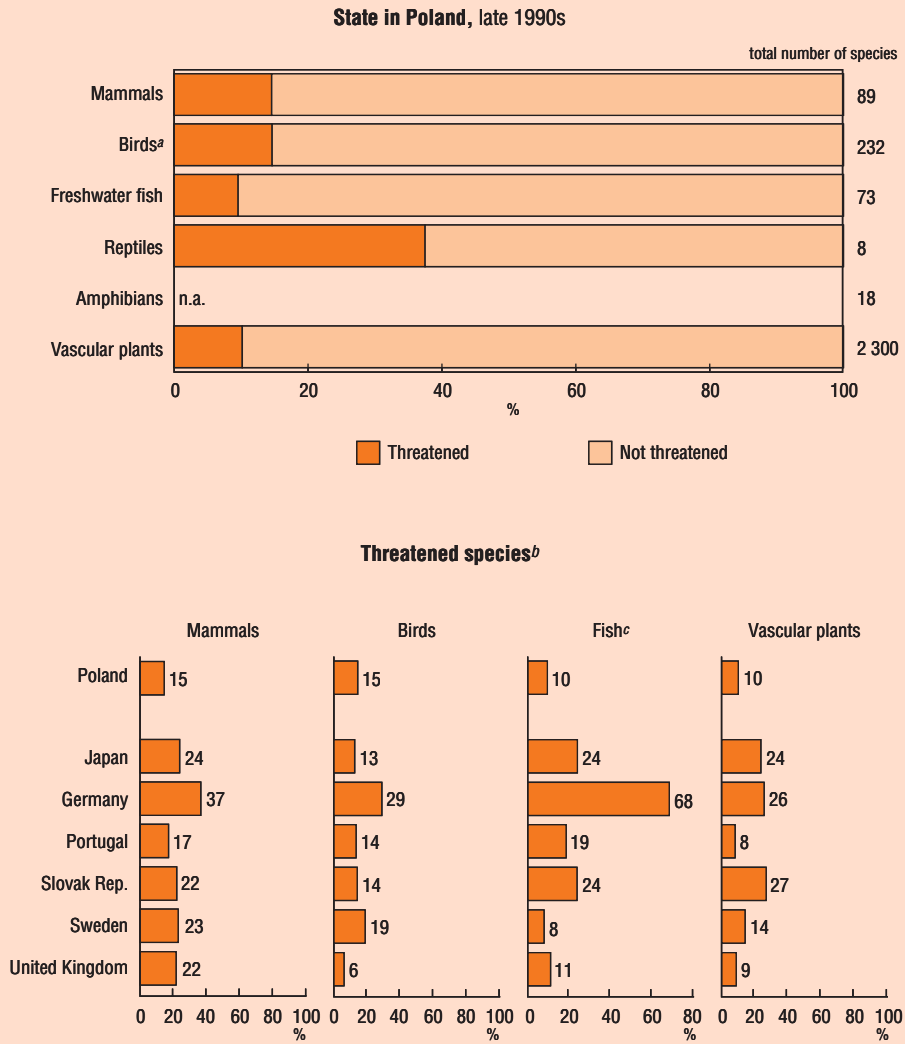
Poland has about 11 000 known *plant species* and at least 5 000 fungi. Approximately 10% of vascular plant species, and an even higher percentage of fungi, lichens and mosses, are endangered.

Diversity of habitats and ecosystems

Many areas of farmland, wetlands and forests of high natural value, as well as about 100 000 km of fairly natural river courses, are being maintained. Of the total land area of 312 000 km^2, 61% is used for *agriculture* (78% arable, 22% grassland); Poland is among the top three European countries in regard to dry grasslands of high conservation interest. *Forests* occupy approximately 30% of the land surface and host 75-80% of the country's biodiversity. The Bialowieza Forest (part of a trans-frontier park shared with Belarus) is Europe's largest remaining old-growth forest, and has been protected since 1932 as a National Park (Chapter 8, Section 1.3). *Other important habitat types* are peatlands, major river basins, lakes, wetlands, and sub-alpine and coastal habitats. Habitats assessed by Poland as in the greatest danger are oligotrophic waters, peatlands, steppes, sand dunes and some alpine ecosystems.

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Figure 5.1 **Fauna and flora**



a) Breeding species only.
b) IUCN categories "critically endangered", "endangered" and "vulnerable" in % of known species.
c) Freshwater fish only.
Source: OECD.

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Poland has two distinct and extensive lake districts, as well as over 520 kilometres of Baltic Sea coastline. *Pollution of rivers, lakes and coastal areas* is generally serious and occasionally extreme (Chapter 3, Section 1.5). Baltic beaches are sometimes closed to swimming. Fishery stocks in the Baltic Sea have declined dramatically (Chapter 8, Section 1.5); sea mammal populations are seriously endangered. Poland's wetlands, while still extensive, have been greatly reduced in area by drainage in recent decades.

1.3 Pressures on nature and biodiversity

The Government of Poland has identified the main current pressures on its biodiversity as changes in *land ownership*, leading to restructuring of the landscape and to intensification of agriculture; growing urbanisation; and growing motorisation, mobility and related development of road transport infrastructure. Poland's rich biodiversity is at serious risk if proper safeguards are not fully implemented. Biodiversity monitoring is sufficient to provide solid baseline information. But evaluation of the impacts of development programmes and projects on nature, landscape and biodiversity, particularly *strategic ex ante assessment*, is still in its infancy. Much change in land use has been triggered by the transition to a market economy, and such change is likely to be further stimulated by EU accession. Land ownership was a major transition issue in the context of EU pre-accession negotiations.

Land use

In the 1990s there were a number of important *changes in land ownership and land use*. State-owned farms (mostly in western Poland) began to be closed down and the land sold. Former Soviet military installations cover over 60 000 hectares; there are pockets of serious soil contamination, but much of this land is likely to be of high natural value. "Urbanisation of the countryside" has begun, including the expansion of some urban areas and chaotic construction of vacation houses on inappropriate sites. The new pressures are exacerbated by the difficulties encountered in legally enforcing *planning control* over use of private land; these difficulties are partly related to devolution of planning authority to the gminas, which often lack capacity for land-use planning and the resources needed to implement or enforce such plans (Chapter 5, Section 2.1).

Agriculture

The economic and social importance of the agricultural sector is greater in Poland than in many other OECD countries. While the sector's contribution to GDP was only 3.3% in 2001, after a sustained slide in volume and value of production

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(Figure 6.1), agriculture is still the main source of income for over 4 million people, employing some *19% of the total labour force*. Arable land and permanent grassland account for 61% of the country's total area. Unlike in other former socialist countries, *private ownership* has always prevailed in Poland's agricultural sector. The privatisation of State farms and State-owned co-operatives, initiated in 1992, led to even greater reduction of the public sector's share in agriculture, from 20% in 1990 to 8% in 2000. Most farmland (88%) now belongs to private family farms, 8% to State farms, 3% to private co-operatives and 1% to foreign and mixed capital owners. Average farm size varies greatly according to type of ownership: from private family farms (7 ha) and co-operatives (200 ha), to State farms (636 ha), and mixed capital properties (1 249 ha). Temporary management contracts and leasing agreements have been concluded, pending sale of the remaining 2 000 State farms (located mainly in the western and northern voivodships).

Environmental damage from agriculture is low compared to that in many OECD countries, as Poland's agricultural sector has been centred around small, private farms using mostly traditional practices and comparatively low levels of agrochemicals. Farming was more intensive on State-owned farms, which were concentrated mainly in western Poland. State-owned agricultural land has often been subject to groundwater pollution, soil contamination and loss of landscape features. In the early 1990s pressures from agriculture decreased due to the recession, resulting in a slight reduction in agricultural activity and a significant *drop in use of agrochemicals*: fertiliser use fell by nearly 70% between 1989 and 1992. Low intensity use of agrochemicals is an outstanding feature of Polish agriculture (Figure 3.4).

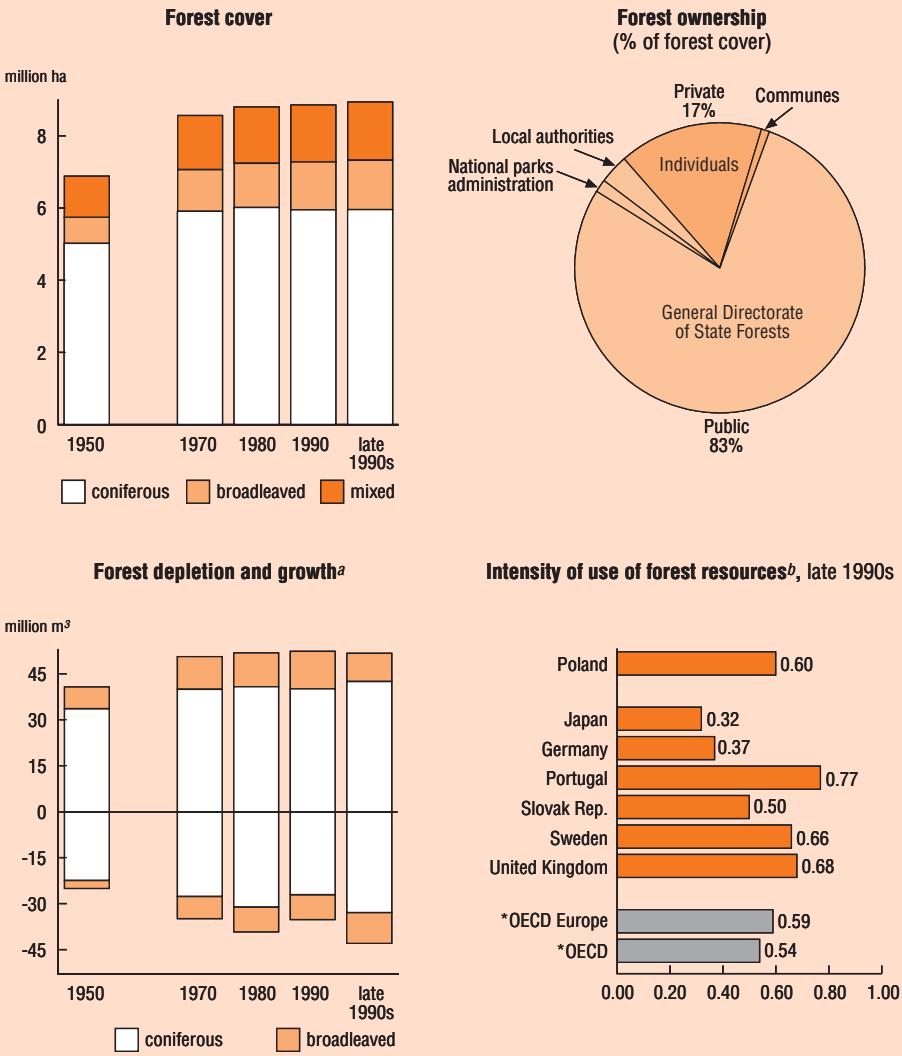
EU accession and membership are likely to amplify some pressures on nature and biodiversity, particularly from intensive agriculture (e.g. through environmentally harmful subsidies such as some existing under the present Common Agricultural Policy) or from major infrastructure projects (e.g. benefiting from EU support during the accession process and post accession phase). There will also be *new opportunities under the CAP* (encouragement of environmentally beneficial farming methods, promotion of marketing of eco-labelled products, encouragement of broader rural development options) where nature, biodiversity and landscape amenities are considered assets for economic growth and social progress.

Forestry

Forests cover *8.96 million hectares (28.4%) of Poland's total area*, a slight increase compared with 1990 (27.8%). Most forests are coniferous (mainly Scots pine), reflecting poor soil conditions. Intensity of forest use (harvest/annual growth) increased since 1990, but remained within a sustainable range (Figure 5.2). Most forests (83%) belong to the State and the remainder (17%) are privately owned, a situation

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Figure 5.2 **State of forest resources**



a) Depletion (losses in growing stock due to fellings, silvicultural measures and natural mortality) is directly comparable to growth (gross increment).
b) Harvest divided by productive capacity (measured as annual growth).
Source: OECD.

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which remained unchanged over the decade. Most State forests (94%) are managed by the General Directorate of State Forests, and the remainder by local authorities or the National Parks administration. State forests account for a large share of most protected areas; 49% have the status of protected forests, being situated around large urban areas, along rivers and sea coasts, or in areas with dunes.

Initial positive steps have been made, with regular *monitoring of forest conditions* prepared by the Inspectorate for Environmental Protection. Forests are now primarily assessed for timber quality, but this could be extended to cover conditions of woodland habitats and, more generally, woodland ecosystems as a whole. Polish forests show same signs of damage: a 2000 survey of forest conditions carried out in the framework of the UN LRTAP Convention revealed that 32% of monitored trees were subject to defoliation of over 25%. This damage may be related to SO_2 and O_3 concentrations in the air, as well as changes in nutrient availability in the soil caused by pollutant deposition**.**

Pollution

The greatest *pollution* damage to nature has been concentrated near heavily urbanised and industrialised areas: Silesia, the Gdansk-Gdynia and Lublin regions, and the urban areas of Kraków, Lódz, Poznan, Szczecin and Warsaw. In Silesia, in particular, soil has been contaminated by heavy metal dust from industrial air emissions. Water pollution from industrial and municipal sources harms river life in the Vistula and Odra rivers and several of their tributaries, as well as in the Baltic Sea (Chapter 8, Section 1.4). Long-range transport of air pollutants from both domestic and international sources has resulted in acid deposition, which may explain defoliation of trees, decreased botanical diversity, and losses of invertebrates and insect-eating mammals such as bats.

1.4 Policy responses

The 1991 *Nature Conservation Act* is the basis of nature protection for designated sites and protected species. An amendment to this Act (December 2000) transposes the EU birds and habitats Directives in Polish legislation. There is no transition period for implementation of these Directives, which are to come into effect immediately upon accession. Poland aims to submit its proposed list of Natura 2000 sites under these Directives to the European Commission by the end of 2002 (Chapter 5, Section 2.2).

The lead ministerial *responsibility for nature and biodiversity and forestry policy* rests with the Minister of the Environment; implementation of nature conservation policy is the responsibility of the Chief Nature Conservator and his staff within the Ministry. Other nature conservation responsibilities lie with the voivodships, which

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can designate Landscape Parks and nature reserves; these functions are supported by regional nature conservators. Agricultural policy is the responsibility of the Minister of Agriculture and Rural Development. The 1995 OECD Environmental Performance Review recognised that Poland's nature conservation *achievements had been impressive* in terms of number of activities, the introduction of new concepts and ideas, and an increase in the number of protected areas. Since 1990 biodiversity in certain areas benefited from improvements in water quality and reduced pressures to drain wetlands. Poland's management of natural resources is supported by a long tradition of *scientific activity*, including reintroduction of large mammal species to the wild, cultivation of endangered plants in botanical gardens and regular collection of significant amounts of data on natural resources.

Protection in designated areas

There are several types of *protected areas* in Poland, including National Parks, Nature Reserves, Landscape Parks and Protected Landscape Areas. By the end of the 1990s, 9.7% of the territory was designated as protected (according to IUCN Categories I to VI) or around 32% if protected landscape areas were included (Figure 5.3). Since 1990 total protected area has increased by over two-thirds.

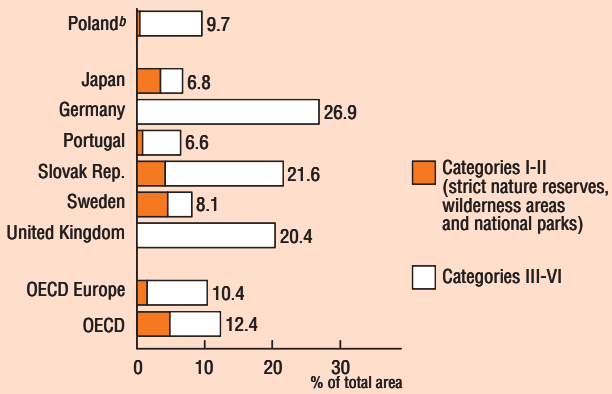
There are 23 *National Parks* (two coastal, eight mountainous and 13 in lowland or hilly areas). Although their surface area has increased by some 85% since 1990, they cover only about 1% of the territory. Since 1995 three new parks have been created. *Nature Reserves* represent even less coverage (around 0.5%); the 1 300 sites are very different in size, ranging from less than one to over 5 000 hectares (about 100 ha on average). *Landscape Parks* (8%) and *Protected Landscapes Areas* (23%) are the most important categories in terms of coverage. Their coverage significantly increased over the 1990s. Since 1995, 18 new Landscape Parks and 63 new Protected Landscapes have been established. New types of protected areas such as natural monuments, documentation sites, or nature-landscape complexes have also been created (Table 5.1).

Perspective for nature conservation and biodiversity policy

With the new Polish Constitution of 1997, the Second National Environmental Policy of 2000 and the Environmental Protection Act of 2001, the perspective of nature conservation and biodiversity policy has broadened *beyond protected areas*. These instruments provide new frameworks within which, in general terms, biodiversity policy is considered an element of sustainable development. The Second National Environmental Policy clearly indicates that biodiversity should not only be conserved in specific protected areas but should also be fully integrated into activities concerning other economic sectors. The development of more detailed action plans and programmes (e.g. with respect to water management, agriculture and land-use planning) should

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Figure 5.3 **Major protected areas,**[a] late 1990s



a) IUCN management categories I to VI; national classifications may differ.
b) National data excluding protected lanscapes.
Source: IUCN; OECD.

Table 5.1 **Protected areas**

	1990 (km^2)	2000 (km^2)	1990-2000 (1990 = 100)	Total territory (%)
National parks	1 659	3 065	185	1.0
Nature reserves	1 170	1 487	127	0.5
Landscape parks	12 154	24 469	201	7.8
Protected landscapes areas	45 748	71 377	156	22.8
Other[a]	. .	124	. .	0.4
Total (excluding overlaps)	60 731	101 638	167	32.5

a) Including natural monuments, documentation sites and nature-landscape complexes.
Source: CSO.

follow. The 2001 Environmental Protection Act provides that all land-use plans shall be subject to public consultation, and that restrictions applying in protected areas shall be reflected in local land-use planning.

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It is therefore to be expected that the *National Strategy for the Protection and Rational Use of Biological Diversity*, whose adoption is anticipated in the end of 2002, would (with its associated action plans) provide mechanisms for translating these general objectives into implementation programmes. The national strategy has been subject to discussion across government departments (including agriculture and fisheries) and to consultation with NGOs and other stakeholder representatives. It has also been available to the public on the internet. The final document should achieve widespread acceptance. The challenge in following through with implementation will be to sustain the principle that the quality of biodiversity is the responsibility of policy makers and actors in all sectors. Because of the traditional strength of Poland's protected area systems, there remains a tendency to assume that biodiversity conservation is relevant only to these areas.

The importance of conserving biodiversity as part of healthy, functioning ecosystems, and as part of progress towards *wider goals* (e.g. flood prevention and alleviation, coastal defence, sustainable forest management) needs to be continually reinforced at all governmental levels and in society as a whole. Since the costs of implementation would thus be integrated into other programme areas, the resource requirements of such policy adjustments would not need to be met specifically by the relatively small budgets of nature conservation departments. It will be necessary to develop continuing *institutional mechanisms* horizontally and at all administrative levels, to ensure that the national strategy is fully implemented (and reviewed periodically against its targets) and that biodiversity indicators are developed in relevant sectors to assess its impacts.

Consideration should be given to mechanisms whereby development projects likely to adversely affect biodiversity or protected areas will be required to include *mitigation and/or compensation* measures. If physical compensation cannot be ensured, use of financial means such as land conversion charges could be considered.

Protection outside designated areas

While nature conservation in Poland focuses primarily on designated protected areas, the main threats to biodiversity are likely to occur outside these areas. There is a serious risk that biodiversity will be lost rapidly through structural changes and intensification of agriculture associated with EU accession. It is therefore a matter of concern that Poland will not gain pre-accession experience with implementing *agri-environmental programmes* under the EU-SAPARD programme. It should be ensured that such schemes are available in the immediate post-accession period. At many Natura 2000 sites such schemes, tailored to the individual site, would be essential for successful establishment and management of agricultural land. More broadly, with its large population of farmers and high share of small part-time family farms,

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Poland's nature conservation and biodiversity objectives will be best served by a CAP with increased broad-based rural development initiatives, including targeted agri-environmental schemes and a decrease in traditional commodity-related support measures.

Commercial fertiliser and pesticide use is currently relatively low in the OECD context (Figure 3.4). Livestock density declined in the 1990s by close to one-third, mainly as a result of the decrease in the number of cattle (Figure 6.1). However, once the agricultural sector recovers, the *differential rate of VAT* on pesticides (7% compared with the standard rate of 22%) is likely to be a perverse incentive in biodiversity terms and should be avoided. Opportunities to diversify into other forms of rural economic activity with high-value products, such as green tourism and organic farming, would also benefit the high proportion of inhabitants of rural areas who are unlikely to benefit from the CAP's normal production support mechanisms.

Poland's 1997 *Forest Act*, which fully conforms with the requirements of the Convention on Biological Diversity, contains well developed programmes to ensure that biodiversity is fully integrated in all forms of woodland and forestry practice. It will be important to make sure that the Forest Act and the forthcoming National Strategy for the Protection and Rational Use of Biological Diversity are consistent. A comprehensive *monitoring system* is currently in place to assess the environmental status of forest resources. Assessments are largely made in terms of the quality of trees and timber, rather than of the forest ecosystem as a whole. Relatively little additional effort would be required to build ecosystem assessment into regular forest monitoring systems; this would constitute a very significant contribution to the overall understanding of Poland's biodiversity resource. Advantage could be taken of the fact that sustainability principles underlie the implementation of forest policies in Poland by considering development of an ambitious *forest management certification scheme* for marketing timber products (e.g. FSC).

1.5 International co-operation and marine conservation

Poland has signed all the *global and regional conventions* on wildlife, habitats, landscapes and biodiversity. It ratified most of them by 1995. The Ramsar Convention was ratified in 1978. Eight Ramsar sites and nine Biosphere Reserves have been designated; five of the later are transboundary reserves shared with Belarus, Ukraine, Slovakia and the Czech Republic (Chapter 8, Section 1.3). Since the *Convention on Biological Diversity* entered into force in 1996, Poland has submitted two national communications (1997 and 2001), both outlining government policy on conservation of biodiversity and referring to measures and projects which already existed before the Convention was signed.

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Concerning the *marine environment*, Poland ratified the Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area in 1974. Within this framework, coastal and inshore marine areas have been proposed for two National Parks and two Landscape Parks. Consideration is being given to two purely marine sites: the Odrzana and Slupska Sandbanks. Work has also begun to reintroduce the grey seal to the Baltic Sea.

Poland is just beginning to develop *policies and programmes for biodiversity in the marine environment*. The special difficulties of making progress in this area are recognised. The coastal strip from 3 km inland to 250 m below the low water mark is the responsibility of the Maritime Office of the Ministry of Infrastructure. The Maritime Office, which controls all activities in this coastal zone, is a good model for ensuring that relevant integration of sectoral activities takes place. However, it does not have jurisdiction over National Parks, Landscape Parks and other marine protected areas, which may extend as far as one kilometre from the coast. To ensure that the conservation objectives of coastal and marine protected areas are respected, it will be important for the Ministry of the Environment, the Maritime Office and the relevant voivodships to co-operate closely on management of fishing, ports, navigational, coastal defence and recreational activities. Poland should also examine the possibility of developing cross-border marine protected areas with its neighbours bordering the Baltic Sea, and of protecting marine areas extending further from its coast.

2. Focus on Selected Topics

2.1 Biodiversity and land-use planning

Poland has established a clear *framework for a comprehensive land-use planning system*, but needs to strengthen implementation and co-ordination at the local level. Plans for new legislation in 2001 were not realised. There is some concern that the five-year term of existing local plans will expire before municipalities have completed new plans. The government is aware of the importance of not leaving a technical gap of this kind. It is a legal requirement that local plans should be consistent with the requirements of National Parks, Nature Reserves and Landscape Parks.

There appears to be a lack of confidence that local plans are strong enough to prevent development decisions that threaten nature, even in the most strictly protected areas. Thus there is a need to strengthen the *relationship between local spatial plans and conservation plans* for protected areas, as well as for full translation of national policies into local plans. This will be assisted by full transposition of the habitats Directive where Natura 2000 sites are concerned. However, increasing development

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ressures will mean that greater effectiveness and transparency of decision-making under the land-use planning system will be essential to prevent gradual biodiversity loss. A fully integrated system of land-use planning should allow economic development to proceed while biodiversity is preserved and enhanced even outside protected areas.

2.2 Implementation of EU Directives

The EU *Directives on birds and habitats* are the two main nature conservation Directives with which Poland must comply by the time of accession. This will require strict protection of birds and certain other species of fauna and flora, as well as designation of Special Protection Areas (SPAs) for birds and Special Areas of Conservation (SACs) for habitat types and other species. Collectively the network of sites thus designated is known as Natura 2000. *Natura 2000* has been a significant challenge for almost all EU countries, in terms of identifying sites (involving consultation with local populations) and transposing the Directives' requirements into national law. Poland used an amendment to the 1991 Nature Conservation Act to transpose the EU Directives in 2000. The new legislation, which sought to harmonise the terminology of existing legislation with that of the Directives, introduced the concept of management plans for Natura 2000 sites.

Following *scientific evaluation*, Poland has so far identified about 180 possible SPAs and about the same number of possible SACs, covering approximately 13% of the country. Following consultation within Poland, including scrutiny by implementation teams in the voivodships, it is intended that the list of sites will be drafted by the end of 2002. At national level Poland has placed great emphasis on *public information and stakeholder consultation* throughout the site identification process; the voivodship teams also include stakeholder representation. Specific consultation is planned when the voidvodships have completed their consideration and before the sites are submitted to the Commission on the day of accession.

Application of the Directives' scientific criteria for site selection will inevitably lead to identification of *sites outside existing protected areas*. Over 50% of Poland's draft list is estimated to fall into this category. For many of these sites the option of creating new National Parks or establishing State ownership will not be pursued. The alternative approach of signing management agreements with farmers where necessary will be followed. This new approach should help encourage acceptance of the proposed designations by providing some financial return (e.g. through agri-environmental programmes or compensation under the EU Less Favoured Area scheme) and by demonstrating that human activity can and should co-exist with a nature conservation designation. The need for effective consultation and communication with local populations and stakeholders, and the time required, should not be underestimated. Relevant

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administrations may need to increase their efforts to ensure that local populations understand the implications of proposals and recognise their value. This will be particularly important for sites outside existing protected areas.

Poland's *1994 Land Use Planning Act* provides a basic framework which can be used to integrate the habitats Directive's provisions for assessing plans and projects likely to have a significant effect on Natura 2000 sites. However, to satisfy the terms of the Directive, there is a need to establish a closer and more transparent linkage between the existing procedures and the steps laid down by the Directive. These steps eventually lead to a binding decision on whether a project damaging to a Natura 2000 site may proceed, and identifying the compensatory habitat measures that should be taken in the event of such a project proceeding. Similar explicit linkages will be needed for other policy areas, such as water management, transport and industrial discharges, in which decisions are made which could have an adverse impact on Natura 2000 sites.

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Part II

SUSTAINABLE DEVELOPMENT

6

ENVIRONMENTAL – ECONOMIC INTERFACE*

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Poland:

- further *decouple* environmental pressures from economic growth to reduce pollution intensity and improve resource efficiency of the economy;
- consider economic, environmental and social aspects in setting *national priorities* at the strategic, planning, programming and budgeting levels;
- at project level, ensure the integration of environmental concerns through EIA and spatial planning and develop *sharing of best practices* among regions and municipalities;
- continue to integrate environmental concerns into *sectoral fiscal and price signals*; extend the taxation of fuels used by stationary sources, differentiating tax rates to internalise environmental externalities;
- prioritise implementation of *cost-effective measures* to improve the energy efficiency of large stationary sources and to reduce the carbon intensity of the energy supply (e.g. through progressive removal of environmentally harmful subsidies);
- further promote capacity building and networking for *local development initiatives* integrating economic, social and environmental concerns (e.g. Local Agenda 21) in urban and rural development;

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of Poland (1995). It also reviews progress with respect to the objective "decoupling environmental pressures from economic growth" of the 2001 OECD Environmental Strategy, and takes into account the latest OECD Economic Surveys of Poland.

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Recommendations (cont.)

- further implement the *polluter pays and user pays principles* to make provision of environmental services more efficient and contribute to their financing, taking into account social considerations;
- increase and maintain *environmental expenditure* at levels necessary to implement the EU environmental acquis, using more private funding (e.g. user charges) and EU funding for environmental investments;
- further enhance the transparency, accountability and effectiveness of *environment funds* (national, regional and local);
- expand the use of *economic instruments* to improve the cost-effectiveness of environmental management; assess the potential role of *tradeable emissions permits*;
- further strengthen *enforcement* of environmental regulations, expanding the role and capacity of the Inspectorate for Environmental Protection and of prosecutors, in line with new responsibilities (e.g. implementation of IPPC, decentralisation of environmental management responsibilities);
- strengthen integration of environmental objectives into *spatial planning* and enhance the coherence of local and regional plans;
- strengthen the use of *quantitative indicators* to assess pressures on the environment and the effectiveness of policy responses.

Conclusions

Integration of environmental concerns into economic decisions

While GDP grew by 45% between 1990 and 2001, Poland *strongly decoupled* its emissions of several air pollutants (e.g. SO_x, NO_x, CO_2), its use of water resources, and its use of agricultural inputs (e.g. nitrogenous fertilisers, pesticides) from economic growth. Municipal waste generation, increasing at only one-fourth the rate of GDP during this period, was also weakly decoupled from economic growth. *Economic restructuring*, industry and energy sector reforms and *environmental policies* explain these trends. The ongoing privatisation process, combined with a high share of foreign direct investment, is accelerating the introduction of cleaner production processes and cleaner products. Poland has established a national policy and institutional *frameworks for sustainable development*. Strategies for economic and sectoral development (e.g. transport, rural development and agriculture) rather systematically integrate environmental objectives. Environmental objectives have also been integrated into certain areas of fiscal policy (e.g. through differentiated taxes on motor vehicles and their fuels). Environmental impact assessment is used to assess and mitigate the negative environmental impacts of major infrastructure projects (e.g. motorways).

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Despite this progress, the *emission intensity* of Poland's economy remains among the highest in the OECD with respect to SO_x, NO_x and CO_2 emissions per unit GDP. Further measures are especially needed to reduce emissions from the energy and industry sectors (e.g. from large combustion plants). While there has been some reduction in use of coal, the *subsidisation of coal mining* distorts market signals; this has slowed progress on reducing discharges of saline effluents to surface waters, and on switching by stationary sources to less carbon-intensive fuels. Taxes on fuels used for stationary combustion are very limited so far, providing little incentive to conserve energy or to switch to less polluting forms of energy. The moderate fuel switching that has occurred has mainly resulted from modernisation, reinforced by air emission charges and fines. Pressures from *transport and agriculture* were relatively low between 1990 and 2000 (e.g. compared with the OECD and EU averages), but they are likely to increase markedly with the growth or intensification of these sectors. There has been little *integration of environmental concerns* into non-environmental chapters during the EU accession process. Polish authorities should better integrate these concerns into sectoral reforms and development projects, as well as into spatial planning. Continuing efforts towards efficient pricing of natural resources and environmental services would enable Poland to improve overall economic efficiency; social concerns (e.g. affordability) should be taken into account.

Implementing environmental policies and strengthening environmental infrastructure

Poland's environmental management is founded on solid environmental institutions and competences. Two *national environmental policies* were adopted in 1991 and 2000 under fast-changing circumstances. The Second National Environmental Policy defines short-term (2000-02), medium-term (2002-10) and long-term (2010-25) objectives for management of natural resources, improvement of environmental quality, strengthening of policy instruments for environmental management, and co-operation on environmental issues of international concern. Together with economic structural changes, these efforts by Poland have contributed to progress on a number of fronts (e.g. reductions of traditional air pollutant emissions, water withdrawal, nutrient discharges and non-municipal waste generation). Poland's *inspection and enforcement* capacity has been preserved (in the national Inspectorate for Environmental Protection), although follow-up by prosecutors could be strengthened. Expenditure on pollution abatement and control, which was between *1.5 and 2% of GDP* throughout the 1990s, has largely been financed by high pollution charges and fines (e.g. for air pollution) redistributed through the *National Fund for Environmental Protection and Water Management* (hereafter referred to as the National Fund for the Environment) and a number of other environment funds operating at regional and local levels. Between 1990 and 2000, Poland expanded its use of *economic instruments* to implement

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environmental policy and to recover the operational costs of environmental services (e.g. drinking water supply, waste water treatment). *Access to environmental services* varies significantly among regions; related investments should be targeted to ensure that basic social and health standards are met throughout the country. Increases in prices relating to household services (e.g. provision of water, energy and transport) have had a significant incentive effect, although with some regressive distributional consequences. In line with the Aarhus Convention, legal bases have been established for *access to information and to the courts*.

However, despite undeniable progress in reducing pollutant emissions and discharges to the environment, Poland lags behind most other OECD countries with respect to a number of environmental indicators. Having done a great deal to resolve environmental problems inherited from the past, Poland now aims at another level of environmental quality and at environmental convergence with other European countries. Considerable investment in *environmental infrastructure* is therefore still necessary. In particular, an environmental investment estimated between 1.2 and 2.7% of GDP per year will be required over ten years to comply with the terms of EU accession. Financing of this investment remains uncertain despite the support expected from European funds. Poland must clarify *environmental priority setting* and ensure that cost-effectiveness has a central place in decision criteria. On-going efforts to improve the transparency and accountability of decision-making by environment funds should be sustained. Introduction of the European system of integrated pollution prevention and control (IPPC) and the recent decentralisation of environmental management will necessitate further strengthening of environmental institutions. Consideration needs to be given to use of emissions trading schemes to help reduce Poland's high air pollutant emission intensities. Further efforts are also needed to ensure that local *spatial development plans* correspond with those established at the regional level, and that both types reflect national environmental objectives. Use of quantitative environmental indicators to inform the process of policy formulation, for communication with stakeholders as well as monitoring policy effectiveness, will also be important.

1. Progress Towards Sustainable Development

1.1 Decoupling of environmental pressures from economic growth

Economic trends

Overall, *rapid GDP growth* has continued in Poland since the 1995 OECD Environmental Performance Review. Annual growth averaged 6.3% from 1994 to 1997 and 4.3% from 1998 to 2000. There has been a significant slowdown in economic activity since 2000, with GDP growing by only 1% per year (Chapter 6, Section 3.1).

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Poland ranks 28th among OECD countries in *per capita GDP* (USD 9 100 in 2001, when adjusted for purchasing power parity).

The *energy intensity* of Poland's economy fell by 37% over a decade, but is still one of the highest among OECD countries (0.26 toe/USD 1 000 GDP). While economic output increased overall by 43% between 1990 and 2000, total energy supply shrank by 10% (strong decoupling). Coal (hard coal and lignite) continues to be the main energy source for electricity production, although its share in the fuel supply fell from 75 to 62% between 1990 and 2000 (Figure 2.3).

Road transport greatly increased in the 1990s. The number of registered passenger cars increased by 100% and the number of lorries and road tractors by 89% (Table 7.1); annual road traffic volume (vehicle-kilometres travelled) increased by 132% during this period. Reflecting modernisation of the fleet, some air emissions from transport decreased in the same period (Table 7.2). Car ownership in Poland, which remains one of the lowest (24 cars per 100 persons) in any OECD country, is likely to increase.

Trends in environmental pressures

Emissions of a range of *air pollutants* (SO_x, NO_x, CO_2) have been strongly decoupled from economic growth over the last decade (Table 6.1). Between 1990 and 2000, SO_x emissions declined by 53%, NO_x emissions by 35% and CO_2 emissions from energy use declined by 16%. Progress can be attributed mainly to restructuring of industrial activity (e.g. reduction of subsidies, shifting to market-based prices), which has encouraged energy conservation, as well as to environmental policies. Despite this progress, however, intensity of SO_x, NO_x and CO_2 emissions per unit GDP remains much higher than the OECD Europe averages (Figures 2.1 and 8.2).

Poland has decoupled *water withdrawals* from GDP growth, with an overall decline in withdrawals of 25% between 1990 and 2001 (Chapter 3, Section 1.2). This improvement is due in part to restructuring of the industrial sector, which accounts for 70% of total water withdrawals. There has also been a sharp drop in water consumption by urban households (from 74 m^3 per person in 1992 to 48 m^3 in 2000), reflecting control of distributional losses and the introduction of metering. Nonetheless, intensity of water use remains 22% above the OECD Europe average (Figure 3.3).

The rate of *municipal waste generation* has risen more slowly than GDP since 1990, achieving relative decoupling (e.g. 10% growth in municipal waste from 1990 to 2000 while GDP increased by 43%). In 2000 Poland's rate of municipal waste generation was the third lowest among OECD countries. In 2001 annual municipal waste generation was 290 kg per capita, 46% below the OECD average (Figure 4.1). It is forecast to continue to climb as packaging materials are increasingly used and private consumption continues to grow.

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Table 6.1 **Economic trends and environmental pressures,** 1980-2001

(% change)

	1980-90	1990-2001
Selected economic trends		
GDP[a]	–1	45
Population	7	1
GDP[a]/capita	–7	43
Agricultural production	21	–16
Industrial production[b]	–18[c]	64
Total primary energy supply	–19	–10[d]
Energy intensity (per unit GDP)	–18	–37[d]
Total final energy consumption	–21	–6[d]
Road freight traffic[e]	–10	85
Passenger car traffic[f]	–10	177[d]
Selected environmental pressures		
CO_2 emissions from energy use[g]	–20	–16[d]
SO_x emissions	–22	–53[d]
NO_x emissions	4	–35[d]
Water abstraction	0	–25
Municipal waste	10	10[h]
Nitrogenous fertiliser use	–3	–31[d]
Phosphate fertiliser use	–62	–19[d]
Pesticide use	–19	17

a) At 1995 prices and purchasing power parities.
b) Includes mining and quarrying, manufacturing, gas, electricity and water.
c) From 1985.
d) To 2000.
e) Based on values expressed in tonne kilometres.
f) Based on values expressed in vehicle-kilometres.
g) Excluding marine and aviation bunkers.
h) For period 1990-2000.
Source: IEA-OECD; OECD.

Intensity of use of commercial *fertilisers and pesticides* is currently low (Figure 3.4). From 1990 to 2000, use of nitrogenous fertilisers in agriculture fell by 31% to reach 6.0 tonnes/km^2 of crop land, nearly 31% below the OECD Europe average. Intensity of pesticide use (0.06 tonne of active ingredients per km^2 crop land in 2000) increased by 17% during this period but is still only one-fifth the OECD Europe average. Intensity of use of pesticides and other chemicals in Polish agriculture is expected to increase following EU accession (Chapter 5, Section 1.3).

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Overall assessment

Poland has made significant progress in decoupling environmental pressures from economic growth. There was *strong decoupling* in the 1990s for major air pollutants and CO_2, as well as for consumption of energy, water, and agro-chemicals (Table 6.1). There was also relative decoupling of municipal waste generation from GDP growth. In the early 1990s much of this progress resulted from economic contraction and restructuring, as well as from environmental policies. Reforms in the industry and energy sectors stimulated further progress. However, Poland could improve its ranking among OECD countries with respect to most indicators of pressure intensity relating to the industry and energy sectors. Besides the remaining pressures associated with "old" industries, there are signs that growth of transport, agriculture and consumption are creating (or will create) *new environmental pressures*. High priority should be given to improving resource efficiency and to further reducing pollution intensity, while continuing to pursue rapid economic growth.

1.2 Institutional integration

Transition towards a market economy has led to major institutional and economic structural changes in the last ten years. Reforms initiated in the early 1990s have presented opportunities to revise and implement environmental management policies, and to achieve greater integration of environmental concerns into other policies. The 1997 Constitution states that Poland will provide for "the protection of the environment, while pursuing the principle of sustainable development".

More recently, the *EU accession process* has been the main driver of further institutional and economic structural changes, including environmental ones. Transposition of EU legislation since 2000 has led to a considerable body of new environmental and non-environmental legislation, some of which will require further institutional changes.

Institutional arrangements for sustainable development

Since the mid-1990s Poland has experimented with institutional mechanisms to implement and co-ordinate its sustainable development efforts. In 1994 a *Sustainable Development Commission* was created, chaired by the Minister of the Environment. This Commission, intended to ensure the inter-ministerial co-ordination necessary for sustainable development, reported directly to the Prime Minister. It was abolished in 1997 as part of general central government reform. In 1998 a committee on regional policy and sustainable development, chaired by the Minister of the Economy, was established with an ambitious remit. It was given responsibility for co-ordinating government action on development issues with territorial and environmental impacts.

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This high-ranking committee, which oversaw the development of *Poland 2025: A Long-term Strategy for Sustainable Development* (2000), was abolished in 2001 as part of an overhaul of the Council of Ministers' administrative structure. Its duties were subsequently transferred to the standing committee of the Council of Ministers.

In 2002 a new *Board on Sustainable Development* was established, as a consultative body attached to the Prime Minister's office. The Board is chaired by the Minister of Environment and includes high-level representatives of other ministries, as well as scientists, representatives of business and industry, and NGOs. Its purpose is to contribute to co-ordination and monitoring of the implementation of the long-term sustainable development strategy.

Economic planning and strategic decision-making

Poland recognises the importance of integrating environmental objectives into *macroeconomic policy*. Economic development in the past ten years has been favourable from the standpoint of reducing pollution and intensity of energy and raw materials use as input to production. The strategy adopted by the Ministry of the Economy has been to seek *win-win situations* in which environmental protection is accompanied by modernisation of the production system.

The *medium-term economic development programme* adopted by the Council of Ministers for the period 1999-2002 integrated concerns regarding the environment and natural resources and emphasised the new environmental pressures arising from rapid economic growth and increased consumption. It stated the government's intention to implement a sustainable development strategy and recommended that the *share of GDP devoted to environmental investment* be maintained or even increased. This document places great emphasis on sustainable development. Specific measures aimed at mitigating new pressures associated with modernisation of the economy include promotion of the principle of extended producer responsibility for end-of-life products, environmentally friendly agricultural production, internalisation of the environmental costs of production, and modernisation of waste management methods.

Current economic and environmental planning is much influenced by the *EU accession process*. To meet EU requirements, Polish authorities must take decisions concerning quantitative targets, legislative changes and investments to be planned over time. Compliance with environmental legislation is the subject of one chapter of the accession agreement; this chapter was provisionally closed in 2001, indicating that the European Commission was satisfied with Poland's compliance plan. However, there are serious concerns about the overall state of the country's public finance and its capacity to face the enormous challenge of meeting new environmental management commitments. Following accession, Poland will probably be eligible to use EU Structural

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Funds. It will be important for authorities to ensure the integration of environmental concerns into sectoral development projects (e.g. transport, energy, agriculture) financed by Structural Funds. It will be equally important to clarify *national priorities* and to ensure that environmental concerns are fully integrated into relevant decisions.

1.3 Integration of environmental concerns into sectoral policies

Besides adequate co-ordination among agencies, sustainable development requires integrating environmental objectives into *sectoral economic policies* (e.g. those concerning energy, transport, agriculture, forestry). Integration of such objectives is facilitated by the broader ongoing process of transition to a market economy, and by ongoing reform to bring Poland's political, economic, social and administrative structures into line with EU requirements. Since public authorities and Polish society in general are experiencing change in many different areas, it will be important to be vigilant to ensure further integration of environmental considerations into economic development.

Within the framework of the National Sustainable Development Strategy (1999-2025) and as part of the EU accession process, Poland has developed *strategies for numerous economic sectors* and there has been some attempt to integrate sustainable development concerns. Among these strategies are:

– National Development Plan (2003);
– National Regional Development Strategy (2000);
– National Transport Policy for 2001-15 (2001);
– Renewable Energy Development Strategy (2001);
– Coal Mining Reform for 1998-2002 (1998);
– Coherent Structural Policy for Rural Development and Agriculture (1999);
– Tourism Development Strategy for 2002-06 (2001).

Energy

Energy intensity (per unit GDP) decreased by 37% in the 1990s, reflecting the restructuring of energy intensive industry (e.g. iron and steel) and the modernisation of manufacturing and fuel combustion processes. Poland's energy intensity (nearly 20% above the OECD average) is still one of the highest among OECD countries (Figure 2.3). In recent years a number of steps have been taken aimed at improving energy efficiency in various sectors. For example, with the objective of increasing the efficiency of electricity and heat production, PLN 150 million was invested from the EcoFund between 1993 and 2000 in shutting down over 800 old coal-fired boilers

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and 12 000 tile stoves and replacing them with modern combustion facilities (Chapter 8, Section 1.1). Targeting improvements in the residential and commercial sector, the 1998 Thermo-Modernisation Act established higher heating efficiency standards for new buildings and sketched out measures to reduce energy use in existing buildings. Using co-financing for individual and institutional investors, the thermo-modernisation scheme has resulted in moderate household energy savings. However, there is further room to improve energy efficiency at large combustion plants and in the residential and commercial sectors, whose energy consumption is still about twice that in OECD Europe countries with comparable climates.

The Polish energy sector has experienced *major reform* in the past five years. The 1997 Energy Act established a new regulatory authority to monitor competition in the energy sector and compliance with certain environmental objectives. In 2001 electricity prices were liberalised at the generation level and large electricity users (over 40 GWh annually) were authorised to negotiate directly with power generators. As electricity prices have increased in order to partially internalise the environmental costs of production, consumers have a stronger incentive to limit consumption. The impact was shown in a sharp reduction of GHG emissions in 1998 and 1999. In June 2000 several amendments to the Energy Act went into effect, with the purpose of making the energy market more transparent, lowering transaction costs, internalising external costs and promoting alternative energy sources. Under these amendments, companies are now required to purchase electricity or heat produced to some extent from renewable or unconventional energy sources.

Coal (hard coal and lignite) continues to dominate Polish fuel supply (Chapter 6, Section 3.2). From 1990 to 2000 overall primary energy supply contracted by 10% and there was some fuel switching from coal to oil and gas. Coal's share in the fuel supply shrank from 75 to 62% during this period, while the share of oil increased from 13 to 22% and that of natural gas from 9 to 11%. Coal still represented 95% of the fuel used to generate electricity in 2000, although overall coal use has declined by 20% since 1990 (Figure 2.3). Part of the reason for coal's continued importance is that domestic production is heavily subsidised. This artificially lowers the market price of domestic coal, giving it an advantage over other fuels on the market. As the majority of coal mines are in economically depressed areas where unemployment is very high, it has been difficult to adjust subsidies even though it is recognised that they are environmentally harmful. The *share of renewables* (mainly biomass) is increasing (to 4.7% in 2000) and is projected to increase further (to 7.5% by 2010 and 14% by 2020) under the 2001 National Programme on Renewables.

In the late 1990s the government initiated *restructuring of the coal mining sector* which included some plans for improving the sector's environmental performance.

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For example, this programme incorporated the targets of desalination of effluents (which affect a very large part of Polish surface waters) and limiting surface storage of waste. It also established a timetable for payment of arrears on emission fees and fines and called for shutting down mines unable to meet environmental performance standards. Given the social implications of closing mines or increasing operational costs, the programme's effects have been limited. Very few mines have incorporated its environmental objectives into their daily operations. In the few cases where individual mining companies have established environmental plans, they typically feature neither quantitative targets nor specific measures.

The coal mining sector currrently receives *significant State aid* for the restructuring programme. The 2002 OECD review of regulatory reform in Poland recommended that measures be taken to enhance the transparency of allocation of State aid. Specifically, use of fiscal instruments (e.g. a tax on electricity consumption intended to compensate electricity generators that purchase relatively expensive domestic coal) is recommended over direct subsidisation of sales. The OECD review also called attention to the distortionary effect on competition of long-term supply contracts in the electricity sector.

Transport

In 2000, *energy consumption* by the transport sector totalled 9.5 Mtoe, a 25% increase over 1990. This increase was relatively small compared to the doubling of road traffic volume (vehicle-kilometres travelled) during the same period and reflects improvements in average fuel efficiency accompanying modernisation of the vehicle fleet (Chapter 7, Section 1.2). Remarkably, overall air emissions from transport actually decreased significantly in the 1990s despite the rapid increase in fleet size, owing to improved fuel efficiency and environmental performance of vehicles as well as better fuel quality. However, the transport sector still contributes a major share of emissions of NO_x, NMVOC and CO emissions (Table 7.2).

Integration of environmental objectives in *national transport policy* progressed in Poland in the 1990s, with environmental concerns explicitly given high priority in the national sustainable development strategy (Poland 2025: A Long-term Strategy for Sustainable Development) and the two national transport policies (the 1995 Transport Policy and the 2001 National Transport Policy for 2001-15). Objectives concerning moderation of the transport sector's negative environmental impacts are systematically integrated into sub-national transport plans. The 1994 Land Use Planning Act stipulates that transport infrastructure development should comply with general land use planning regulations, which require that environmental and public health concerns and landscape values be taken into account.

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Major road construction projects are subject to *environmental impact assessment* (Chapter 7, Section 1.4). The 2001 National Transport Plan includes an ambitious new road construction plan (Chapter 7, Section 2.2). Consistency of projects begun under this plan (or the previous 1993 motorway construction programme) with sustainable transport policy needs to be demonstrated. In practice, these projects will compete for funding with other types of investment required in order to make progress towards an environmentally sustainable transport sector. Development plans have been subjected to thorough environmental assessments, with siting and construction procedures handled separately. Experts designated by the Ministry of the Environment carry out environmental impact assessments, often complemented by studies of impacts on farmland, forests and cultural heritage conducted for other ministries.

Agriculture

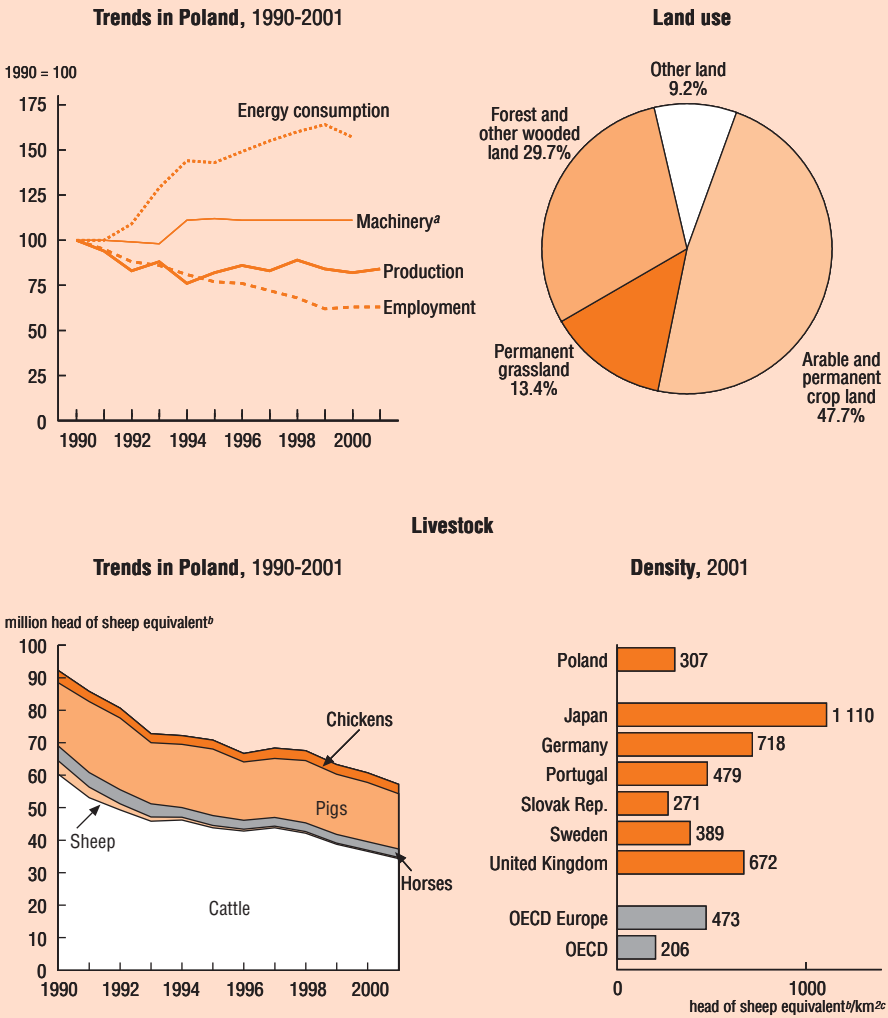
The *economic and social importance* of the agricultural sector is much greater in Poland than in many other OECD countries. It is characterised by low-intensity traditional agriculture dominated by small, privately owned farms, especially in the eastern part of the country. Employing some 19% of the total labour force, agriculture is the main source of income for over 4 million people (more than 40% of the rural working population). Following privatisation of State farms and State-owned co-operatives (particularly in western Poland), public ownership of agricultural land dropped from 20% in 1990 to 8% in 2000. *External environmental costs* from agriculture are low in Poland compared with those in many other OECD countries, although 61% of total land area (312 000 km^2) is used for agricultural production (78% arable, 22% grassland). Intensity of use of fertilisers and pesticides in Polish agriculture, and the intensity of livestock operations, are still several times below the OECD averages (Figure 6.1).

Poland has recently begun looking at ways to incorporate *environmental objectives* into agricultural policies, with the aim of reducing nutrient run-off and accentuating agriculture's contribution to flood control and climate protection. Despite the relatively light environmental pressure of the Polish agricultural sector, nutrient run-off remains a major concern, especially in the context of Poland's HELCOM commitments to limit inputs to the Baltic Sea (Chapter 8, Section 1.4). In 2001 Poland presented a strategy for protecting water resources against nitrate run-off from agricultural sources and the Ministry of Agriculture began to offer support for agri-environmental measures at Natura 2000 sites (Chapter 5, Section 2.2). The Second National Environmental Policy calls for intensive afforestation of areas unsuitable for agriculture, an objective with important implications for flood control and climate protection efforts.

In 1999 the *producer support estimate* (PSE) for Poland was PLN 13 billion. Transfers to agriculture are 90% provided through market price support, with the remaining 10% of PSE provided in the form of subsidies for use of inputs to stimulate

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Figure 6.1 **Agriculture**



a) Tractors and combined harvester-threshers in use.
b) Based on equivalent coefficients in terms of manure: 1 horse = 4.8 sheep; 1 pig = 1 goat = 1 sheep; 1 hen = 0.1 sheep; 1 cow = 6 sheep.
c) Of arable, permanent crop land and permanent grassland.
Source: OECD; FAO.

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productivity (certified seeds, seed potatoes, new animal breeds) and to prevent increases in soil acidity (use of lime). In the late 1990s support to producers (PSE as % of total value of production) reached 25%, but it is still well below the OECD average. In the late 1990s approximately PLN 285 million per year was provided for use of high-quality seeds and breeding animals and PLN 100 million for use of lime fertilisers. Support to agriculture (especially market price support) as measured by PSE rose by about 20% in the 1990s, mainly due to a greater decline in world prices than in producer prices for grains and milk. Use of industrial fertilisers has been increasing, partly due to preferential credit supplied to farmers for this purpose.

1.4 Market-based integration: greening of sectoral taxation and price signals

Energy prices and taxation

In the 1990s *energy prices for households* increased steeply; between 1991 and 2001 they increased by 66% for electricity and by 179% for natural gas (in real terms). When adjusted for purchasing power parities, energy prices for households in 2001 were higher than the OECD average by 44% for electricity, 80% for light fuel oil and 66% for natural gas (Table 2.3). High prices are a strong incentive for households to use less energy.

Poland has taken steps to strengthen economic incentives for energy conservation, but there is still considerable scope to strengthen price signals in the *industrial sector*. Fuel prices for Polish industry, low compared with those in other OECD Europe countries (Table 2.3), could probably be adjusted upwards without jeopardising competitiveness. Taxation of fuels used in stationary combustion plants is so far limited (Table 6.2). While light fuel oil for heating purposes (e.g. in households) is subject to a 7% excise duty introduced in 1999, most fuels used in industrial stationary combustion (e.g. coal, heavy oil) are exempt. Exemption of fuels with such high pollution potential from taxation provides no incentive to choose less polluting fuels. Consideration should be given to expanding taxation of non-automotive fuels, with some differentiation according to environmental impacts.

Subsidisation of coal production (hard coal and lignite) distorts domestic market prices in favour of this relatively pollution-intensive fuel. Between 1998 and 2001, direct State subsidies to support coal production increased by 97% (from EUR 199.7 to 393.8 million), even as output declined by 10% (from 116 Mt to 104 Mt). In other words, direct subsidisation per tonne increased from EUR 1.7 in 1998 to EUR 3.8 per tonne in 2001. Indirect subsidies take two forms: cross-subsidies from more to less profitable coal mines (carried out within industrial

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Table 6.2 **Selected environmentally related taxes on energy and transport,** 2002

Stationary Combustion fuels	Excise tax	(+7% VAT)	PLN/1 000 litre
		Light fuel oil used for heating purposes	160
	Exemptions	Coal, heavy fuel oil	
	Revenue 2000	. .	
Transport fuels	Excise tax	(+22% VAT)	PLN/1 000 litre
		Leaded petrol	1 629
		Unleaded petrol	1 464
		Diesel fuel:	
		Sulphur content less than 0.005%	980
		Sulphur content range 0.005-0.05%	1 027
		Sulphur content range 0.05-0.2%	1 090
		Other diesel fuels	1 104
	Exemptions	Petrol containing 4.5-5% ethanol; diesel fuel containing at least 10% by volume regenerated waste oil	
	Revenue 2000[a]	PLN 13 024 million	
Vehicle sales tax	Excise tax		In % of value
		Vehicle with engine capacity > 2 000 cm^3	*12*
		Vehicle with engine capacity < 2 000 cm^3	*3*
	Exemptions	. .	
	Revenue 2000	PLN 700 million	
Vehicle import Duty		Differs according to country of origin	Minimum (EUR)
		Passenger cars (up to 4 years old) non-EU, 35% of vehicle value	1 250
		Passenger cars (older than 4 years) non-EU, 35% of vehicle value	2 500
	Exemptions	. .	
	Revenue 2000	PLN 900 million	

a) 30% of revenue earmarked for road construction and maintenance.
Source: EU; Ministry of Finance, Polish Customs Service, Polish Official Legislative Record; OECD.

federations) and cross-subsidisation of coal exports through domestic sales. In 1999, EUR 458 million was provided as a cross-subsidy from domestic coal consumers (who pay 50% more for Polish coal than do buyers on the world market) to support the export of 26 Mt of coal. In the same year domestic consumers paid EUR 33 per tonne for Polish coal, which was sold on the world market at EUR 21 per tonne; extraction costs were about EUR 35 per tonne. Thus, the domestic coal industry – despite much progress – is still not competitive. The 2002 OECD study of regulatory reform in Poland recommended ensuring that cross-subsidisation of exports is phased out.

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Transport prices and taxation

Use of *vehicle taxation* expanded in the 1990s through application of vehicle excise duty, annual vehicle taxes and company car charges (Chapter 7, Section 1.4). Some attempt has been made to reflect environmental concerns through differentiated rates (Table 6.2). Vehicle excise duties, introduced in 1993, have been differentiated by engine size since 2000. Cars with engine capacity over 2 000 ccm are taxed at 12% of their value; those under 2000 ccm are taxed at only 3%. This is a disincentive to purchase larger vehicles. The annual vehicle registration fee charged for lorries and buses is differentiated in favour of those with smaller loading capacity (two categories). In 2000 a special tax was announced for company cars, differentiated according to engine size and type of fuel. Most transport taxes so far are aimed at influencing car ownership choices rather than patterns of car use. A recent study found that about 70% of the total external costs of the transport sector were internalised through transport-related excise duties and VAT (Chapter 7, Section 1.4). Tax rates should be reviewed and adjusted with a view to full internalisation of these costs.

When adjusted for purchasing power parities, *road fuel prices* are among the highest in the OECD (Figure 7.2). Taxes on motor vehicle fuels increased substantially in real terms during the 1990s (for both petrol and diesel) and have been increasingly differentiated to reflect external environmental costs (Table 6.2). The tax on unleaded petrol is lower than that on leaded, helping to accelerate the phase-out of leaded fuel, which was almost complete in 2002. The excise tax on diesel fuel is differentiated according to sulphur content. An 11% value added tax (VAT) on motor vehicle fuels was introduced in 1993. It was raised to 22% (its present level) in 1994.

1.5 Integration of environmental concerns into spatial and project planning

Spatial planning

In the late 1990s the State Council for Spatial Planning published a *national spatial planning* "*concept*" (pursuant to the 1994 Land Use Planning Act). Since 2001 spatial planning has been undergoing a period of transition, with new powers being delegated to regional and local levels, new legal provisions, and the need to adopt regional and local plans within a limited time frame.

The *Second National Environmental Policy (2000)* identifies spatial planning as an important environmental management instrument which makes it possible to ensure territorial integration and cohesion. It classifies territories according to the types of environmental issues that need to be addressed and identifies those of particular interest with respect to environmental protection (e.g. Poland's "green lungs" in the north-eastern part of the country). It also sets short- and medium-term objectives for integrating environmental objectives into spatial planning.

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Regional plans are being used to implement national policy. Eleven have been adopted and five others are being prepared. The deadline for revising these plans and bringing them into conformity with the national concept has been extended several times. Co-ordination of these plans is important, as the two planning levels must be consistent with each other if the system is to work effectively. In practice, regional plans have frequently been changed in favour of increased building and higher density. Strengthening regional planning, inter alia to protect the environment and ensure that the obligation for local plans to comply with regional plans is being met, would be conducive to environmental protection. In particular, it might be necessary to strengthen the content, ranking and *legal force of spatial planning* with a view to satisfying and balancing: i) housing needs (estimated at 1.2 million units in the coming decade); ii) infrastructure needs arising from economic development, urban sprawl and tourism; and, iii) the need to conserve natural areas and urban green spaces.

Environmental impact assessment

Since 1990 *environmental impact assessment (EIA)* has been required for any development project that could have a significant negative impacts on the environment. Commissions overseeing this procedure exist at the national and regional levels. Training is regularly provided for government officials and contracting parties to improve the quality of assessments. In 2000 and 2001 Poland's EIA requirements were modified to be in line with the EU's EIA Directive, the European Convention on Environmental Impact Assessment in a Transboundary Context, the Aarhus Convention and the draft EU Directive on strategic environmental assessment (SEA).

Poland's massive *motorway expansion* programme has brought EIA to the forefront in recent years (Chapter 7, Section 2.2). In particular, EIAs are considered necessary with respect to the proposed construction of the A1, A2, A3 and A4 motorways, as protected areas are at risk. Documentation from EIAs for major transport infrastructure projects to date shows that environmental protection typically accounts for 5 to 20% of the cost of a motorway project. Environmental protection expenditure represented 18% of the cost of the Bielany Wroklawskie-Nogawczyce section of the A4 and 11% of that of the Kra by-pass, which is also a section of the A4. The EIA procedure has been useful in identifying and proactively addressing the potential environmental impacts associated with the motorway programme.

2. Efficiency and Cost-effectiveness of Environmental Management

Within a rapidly changing socio-economic context (i.e. transition to a market economy, the EU accession process) Poland has made *major changes to its institutional and legislative structures* for environmental management. Two national environmental

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policies (published in 1991 and 2000) establish broad environmental management principles. Polish authorities have demonstrated their good judgement in keeping and further developing traditionally strong environmental policy instruments, particularly the monitoring and inspection system, which is an asset for environmental policy implementation. The approach of building the new on the foundation of the old system (or its strongest elements) appears to effectively minimise unnecessary change and conserve valuable social capital.

2.1 Institutional framework for environmental management

In recent years Poland has moved towards *decentralisation of responsibilities* for policy implementation and environmental management. The Ministry of the Environment (MOE) is primarily responsible for establishing environmental standards, drawing up national strategies and preparing legislation. The Inspectorate for Environmental Protection, which operates under MOE supervision, is responsible for operating the national environmental monitoring system (e.g. establishment of reference laboratories, certification of methodology and measures) and regulating transboundary movement of waste and the largest and most hazardous industrial facilities. In 1999 responsibility for routine inspections of small and medium installations was transferred to the voivodship inspectorates. Policy implementation is now the responsibility of *territorial authorities*, including the 16 voivodships (regions) and 371 poviats (counties) created on 1 January 1999 as well as the 2 458 gminas (municipalities) which have existed since 1990. The territorial authorities are responsible for drawing up and executing plans in line with national strategies. The 2001 Environmental Protection Act solidified this decentralisation of responsibilities, setting out the respective powers of territorial authorities with respect to regulation, inspection and enforcement. Poland's decentralisation process conforms to the subsidiarity principle common in EU countries. Some fine-tuning may be necessary to address administrative overlaps and inconsistencies, which are increasing transaction and regulatory costs (Figure 6.2).

Between 1997 and 2000, Parliament passed 207 laws designed to bring Polish legislation into line with that of the EU. Since 2000, Poland's *environmental legislation* has been rapidly evolving (Table 6.3), reflecting the effort to bring national laws into line with the EU acquis. Managing decentralisation reform in this context is a challenge for Polish authorities that will require some institutional strengthening and rationalisation of responsibilities. The Second National Environmental Policy (2000) recognises the need to strengthen institutions, especially regional water boards and environmental departments of voivodships and poviats, in order to help them cope with new obligations under the decentralised system. For example, implementing the EU's integrated pollution prevention and control (IPPC) permitting system at a projected 2 500 installations will require a corresponding strengthening of resources and of institutional capacity at the

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Figure 6.2 **Key government institutions with environmental management responsibilities**

	Leadership centrally appointed	Leadership locally elected	Organised by river basin
Central government	**Ministry of the Environment** - Ambient air quality standards - Technology and emissions standards - Product standards - Charge and fine rates and modalities - Rules for permitting - Control of National Environment Fund **Inspectorate for Environmental Protection**[a] - Environmental monitoring - Inspections and enforcement for special facilities - Administration of fines and other sanctions		
16 Voivodships (regions) Coexistence of centrally appointed governor and locally elected authorities	**Voivodship Governor's office** - EIA of hazardous installations - Permits for large and hazardous polluters - Levying and control of water discharge and waste charges - Control of Voivodship environment funds	**Voivodship Environmental Inspectorate**[b] - Inspections and enforcement - Levying and negotiating non-compliance fines, other sanctions - Environmental monitoring	**Regional Boards for Water Management** Management of water resources
371 Poviats (counties) Medium level of locally elected government		- Permits for small and medium polluters - EIA of investment projects - Control of Poviat environment funds - Environmental monitoring - Development of sustainable development plans	
2 458 Gminas (municipalities) Lowest level of locally elected government		- Halting operation of polluting facilities - Municipal waste management - Control of local environment funds - Environmental monitoring - Development of action plans for sustainable development	

a) National Inspector-General reports to the Minister of the Environment.
b) Voivodship Environmental Inspector reports to both the National Inspector-General in Warsaw and the Voivodship Governor.
Source: OECD.

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regional (voivodships) and county (poviat) levels over the next ten years. Since 2001 pilot projects have been launched in three voivodships to evaluate the administrative implications of IPPC; lessons learned should be documented and disseminated.

Table 6.3 **Major environmental legislation**[a]

1973	Statute on the Protection of Agricultural and Forest Lands (amended in 1982)
1977	Statue on the Polish Fishing Zone
1980	Statute on the Protection and Shaping of the Environment (amended in 1989, 1990, and 1993)
1984	Statute on Land Use Planning
1986	Statute on Nuclear Law
1990	Statute on Water
	Decree on Environmental Impact Assessments
1991	Statute on the State Inspectorate for Environmental Protection
	Statute on Forests
	Nature Conservation Act (amended in 2000)
1994	Land Use Planning Act
1995	Act on Protection of Agricultural and Forest Land
	Act on Prevention of Pollution by Ships
	Hunting Act
1996	Sea Fishery Act
1997	Waste Act
	Energy Act
	Forest Act
	Protection of Animals Act
1998	Thermo-Modernisation Act
2000	Act on Access to Information on the Environment and its Protection and on Environmental Impact Assessments
	Act on Nuclear Energy
2001	Act on Handling Substances that Deplete the Ozone Layer
	Organic Farming Act
	Environmental Protection Act
	Waste Act
	Road Transport Act
	Packaging and Packaging Waste Act
	Act on Economic Operators' Obligations in Managing Certain Types of Wastes and on Product and Deposit Charges
	Public Water Supply and Public Waste water Collection Act
	Forest Reproductive Material Act
	Genetically Modified Organisms Act
	Allocation of Farmland for Afforestation Act
	Water Act

a) Statutes are legal instruments passed by a minister, Council of Ministers or high-level committee. Acts are approved by Parliament
Source: MOE.

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The National Environmental Policies

The objectives established in the *First National Environmental Policy*, adopted by Parliament in 1991, were described in the previous OECD Environmental Performance Review of Poland. To a large extent these objectives have been met, as demonstrated by large reductions in polluting emissions to air and water (Chapters 2 and 3). This success is clearly due to both environmental policy implementation and economic restructuring. Public sector investment in environmental protection increased four-fold between 1990 and 2000 (from PLN 451 million to PLN 4.9 billion, in 1995 prices).

The *Second National Environmental Policy* (2000) established short (2000-02), medium (2002-10) and long-term (2010-25) objectives related to: 1) rational use of natural resources; 2) improving the quality of the environment; 3) environmental policy tools and instruments; 4) programme implementation and monitoring; and, 5) international co-operation. Some short-term objectives such as adoption of laws transposing EU legislation or international conventions have already been met. The *medium and long-term objectives* are very ambitious. Achieving them will require establishing and implementing new regulations on: 1) waste management; 2) voluntary agreements with firms; 3) liability for environmental damage; 4) regulation of products containing heavy metals and persistent organic pollutants; and 5) noise and vibration. The Policy calls for the use of indicators to regularly monitor environmental quality. It also envisages an expanded role for spatial planning in achieving territorial development objectives and a greater role for economic measures, particularly product charges, deposit systems and tradable emission rights.

Environmental expenditure

Reported *pollution abatement and control (PAC) expenditure* in 2000 was PLN 13.8 billion (2.0% of GDP); the majority (61%) was borne by industry (Table 6.4). Most (57%) of public expenditure was in the form of investment, while industrial expenditure (i.e. by business in all sectors) was dominated by current expenditure (60%). As could be expected, the greatest portion (83%) of public PAC investment was for waste water treatment infrastructure. For industry, priority PAC investment areas were air and climate protection (66%), while most PAC expenditure was for air protection (56%) or waste management (21%). In addition to PAC expenditure, *other environmental expenditure* (i.e. on nature and biodiversity conservation) was about PLN 293 million, mainly by the public sector.

Since 1997 the cost of Poland fully implementing the *EU environmental acquis* has been the subject of various estimates. Estimates of the overall environmental investment required range from EUR 22 billion to EUR 50 billion (Chapter 8, Section 2.1). Spread over ten years, this would amount to between 1.2 and 2.7% of GDP per year. Estimates vary, depending on the envisaged method of implementation of the EU environmental acquis and on the projected growth rate of GDP.

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Table 6.4 **Environmental expenditure,** 2000

(PLN million)

	Total	Public			Industry		
		Total	Investment	Current expenditure[a]	Total	Investment	Current expenditure[a]
Total env. Expenditure[b]	14 068	5 647	3 080	2 568	8 421	3 326	5 095
% GDP	*2.1*	*0.8*	*0.4*	*0.4*	*1.2*	*0.5*	*0.7*
PAC expenditure[c]	13 775	5 354	3 076	2 278	8 420	3 326	5 095
Air	5 788	749	211	538	5 039	2 197	2 843
Waste water	4 715	3 159	2 553	605	1 556	694	862
Waste	1 820	484	251	233	1 337	273	1 064
Soil and groundwater	409	28	2	26	381	65	316
Noise	49	38	36	2	11	11	–
Other[d]	993	897	23	874	95	86	10

a) Breakdowns by media are OECD Secretariat estimates.
b) The sum of PAC expenditure (as detailed below) and expenditure on conservation of biodiversity and landscapes.
c) Sum of parts may not equal whole due to rounding.
d) Includes expenditure for protection against radiation, environmental education and training.
Source: OECD.

Table 6.5 **Environmental charges and fines entering the National Fund**[a]

(PLN million)

	1995	1996	1997	1998	1999	2000
Pollution charges	1 813.8	1 744.6	2 168.9	2 013	1 462.5	1 669.5
Air pollution	658.2	750.7	865.1	719.8	646.4	677.1
Waste water	699	498	825.8	861.7	459.2	551.1
Water	173.7	212.8	229.4	239.8	209.3	206.3
Waste	282.9	283.1	248.6	191.7	147.6	235
Fines for non-compliance	214.9	195.5	277.9	311.3	191.1	404.9
Waste water	77.6	99.1	133	123.9	72.9	151.7
Air pollution	102.1	52.8	56.2	22.8	45.2	25
Noise pollution	3.4	4.9	5.7	3.7	6.3	4.8
Waste disposal	31.8	38.7	83	160.9	66.7	223.4
Total	2 028.7	1 940.1	2 446.8	2 324.3	1 653.6	2 074.4

a) Charges are levied for allowable emission levels; lines are levied as penalties for non-compliance with environmental standards
Source: CSO; MOE.

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Financing

Environment funds were created at the beginning of the transition period to provide financing for environmental projects at various administrative levels. Today they include the National Fund for Environmental Protection and Water Management (hereafter referred to as the National Fund), 16 voivodship funds, over 370 poviat funds and some 2 500 municipal funds. The large number of funds and a lack of transparency in their funding decisions likely lead to inefficiencies. One special environment fund, the EcoFund, manages funds received as part of international debt-for-environment swaps (Chapter 8, Section 1.1). On the national and regional levels, environment funds operate as independent public legal entities, managed by Executive Boards under the supervision of Supervisory Councils but with government-appointed managers and council members. Regional environment funds are the instruments of the administration elected at voivodship level, whereas the Minister of the Environment oversees the National Fund. Apart from the EcoFund, environment funds operate as *transfer mechanisms*, receiving revenue mainly from pollution charges and fines (in line with the PPP) and financing environmental projects.

Historically, environment funds have played an essential role in *financing environmental investments*. Their overall share in investment funding has fallen from 50% in 1992 to less than 30% today. The funds provide grants and soft loans, and sometimes take equity stakes in environmental projects. About 25% of collected pollution fees go to the National Fund and 75% is split between funds at the voivodship, poviat and gmina levels. In addition to designated portions of pollution charges and non-compliance fines, the National Fund and regional funds dispose of some other resources such as foreign assistance and earnings from their own financial operations, with the later now exceeding revenue from fees and fines. During the initial transition period environmental funds provided an important, reliable source of financing at a time when little such financing was available from commercial banks (Table 6.5). Commercial creditors have become increasingly active in recent years, which has raised concerns regarding competition from environmental funds.

Several *shortcomings in the way environment funds operate* were pointed out in the 2001 and 2002 OECD Economic Surveys of Poland. Although these criticisms do not apply equally to all funds, they focus on transparency, rigour in project selection, consistency with strategic objectives, accountability, and in a few cases the influence of special interest groups. A recent review of the National Fund's project portfolio proposed more systematic use of cost-effectiveness as a criterion for project selection. The Second National Environmental Policy projected a gradual reform of the environment funds' income base. Reduced environmental charges and fines would be offset by the introduction of a system of product charges. This reform would give a greater

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role to revolving financial institutions and would require a larger contribution from households. These planned changes reflect in part the aim of giving more equal treatment to enterprises in a European context.

2.2 Policy mix and cost-effectiveness

Poland has broadened and diversified the *mix of instruments* used to implement environmental policy. Regulatory requirements, which continue to be the basis of environmental policy implementation, are often associated with economic instruments (e.g. pollution charges). More recent developments are shaped by the need for conformity with the EU environmental acquis. Cost-effectiveness should be more explicitly present in decision criteria for choosing policy instruments.

Monitoring of environmental quality is carried out through the extensive national, regional and local networks that make up the state environmental monitoring system. Activities are carried out within the framework of national monitoring programmes (e.g. the programme for 1998-2002). A report on the state of the Polish environment is published every four to five years, and regional environment reports every year or two. Self-monitoring has been an important part of emissions monitoring in Poland for many years. However, it has focused on pollution charges. More detailed types of self-monitoring have been limited to the most polluting installations (e.g. the list of the 80 worst polluters). The level of information and techniques for assessing emissions is poor at many smaller installations. Waste monitoring is especially problematic; data on waste arisings and on management of disposal facilities (especially the many small landfill sites) are unsatisfactory. So far, the development and use of *quantitative indicators* as communication tools related to environmental pressures and trends, and the effectiveness of policy implementation in limiting these pressures, has been very limited. Development and regular publication of such indicators as a means of evaluating policy effectiveness and improving accountability should be given high priority.

Regulatory instruments and enforcement

Separate *emission permits* are required for discharges of polluted waters, emissions of gaseous pollutants and waste disposal. Voivodships issue permits for large projects, setting source-specific emission ceilings to prevent excessive pollutant concentrations in ambient air and water. As part of the transposition of the EU Directive on integrated pollution prevention and control (IPPC), the 2001 Environmental Protection Act introduced a system of integrated permits for large polluting sources. The integrated permits, which will be extended to cover direct and indirect discharges to air, water and soil, will include stipulations concerning waste minimisation, energy efficiency,

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resource utilisation, prevention of accidents and restoration of sites once industrial activity has ceased. Existing permits, issued based on ambient quality standards, will gradually be replaced by permits based on a technology-oriented best available techniques (BAT) approach in line with the EU Directive on IPPC. The high cost of implementing BAT at existing installations will have positive environmental implications, but not necessarily at the lowest cost.

Polluters that violate the conditions in their permits are subject to *non-compliance fines*, which are calculated as a multiple of regular emissions charges (usually ten times). Only 15 to 20% of total fines levied are collected, as environmental inspectors have the right to defer or even dismiss fines if polluters make investments aimed at improving compliance. Voivodship environment inspectors have the right to close discharging installations operating without (or in flagrant non-compliance with) permits. Receipts from pollution fines in 1990 were PLN 47.8 million. The most common reasons for fines were excessive discharges to air and water. Firms can avoid paying fines by committing to bring their facilities into conformity with regulations within five years. If they succeed in doing so, the fines are deferred; otherwise they are increased by 50%. Some 70% of the firms that have signed investment agreements have met their commitments to date.

The *Inspectorate for Environmental Protection (IEP)* enforces environmental regulations and ensures compliance with discharge permits. It is directed by an Inspector-General who reports to the Minister of the Environment. The IEP is responsible for monitoring environmental quality, ensuring that permitted activities comply with regulations, and reducing environmental risks. Set up in 1980, it has been restructured several times since 1991 and now has wide responsibilities. There are inspectorates in each voivodship, allowing effective decentralisation and deployment of staff (2 400 persons) throughout the country. In the voivodships, inspectorates are accountable to the Inspector-General in Warsaw and to the Voivod (elected regional governor). The IEP, which has *wide enforcement powers*, can impose fines when maximum emission limits are exceeded (1 260 cases in 2001). It can also order closure of plants in breach of regulations (136 plants were closed between 1992 and 1998). Inspectors' decisions can be appealed to the Administrative Court. The IEP also has the option of referring the most serious cases to the court (43 referrals in 2001).

In the late 1990s, about 16 000 inspections per year were carried out (Table 6.6). The *probability of being inspected* is therefore once every three or four years, but some activities are inspected once or more per year. About 1 070 enterprises considered to pose exceptional risk are kept under particularly close surveillance. On average, 200 risk incidents are recorded every year. A major challenge for the Inspectorate will be implementing the EU's IPPC permitting system. In 2002 it was estimated that

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about 2 500 plants would ultimately be subject to IPPC permitting. Beyond permitting of large and complex plants under the IPPC process, it will be increasingly important to monitor small and medium-sized plants more closely and to address the problem of solid waste management more comprehensively. The 600 environmental inspectors currently employed by voivodship inspectorates will need training on EU regulations, as well as on integrated inspection and permitting techniques.

During the 1990s the IEP developed and made public the "*list of 80*" identifying the worst polluters. This list helped focus scarce enforcement resources and the attention of NGOs on critical sources of pollution. The enterprises named came under strong pressure from both the Inspectorate and the general public to reduce pollutant emissions. The list of the 80 worst polluters has become more influential over the past decade, as firms have found themselves under increasing competitive pressure. Difficulties in attracting investors and even in increasing commercial debt have prompted many to accelerate their environmental compliance efforts. By 2000, 32 enterprises had been removed from the list but a few new plants had been added. From a pollution perspective the results of this "name and shame" programme have been spectacular: total dust emissions from the original 80 polluters have been reduced by 90%, their atmospheric emissions by 66% and their waste water discharges by 33%. The recent extension of Local Agenda 21 activities in Poland has further strengthened the role of local stakeholders in sustainable development (Chapter 6, Section 3.3).

Table 6.6 **Trends in inspections by the Inspectorate for Environmental Protection**

	1998	1999	1st half 2000
Total number of inspections	16 617	15 976	8 583
Number of intervention inspections	3 287	2 994	1 681
Number of inspected entities	13 219	13 452	7 502
Total value of fines imposed (million PLN)	311.3	191.0	143.5

Source: Inspectorate for Environmental Protection.

Economic instruments

An ambitious system of *environmental charges* was introduced in 1980. There are currently charges for water consumption, waste disposal, pollutant emissions to air and exploitation of natural resources (Table 6.7). The charges have two purposes.

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First, they are meant to raise revenue that is channelled to environmental investment through environment funds (Chapter 6, Section 3.4). Second, they send price signals concerning the true cost of using the environment and therefore stimulate improvements in environmental performance.

The environmental charge system has fulfilled the first, *revenue-raising function* reasonably well. In 1999 the charges generated totalled PLN 1.6 billion (0.26% of GDP and 1.3% of total tax revenues). Collection rates were high, well over 90% (close to 100% if the coal mining sector is set aside). Important elements of successful collection include a good system design, a decade of experience and familiarity with its operation, and strict elimination of administrative discretion in deciding whether fees should be paid. Concerning tax liabilities, until recently the authorities have not been allowed to negotiate the amount or schedule of payment with polluters. Forgiveness and offsets of pollution charges were also strictly prohibited until the 2001 Environmental Protection Act widened the possibilities for administrative discretion. As a result, the collection rate is already falling, and is expected to fall further.

The charges fulfil their second function – sending adequate *price signals* – much less effectively. Polish air pollution charges are high compared with those in other countries that use them primarily for revenue raising (France, Japan, Netherlands, United States), but they are several times lower than emission fees and taxes with incentive purposes (Germany, Norway, Sweden). The rates of Polish air pollution charges are established based on criteria unrelated to abatement costs, implying that de facto they are not designed with incentive effects in mind. The rates for air emissions remain in the low range of marginal abatement costs, indicating that they provide an incentive to reduce emissions for some sources. However, they are not adequate to achieve the emission reduction targets to which Poland is committed in the framework of EU accession. Waste water effluent charges were adjusted following the Ordinance of the Council of Ministers of October 2001. Whereas there was previously a considerable difference in the rates applied to industrial and municipal discharges, now a flat rate is applied to all. Furthermore, the rate has been increased to a level comparable with those applied by the Czech Republic and Slovenia, now providing a true incentive to treat waste water at least biologically.

A new *clarification of the objectives* of the system of environmental charges is called for, together with streamlining of certain charging schemes that are excessively complicated (e.g. air emissions charges, for 62 air pollutants) and thus inflate transaction costs for implementing authorities and industries alike. Left unchanged, the revenue-raising function of the emission charges will become less important as progress is made in reducing pollution. The historic high rate of collection has fallen rapidly since 2001, following introduction of provisions of the Environmental Protection Act

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Table 6.7 **Selected environmental charges**

Air pollution	Levied on measured or estimated emissions, by pollutant		PLN/kg
		NO_X (recalculated as NO_2), SO_2	0.4
		CO	0.1
		NMVOCs	0.9
		CO_2, methane	0.2
		Asbestos, nickel, dioxins and furans	267.9
		Manganese	15.3
		Benzene	6.1
		Chrome, cobalt	38.3
		Molybdenum	9.0
		Zinc, tin	4.0
		Lead	30.6
		Cadmium, mercury, halons, trichloroethane	133.9
	Exemptions	Emissions from agriculture, fisheries, public institutions	
	Revenue 2000[a]	PLN 761 million	
	Levied per unit estimated emissions, for certain activities		PLN/Mg
		Reloading of combustion fuels	1.2-4.2
		Combustion of fuels (lignite, wood, gas)	3.2-9.5
	Revenue 2000	. .	
Waste disposal	Levied per unit waste, by sector of origin		PLN/tonne
		Agriculture/Food processing	8.9-116.3
		Industry	7.8-101.5
		Construction	8.2-106.7
		Municipal	13.8-44.3
	Revenue 2000	. .	
Tree felling	Levied per cm of tree trunk circumference		PLN/cm
		Minimum-maximum	10-1 340
	Revenue 2000	. .	
Premature forest harvesting	The charge equals the estimated difference between market value that timber from the forest would have had at mature cutting age, and its market value at the time of pre-mature harvest		
	Revenue 2000[b]	. .	
Forest conversion	Levied on estimated annual market value of timber no longer grown on converted land. Charge is 10% of the expected annual market value of timber, from the land subjected to changes (15% in the case of protected forests). Paid for 10 years if conversion is permanent.		
	Revenue 2000[c]	about PLN 100 million	

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Table 6.7 **Selected environmental charges** *(cont.)*

Mineral extraction	Levied per cubic metre of mineral extracted		% of market price
		Hard coal	*2*
		Brown coal, salt	*4*
		Gas, methane, crude oil, mineral resources	*10*
		Metals, sulphur and other chemical resources	*3*
	Revenue 2000[c]	PLN 921 million	

a) Earmarked for environment funds: 20% gmina funds, 10% poviat funds, 50.4% voivodship funds, and 19.6% National Fund.
b) 100% of the revenue goes to the State Forest Fund.
c) Earmarked for environment funds: 60% gmina and poviat funds, 40% National Fund. For minerals extracted from the sea-bed 100% of revenue earmarked for National Fund.
Source: Ministry of Finance; Decision of the Council of Ministers, 9 October 2001; Central Customs Office; Regional Environmental Centre for Central and Eastern Europe.

that opened the door to administrative discretion and individual negotiations concerning payment of pollution charges. The Ministry of the Environment estimates that this could ultimately reduce fee collection rates to an estimated 15 to 20% (similar to those for non-compliance fines), thus fragilising an effective system for financing environmental investments.

Voluntary initiatives

The Second National Environmental Policy (2000) encourages use of *voluntary agreements* between government and industry, under which pollution fines would be suspended if firms undertake to reduce excess pollution following a "negotiated compliance schedule". This is intended to give flexibility to Poland's rigid permitting system, but it may reduce willingness to pay emission fines and create obstacles to the introduction of emissions trading. Information about the extent to which new negotiated agreements have been used since 2000 was unavailable at the time of writing.

Environmental management systems have been adopted on a large scale in Poland. The most popular certification is ISO 14001. By 2001 nearly 200 enterprises had been certified, and about 20 organisations (five Polish) were involved in the certification procedure. A quality promotion programme has been in effect since 1992 to prepare firms for the introduction of ISO 14000 and ISO 9000. Several hundred firms and 200 research laboratories participate in this programme, which has been expanded to include consideration of environmental issues. Only a few firms have gone beyond certifying their production processes to certifying products as

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environmentally friendly by using *eco-labels* (eco-znac). Since 2001 there have been some experimental efforts to introduce eco-labelling in the paper, refrigeration, computing, electronic and fertiliser sectors.

Polish authorities are notable among those in transition countries for their proactive support of *cleaner production technologies and techniques*, working hand-in-hand with industry. They have signed the UNEP Declaration on Cleaner Production and launched a programme to introduce cleaner technologies in enterprises. By 1999, 167 Polish enterprises had signed the Declaration. A National Cleaner Production Centre (NCPC) was established in 1996; four Cleaner Production Centres and management schools have been created. To ensure adequate technical expertise, 129 experts have been identified and 1 800 people have received training. Some 150 demonstration projects were conducted with the participation of industry, local authorities and services, and with support from the National Fund.

2.3 Cost recovery for environmental services

Prices of water for households have increased considerably since the 1995 Environmental Performance Review. In 1992 they were estimated at between USD 0.15 and USD 0.35 per m^3; in 1998 they varied between USD 0.19 and USD 1.42 per m^3, averaging USD 0.42. This trend has been accompanied by development of a metering system, especially for new dwellings (which must be equipped with individual meters), and by a decline in water consumption by households (Chapter 3, Section 1.4). These market trends, together with large investments in reducing distributive losses in urban networks, have helped lower per capita water consumption.

Cost recovery for water supply and sanitation has improved considerably in the past decade. Operating and maintenance costs are almost fully recovered. However, investment expenditure for water supply installations and municipal waste water treatment plants are not yet being recovered (Chapter 3, Section 1.5). In large urban areas, higher levels of cost recovery are possible. The opposite is the case in smaller municipalities, where capital costs are generally subsidised totally or partially from municipal budgets. Increasing prices to full cost-recovery levels has been difficult in Poland's rapidly changing socio-economic setting, as affordability issues immediately arise. In practice, it has been difficult to incorporate affordability concerns into stable pricing policies at the municipal level since the subject has become politically polarised. This makes it difficult to attract private operators. The level of private sector participation in providing municipal environmental services is presently lower than that in other EU accession countries.

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Poland has a long history of *charging users for municipal waste management services*. Services are contracted on a commercial basis between generators (e.g. households, enterprises) and service providers, which are usually largely State-owned. Municipal governments set waste management charges, not necessarily with cost recovery as the goal. New legislation since 2000 will introduce a range of taxes and other economic instruments to help create markets for recycled materials (Chapter 4, Section 2.1).

3. Focus on Selected Topics

3.1 Major economic trends

GDP growth (45% overall between 1990 and 2001) has continued since the 1995 Environmental Performance Review, with annual growth averaging 6.3% from 1994 to 1997 and 4.3% from 1998 to 2000. Since 2000 there has been a significant slow-down in economic activity, with GDP growing only 1% per year. In 2001 GDP at current prices totalled PLN 722 billion (USD 176 billion) and Poland's *per capita GDP* (USD 9 100 corrected for purchasing power parities) ranked 28th among OECD countries (Figure 6.3).

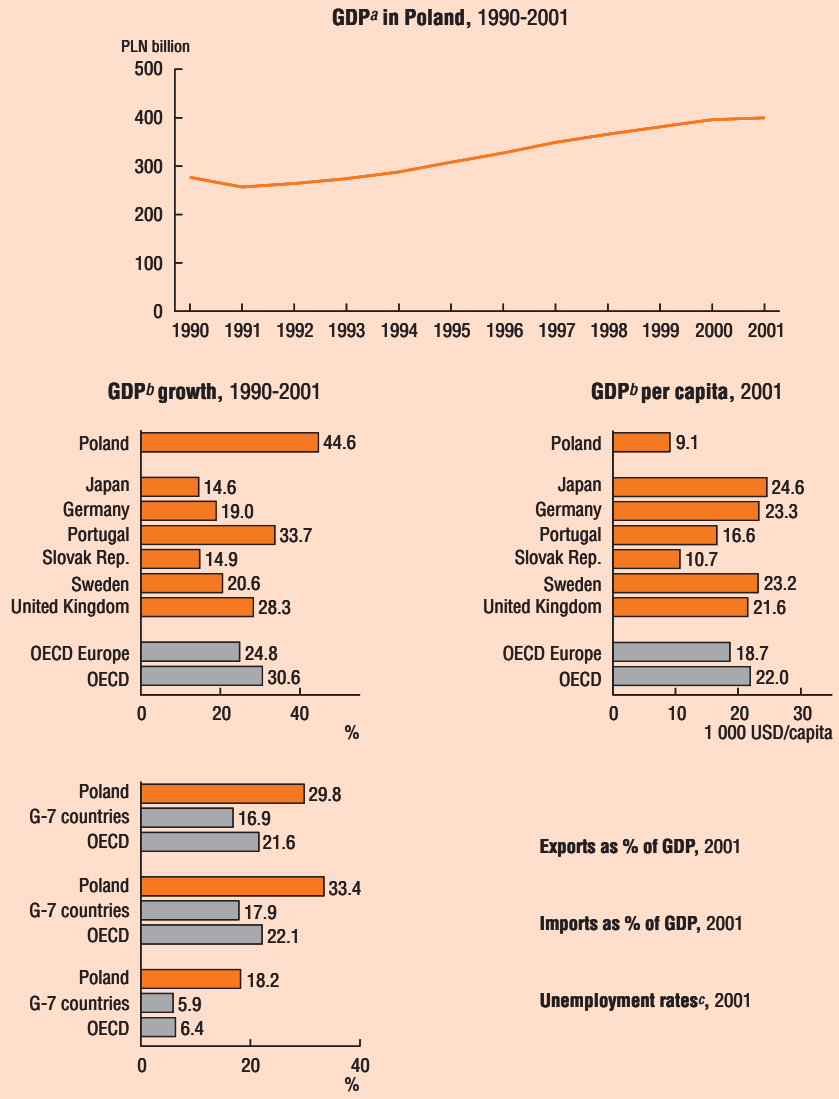
The main reason for the recent slowdown has been a *drop in investment* activity beginning in 2000, with substantial increases in interest rates during the previous year playing a major role in this decline. The fall in investment spending was broadly based, with both foreign firms (which represent 37% of investment) and domestic ones experiencing declines; only the water supply and coal mining sectors (the former dominated by local government enterprises and the later by State companies) reported investment growth.

On the production side, recent changes in output have been uneven across sectors, which translates into important *shifts in sectoral contributions to GDP* during the review period. The fall in production in the *agriculture* sector, partly due to factors such as bad weather that reduced crop yields, high production costs, declining subsidies and low market prices for animal products, led to a contribution to GDP by agriculture, forestry and fishing of about 3% in 2001, down from nearly 7% in 1995. *Services* accounted for about 64% of value added in 2001, compared with 54% in 1995. Industry accounted for 33% of total value added in 2001, compared with 39% in 1995. Since 2001 industrial output and construction activity have been declining.

Deterioration of the labour market has accompanied the economic slowdown since 2000. In 2002 Poland's *unemployment rate* (20.3%) was the highest in the

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Figure 6.3 **Economic structure and trends**



a) GDP at 1995 prices.
b) GDP at 1995 prices and purchasing power parities.
c) Per cent of total labour force.
Source: OECD.

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OECD. Almost half of working-age population is without work (i.e. unemployed or outside the labour force) and nearly 50% of those unemployed have been looking for work for over 12 months. Unemployment is highest, as it has been for decades, in the relatively sparsely populated, low-income agricultural regions along the Baltic Sea or bordering Russia and Germany. Restructuring in the mining and steel industries has contributed to a worsening of labour market performance in the southern and central regions of Slaskie and Malopolskie, and *spatial distribution of unemployment* in 2002 is broadly the same as throughout the 1990s.

3.2 Energy supply and consumption trends

Poland has *significant energy reserves*, mostly hard coal (45 000 Mt) and lignite (14 000 Mt). It produces more coal than it consumes, exporting 23.1 Mt in 2000, mainly to Germany (6.5 Mt in 2000) and Russia. Proven oil reserves total 115 million barrels (Mbl) or 14 Mt. A new field discovered in 1996 near the German border in the Polish part of the Permian basin is estimated to contain some 82 Mbl of oil. In 2000 Poland's crude oil production averaged 13 000 barrels per day (653 kt), whereas its consumption was 29 times higher. About 93% of oil imports come from Russia; the UK, Iran and Norway also supply significant amounts. Natural gas reserves are estimated at 5.1 trillion cubic feet. In the late 1990s Poland consumed some 444 billion cubic feet (Bcf), producing 181 Bcf domestically and importing 281 Bcf, mainly from Russia.

Coal continues to make up the bulk of *primary energy supply*, representing 62% of TPES in 2000 followed by oil and gas (22% and 11% respectively). There was significant fuel switching from coal to oil and gas between 1990 and 2000, mainly for heating purposes (Chapter 2, Section 1.3). Coal consumption dropped by 25% while consumption of petroleum rose by 59%. Hydroelectric energy contributes 0.2% of energy supply; the contribution of other non-fossil fuels is negligible. Poland does not use nuclear energy.

Approximately 97% of hard *coal production* occurs in the Upper Silesian Basin in southern Poland. The rest is essentially in Lublin. The number of operating mines is falling. There were 70 mines in operation falling in 2000, 54 in 2000, and 40 in 2002. The Polish coal industry reported a EUR 350 million loss in 1999. The accumulated debt of the sector totalled EUR 5.5 billion in 2000, compared to a turnover of EUR 3.3 billion. Despite these realities, *direct and indirect subsidisation* of coal mining continues to lead to over-production (Chapter 6, Section 1.3) and should gradually be phased out, with appropriate attention to unemployment issues.

Seeking to comply with EU requirements concerning use of *renewable energy sources*, Poland recently set the objective of increasing these sources' share in TPES

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to 7.5% by 2010 and to 14% by 2020. In 2000 renewable energy sources made up 4.6% of TPES. Although no attempt was made to estimate benefits in economic terms, MOE simulations suggest that meeting the targets would lead to a net reduction in annual CO_2 emissions of 24 Mt by 2010 and 37 Mt by 2020. Other benefits cited include more efficient use of natural resources, less dependence on imported energy and creation of new jobs. The costs of pursuing the development of renewables instead of measures with lower marginal costs (e.g. closing down subsidised coal mines) were not assessed.

In 2000 Poland's total *primary energy consumption* exceeded domestic energy supply by nearly 21%.The difference is mainly made up by imports from Russia. In 2000 final energy consumption (58.7 Mtoe in all) was dominated by the industry sector (35% of the total) and residential/commercial sector (37%). Transport accounted for 16% of total final consumption and agriculture for 9%. Since 1989 energy consumption by transport has grown significantly, with consumption of petrol and diesel fuels increasing by 40% and 28%, respectively.

3.3 The extension of Local Agenda 21 to smaller communities: the case of Kwidzyn

Agenda 21, the global action programme for sustainable development agreed at the 1992 Earth Summit, identifies local communities and governments as key actors for implementing development strategies integrating economic, social and environmental concerns. The Local Agenda 21 (LA21) approach gives these three "pillars" an important spatial, institutional and political dimension. It places particular emphasis on *local democracy and partnerships* as intrinsic characteristics of sustainable development. This is especially relevant in Poland, where institutional structures and procedures for local governance have been fundamentally reshaped in recent years. LA21 in Poland has benefited from several international initiatives and conferences. For example, the European Sustainable Cities and Towns Campaign held regional conferences in 1998 which resulted in the Turku Declaration, "*Baltic Local Agenda 21*", and the Sophia Declaration, "*Towards Local Sustainability in Central and Eastern Europe*". These declarations aroused significant interest in Poland and provided the impetus for launching broader based LA21 initiatives.

In 2000-01 a *Network of Polish Sustainable Cities, Towns and Districts* was set up. A major driving force behind this network has been the UNDP Umbrella Project, with additional support from the EU PHARE Programme and the Dutch MATRA Fund. By the end of 2001 some 60 local communities had received assistance in initiating LA21 processes. Local coalitions or partnerships were at first set up primarily in major urban centres like Warsaw, Gdansk, or Poznan, whereas small and medium-sized towns

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and villages in rural voidvodships lagged behind. There are now a few promising pilot projects in rural areas and smaller communities which may in the future serve as positive models.

The town of Kwidzyn recently launched the *Kwidzyn LA21 initiative*. In recent years, Kwidzyn has experienced significant economic growth and social change, together with environmental improvements. Its population has grown from 25 000 in the mid-1970s to over 40 000 in 2002. This is in part due to major foreign direct investment in the local paper mill (owned by a multi-national company) which not only created economic value-added but also jobs. Since 1992, the company has undertaken major steps to improve environmental quality, not only at the firm level but also more widely, by supporting local initiatives for better environmental management, resource management and nature conservation. In parallel, strengthened local democracy and administrative autonomy have triggered innovations in local governance which encourage pro-active public-private partnerships.

In 1999, as a result of a long interactive process involving a number of different actors, Kwidzyn adopted a *LA21 strategy with six priority areas*: i) transport (construction of a new bridge and cycling paths); ii) waste management (recycling and consumer awareness); iii) industrial pollution control and environmental management (e.g. ISO 1400); iv) managing green open space for conservation and recreation; v) sewage, water and air quality; vi) environmental education. In each area 17 key actions have been identified and concrete measures, indicators and other elements designated. As part of the local sustainable development strategy, a *Centre for Environmental Education* has been created with the aim of raising the environmental awareness of both children and adults. The centre also collects data which can be used to monitor environmental pressures and trends. A *local activities centre* provides assistance through a civic information desk and a consultation desk for NGOs; it also hosts a volunteer club and an ecological club for teenagers.

3.4 Financing environmental investment through environment funds

The National Fund

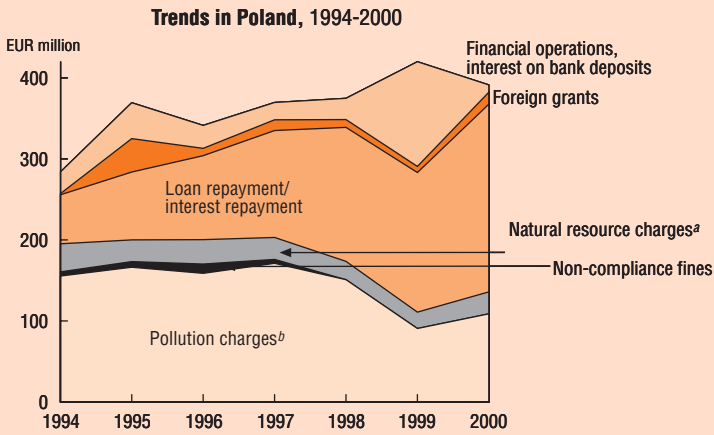
The National Fund for Environmental Protection and Water Management (hereafter referred to as "the National Fund"), established in 1989, is a major source of *financing for investment in environmental protection* and related activities (e.g. monitoring, research and educational programmes). It is administered by a Supervisory Council and executive board. The National Fund's income initially consisted mainly of pollution charges and fines and natural resource use charges; since 1998 it has consisted mostly of loan interest payments (Figure 6.4). The 2001 Environmental

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Protection Act reduced the Fund's potential income from pollution charges by making their calculation the responsibility of enterprises and transferring income to regional and local funds. Reduction of industrial pollution as well as the new negotiable nature of charges help explain the recent decrease in the total amount of revenue entering the National Fund (Table 6.5).

The National Fund applies the *expenditure priorities stemming from the EU accession process*, as set out in the environmental policies Poland has adopted in recent years. The contribution of the National Fund and regional and local funds to environmental expenditure fell from 50 to 30% between 1992 and 1999. Its contribution is likely to remain large, but questions are being posed about the Fund's structure. This is mainly due to changes in the source and base of its income, of which a greater share is set to come from product charges rather than emission charges in the future.

Figure 6.4 **National Fund revenues by source**



a) Mostly mineral extraction charges.
b) 1998-2000: includes pollution charges and non-compliance fines.
Source: National Fund's annual reports; CSO.

Territorial environment funds – the example of Gdansk

There are 16 voivodship (regional), 370 poviat (county) and 2 500 gmina (municipal) environment funds. They operate as *independent entities* but sometimes finance projects jointly. The Voivodship of Pomerania (which includes the city of

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Gdansk, the historic Baltic port which has a population of 460 000) has operated a regional environment fund (WFOS) since 1999. Playing the leading role in financing environmental protection in the Gdansk region, the WFOS channels revenue from pollution charges and fines to investment in environmental infrastructure (e.g. waste water treatment plants). A list of priority tasks is prepared on an annual basis, identifying the most important programmes and investments related *to environmental protection and water management in the Gdansk area*. WFOS revenues were PLN 54.5 million in 1999, PLN 65.0 million in 2000, and PLN 68.3 million in 2001. Revenues from environmental charges and fines make up about 65% of the total, with the remainder mainly generated from the fund's financial operations.

As with other regional funds, about 70% of the financing offered by the WFOS takes the form of *soft loans*. The rest is offered as *grants*. In 1999 and 2000, 62% of the financing made available by the fund was for water management infrastructure, 17% for air quality protection and about 7% for waste management activities. The WFOS participates in *nearly all major public environmental infrastructure investments* in the region of Pomerania. The WFOS (along with the EcoFund and other important sources) facilitated construction of the largest municipal sewage treatment plants in Gdansk (throughput 180 000 m^3/day), Gdynia (throughput of 130 000 m^3/day) and Jasturnia, as well as extension of sewerage systems in several other coastal communities. The WFOS fund has also co-financed construction of several industrial waste treatment plants (e.g. Dalmor S.A., Wilbo, S.A.) and numerous investments for the purpose of reducing air emissions or improving the energy efficiency of industrial processes. It has been instrumental in providing the financing necessary to upgrade and extend the Gdansk area's air monitoring network to bring it up to EU standards for measurement methods and data quality. This fund will clearly need to devote increasing resources to municipal waste management.

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7

SECTORAL INTEGRATION: TRANSPORT*

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Poland:

- fully implement exhaust emission control, automotive fuel quality control and in use-vehicle inspections to reduce *road vehicle emissions*;
- fully integrate environmental considerations into Poland's *road transport infrastructure* development (e.g. the Trans-European Network), using environmental impact assessment and strategic environmental assessment; in particular, ensure consistency with the Habitats Directive and with the sustainable development scenario of Poland's 2001 National Transport Plan;
- *establish priorities* for scheduling and financing transport infrastructure investments;
- implement *demand management measures* for both passenger and freight transport (e.g. park and ride, combined freight transport, tighter parking control in city centres);
- facilitate sharing of cities' experiences improving *urban public transport*, with appropriate national administrative support for local authorities;
- review and revise *transport taxes and charges*, with a view to better internalising the environmental externalities of various transport modes.

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1995. It also reviews progress with respect to the objective "decoupling environmental pressures from economic growth" of the 2001 OECD Environmental Strategy.

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Conclusions

In the 1990s Poland progressively incorporated environmental concerns into its transport policies. It established a range of measures to make its transport system environmentally sustainable in the 2001 *National Transport Plan*. Air emissions from the transport sector were significantly reduced in the 1990s through tightened *emission and fuel quality standards* for motor vehicles. Leaded petrol now accounts for less than 10% of total petrol sales. A vehicle inspection system, including an emission test, was introduced in 1992. *Environmental impact assessment* has been used since the early 1990s for major transport infrastructure developments. Internalisation of environmental externalities has progressed in the Polish transport tax system (e.g. differentiation of the excise duty on diesel fuel by sulphur content and of the vehicle excise duty by engine size).

However, Poland's *road vehicle stock* increased rapidly since 1990 and is likely to continue to do so, as it remains among the lowest per capita in OECD countries. The rate of growth of road passenger and freight traffic volume far exceeded that of GDP in the 1990s. In contrast to the rapid increase in road transport, use of *public transport declined* significantly in the 1990s. With almost complete withdrawal of national administrative and financial support for local public transport, infrastructure and quality of service have deteriorated, accelerating the loss of modal share. The decline of rail passenger transport has also been significant (–67% since 1990), partially as a result of governance issues and low efficiency in service provision; a large modal shift towards road transport has resulted. Increasing the efficiency of rail transport could be expected to reduce costs and increase utilisation. The planned motorway network should be carried out in a way consistent with nature protection objectives (e.g. the Habitats Directive). Measures to alleviate *urban road traffic congestion*, including economic instruments (e.g. road charges, parking charges), are still limited.

1. Evaluation of Performance

The transport sector plays an important role in the Polish economy, contributing 5.9% of GDP and 5.2% of employment. The transport network is fairly well developed. Road density (122 km road per 100 km^2 land area) is higher than in most central/eastern and several EU countries; rail density (732 km per 100 km^2) is among the highest in any European country. Although motorisation is increasing rapidly in Poland, rail's modal share is still among the highest of any OECD country. The quality of transport infrastructure is generally poor due to lack of financial resources; the share of paved roads (66%) is well below the average for EU countries, and motorway density (9 km per 100 km^2) is among the lowest of any EU accession

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candidate. In the context of EU accession, large-scale transport infrastructure development (particularly construction and upgrading of motorways that will be part of pan-European transport corridors) is a top national priority. Poland also has inland waterway and maritime transport.

1.1 Policy objectives

National policies

Polish transport policy in the 1990s was driven by two major *structural transformation* processes. First, privatisation of the transport sector (and reforms to restructure it, mainly to improve economic efficiency) began with economic transition. Second, the accession process has further stimulated liberalisation of the transport market, as well as the development/upgrading of infrastructure in line with EU programmes and standards (e.g. the Trans-European Network). Structural changes (i.e. the decline of heavy industries and growth of the service sector) have resulted in less need for heavy goods transport, while demand for passenger transport has increased. Transit traffic between neighbouring eastern and western countries is expected to increase, with significant environmental implications due in particular to road traffic.

Environmental considerations and the concept of sustainable transport have increasingly been incorporated into national transport planning since the early 1990s. The *1995 Transport Policy* focused on introducing regulatory and economic instruments to reduce emissions from individual vehicles. The 2001 *National Transport Policy for 2001-15* elaborates the concept of sustainable transport and presents a comprehensive set of policy measures including regulatory instruments (e.g. emission/fuel quality standards, inspection requirements), economic instruments (e.g. road pricing), physical planning and strategic environmental assessment (SEA), technology development and public awareness raising (e.g. with respect to driving behaviour). These measures derive from the recognition that transport needs should be "rationalised" and that the shift from other modes towards road should be moderated. This new direction in Polish transport policy is also reflected in the *Second National Environmental Policy* (2000).

Environmental objectives related to transport are primarily based on EU Directives, but also on national and sub-national environmental plans and strategies (e.g. air quality improvement, noise abatement, landscape protection) and on international commitments (e.g. the Framework Convention on Climate Change, the Conventions on Biological Diversity and on Long-range Transboundary Air Pollution).

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1995 OECD Environmental Performance Review

Concerning transport policy, the 1995 *OECD Environmental Performance Review* recommended (in the context of air management) that Poland:

- renew efforts to contain or reduce environmental damage caused by the growing stock of motor vehicles by extending emission standards to all newly registered automobiles, introducing emission standards for trucks and buses, developing a system of inspection and maintenance for in-use vehicles, and considering the use of economic instruments to rapidly eliminate highly polluting obsolete vehicles;
- integrate transport and environmental policies at national and local levels, especially for major infrastructure decisions.

1.2 Structural changes in the transport sector

Trends

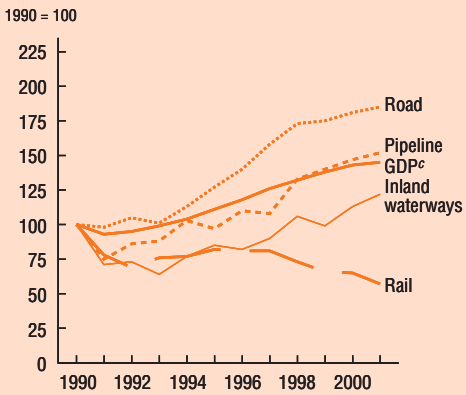
In 2001 the Polish *road vehicle fleet* comprised 10.5 million passenger cars, 2.1 million lorries, buses and road tractors, 1.3 million tractors and 0.8 million two-wheelers. Between 1990 and 2001, the number of registered passenger cars and lorries and road tractors increased by 100% and 89%, respectively; the number of two-wheelers fell by 41% (Table 7.1). Annual *road traffic volume* (in vehicle-km) doubled in the 1990s, growing three-times faster than GDP. Per unit of population, car ownership (24 cars per 100 people) and road traffic volume (4 500 vehicle-km per capita) are still significantly lower (by 38% and 27%, respectively) than the OECD Europe averages (Figure 7.1).

Modal shares of passenger transport were fairly evenly distributed among rail, buses/coaches and private passenger cars in the early 1990s, but the latter became the dominant mode by the end of the decade. The share of cars in passenger transport (in passenger-km) increased in the 1990s from 40 to 72%, while that of rail fell from 30 to 10% and buses/coaches from 27 to 14%. The traffic volume of cars increased by 132% in the 1990s, while that of rail and buses fell dramatically, by 55% and 33% respectively. The increase in road transport is also evident in the *modal shares of freight transport*: the share of road vehicles (in tonne-km) increased from 29 to 51% in the 1990s, while that of rail fell from 60 to 33%. Pipelines accounted for most of the rest; freight transport by inland waterways was negligible. Although the total volume of freight traffic increased by only 4% from 1990 to 2001, the volume of road freight traffic increased by 85% (Figure 7.1).

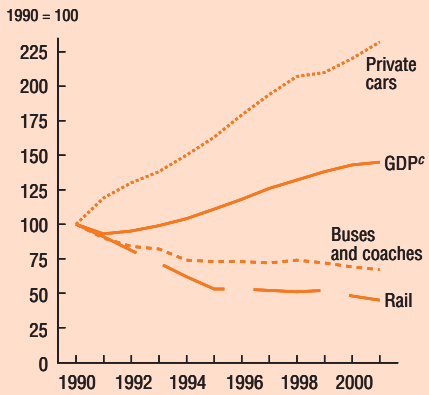
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Figure 7.1 **Trends in the transport sector**

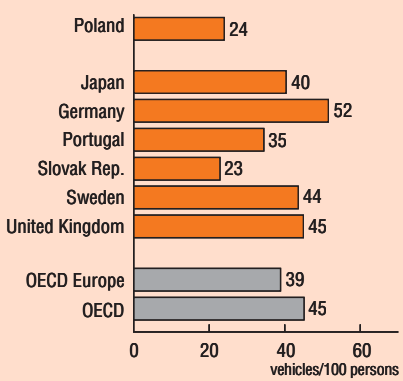
Freight traffic[a], 1990-2001



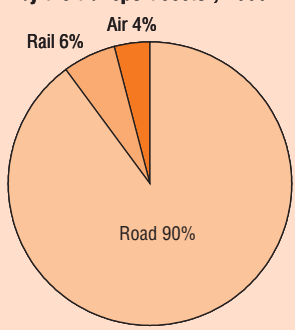
Passenger traffic[b], 1990-2001



Private car ownership, 1999



Total final energy consumption by the transport sector, 2000



a) Index of relative change since 1990 based on values expressed in tonne-kilometres.
b) Index of relative change since 1990 based on values expressed in passenger-kilometres.
c) GDP expressed in 1995 prices and purchasing power parities.
Source: ECMT; AAMA; IRF; OECD.

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Total final energy consumption (TFC) by the Polish transport sector in 2000 was 10 Mtoe, or 16% of national TFC. Road transport accounted for 90% of the sector's TFC, followed by rail (6%) and air (4%) (Figure 7.1). In comparison to the rapid growth in road traffic volume (which doubled in vehicle-km in the 1990s), the increase in TFC by road transport was moderate (+40%), reflecting increased fuel efficiency associated with modernisation of the vehicle fleet. Of the energy consumed by road vehicles, 62% was petrol, 32% diesel and the rest mainly LPG. Electricity provides two-thirds of the energy consumed by railways and diesel the remainder; the proportion of diesel-traction trains in total rolling stock has been decreasing substantially (Table 7.1).

Table 7.1 **Transport infrastructure and fleet,** by mode, 1990-2001

	1990	2001	Change 1990-2001 (%)
Road			
Hard surface public roads (km)	218 447	248 712[a]	*+14*
Number of: passenger cars (1 000 units)	5 261	10 503	*+100*
lorries and road tractors (1 000 units)	1 045	1 979	*+89*
agricultural tractors (1 000 units)	1 192	1 257	*+5*
Motorcycles and scooters (1 000 units)	1 357	803	*–41*
buses (1 000 units)	92	82	*–11*
Rail			
Railway lines in operation (km)	26 228	21 119	*–19*
Number of: electric trains	1 705	1 222	*–28*
diesel trains	2 268	1 125	*–50*
steam trains	103	3	*–97*
Inland waterway			
Inland waterways (km)	3 997	3 812	*–5*
Number of: freight ships, tugs, and barges	1 748	876	*–50*
passenger ships	57	104	*+82*
Maritime			
Number of: cargo vessels	4 041	2 278	*–44*
Ferries	18	21	*+17*
Air			
Number of: aircraft	41	50	*+22*

a) 2000 data.
Source: CSO.

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Transport market reform

Restructuring of the Polish State Railways (PKP) began in the late 1990s. Infrastructure, freight operations, passenger operations and track maintenance were separated within PKP; separate accounting was introduced in 1998. PKP became a joint stock company in 2000. The next year it was further broken down into several companies, including one inter-city company, a number of regional passenger companies and a few freight companies. Companies' stocks are currently 100% State-owned, but they will be publicly traded in the near future. Separation of infrastructure management from passenger and freight operations in this way is intended to ensure equal market access to all operators, in conformity with relevant EU legislation. In the European Commission's 2001 pre-accession evaluation report, some concern was expressed about the finances and market openness of Polish railways.

The 2001 Road Transport Act transposed EU legislation concerning *market access for road transport*. Licences are granted to road transport operators on the basis of technical competence and financial standing. The Act introduced the Road Transport Inspectorate to enforce technical, environmental, safety and competition regulations, and gave more power to the Ministry of Infrastructure to control and monitor the road transport market and operators. Upon accession, the EC will grant Poland access to the EU road transport market. In order to achieve smooth integration, access of Polish operators to the markets of other member states is to be phased in gradually, with a three-year transitional period (possibly extended by two more years). Poland has already progressed towards removal of restrictions on market access through bilateral agreements with several member states of the EU and the European Council of Ministers of Transport. Market liberalisation of international coach transport originating in the EU (INTERBUS programme) will become effective in early 2003. Upgrading of main road networks is a priority for Poland, as only 1% of Polish roads are currently capable of accommodating heavy vehicles and much reinforcement is required. Following negotiations with the EC, Poland may continue until 2010 to tax lorries (up to 11.5 tonnes per axis) for road use, and to grant lorries access to non-upgraded parts of its national road network.

Liberalisation of the urban public transport market began in the early 1990s. However, public transport operators still have public status in about half of Polish cities including Warsaw, Poznan and Gdansk. Contracting of services has become common, while tendering has been instituted in only a handful of cities; a majority of cities are still liable for the entire financial risk and must provide all investment funding. The slow privatisation process is encountering union opposition to the provision of public transport on a large scale by private operators.

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1.3 Specific environmental measures

Air emissions from transport decreased significantly in the 1990s, reflecting improved fuel efficiency and quality. The transport sector remained the largest source of national emissions of some pollutants (e.g. NO_x, NMVOCs) (Chapter 2, Section 1.4). Road transport is the main source of air emissions from this sector, accounting for 73% of NO_x, 97% of CO_2 and 81% of NMVOC emissions in 2000 (Table 7.2). While ambient air quality has generally improved, the remaining hotspots (particularly for NO_x and particulate matter) are often associated with heavy road traffic. The provinces of Katowice, Warsaw and Lódź are the most heavily exposed to the adverse environmental impacts of road transport, including air pollution and traffic noise.

There has been major progress since the early 1990s with respect to regulatory measures aimed at reducing automotive air emissions. Poland introduced statutory *automotive emission standards* in 1992, tightened them several times, and eventually adjusted them in line with EU emission standards at the end of the 1990s. *Automotive fuel quality* was also improved in the 1990s by progressively tightening limits on sulphur content and introducing benzene content limits. Importing old vehicles without catalytic converters was banned in the mid-1990s; the proportion of vehicles fitted with catalytic

Table 7.2 **Air emissions from transport,** 1990-2000

	Emissions from transport				Emissions from road transport			
	2000[a] (kt)	1990[b]–2000[a] (% change)	Share in total emissions 1990[b] (%)	2000[a]	2000[a] (kt)	1990[b]–2000[a] (% change)	Share in transport emissions 1990[b] (%)	2000[a]
CO_2	31 382	*+8*	*8*	*10*	29 010	*+61*	*86*	*97*
CH_4	7	*±0*	*0.2*	*0.3*	. .	. .	. .	. .
NO_x	314	*35*	*38*	*37*	230	. .	. .	*73*
CO	805	. .	. .	*23*	688	. .	. .	*85*
NMVOCs	177	*–50*	*43*	*30*	143	*–49*	*79*	*81*
Lead	0.17	*–75*	*50*	*23*	. .	. .	. .	. .
Particles	61	*+126*	. .	*13*	54	. .	. .	*89*

a) 1999 data for CO_2, CH_4 and lead.
b) 1991 data for lead.
Source: UNFCCC; CSO; OECD.

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converters reached 45% for cars and 34% for goods vehicles by 2000. The recent rapid increase in the number of liquid petroleum gas (LPG) cars has also contributed to the reduction of air emissions from road transport (Chapter 2, Section 1.2). Continuous efforts should be made to strengthen regulatory measures to further reduce emissions from road vehicles.

The *road vehicle emission inspection system* was strengthened in the 1990s. Compulsory periodic emission inspections for all in-service vehicles (e.g. three years after the first registration, then two years later and then annually for passenger cars; every year for large trucks) and random roadside inspections were introduced in 1992. This system could be improved by extending coverage of CO, hydrocarbons and the air-fuel ratio to include NO_x and particles, as these have become the main air pollutants of concern in urban areas in recent years. Systematic data compilation and synthesis of inspection results would provide valuable information for use in improving the effectiveness of the vehicle emission control system.

Environmental protection in rail transport has also progressed. The Polish State Railways has a good record of compliance with environmental regulations. PKP's environmental performance is subject to periodic auditing by the Ministry of the Environment; results have generally been satisfactory, with penalty fees for non-compliance with audit recommendations steadily declining. Despite financial difficulties, the company has allocated about 15% of annual investment outlay to projects related to environmental protection in recent years. It has also enhanced its institutional capacity to address environmental issues by establishing a special environment directorate, as well as by developing a long-term (20-year) environmental strategy focusing on noise, air, soil and electromagnetic fields.

Environmental measures in maritime transport in the last few years have included the introduction of an obligation to take ship-generated waste and cargo residues back to ports (in conformity with the relevant EU Directive and the Baltic Strategy for port facilities) and the adoption of a lower port charge for double-hulled tankers. In 1999 Poland ratified the Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area and the International Convention for the Protection of the Odra (Chapter 8, Section 1.4). Both include restrictions concerning pollution from ships. Poland is also active in international efforts to establish ship-recycling schemes. The Fund for Inland Navigation has been established to promote *inland waterway transport* by supporting reconstruction and modernisation of the fleet. Poland also aims to stimulate the development of combined transport modes for transit freight traffic (East-West), through an action plan, "From Road to Sea/Inland Waterway".

Noise protection in the civil aviation sector has been strengthened. At Warsaw-Okecie Airport an atmospheric noise monitoring system installed in 1994 produced

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acoustic maps for the first time. This system provides valuable information for development of countermeasures. In 1998 a programme to reduce noise at Warsaw Airport was adopted, followed by adoption of standard departure and landing procedures to minimise noise levels. Co-operation between the Warsaw Airport authority and the gminas on land use planning in surrounding areas has been developed to ensure that air and noise issues are taken into account in building/housing development planning by the gminas. The noise levels of Polish aircraft are relatively high as they are ageing; only 10% of the fleet is currently certified as in compliance with International Civil Aviation Organisation noise standards.

1.4 Integration of environmental concerns into transport policies

Institutional integration

Addressing the environmental impacts of the transport sector and establishing objectives to reduce these impacts have become standard practice in national and sub-national *transport planning*. In developing such plans environmental administrations are usually consulted. Institutional integration of environmental and transport policies has also been reinforced through the government-wide *sustainable development initiative*, under which inter-ministerial meetings (e.g. the Committee of the Council of Ministers on Regional Policy and Sustainable Development, established in 1998) are held and integration of policy fields including transport and environment is pursued, resulting in the adoption of national sustainable development strategies (e.g. Poland 2025: Long-term Strategy for Sustainable Development, published in 2000). Nonetheless, co-ordination among national, regional and local governments on transport policy is weak, especially where public transport issues are concerned. Restructuring of regional and local public administrations in 1999 improved the situation, but more still needs to be done.

The 1994 Land Use Planning Act strengthened the incorporation of environmental concerns into transport infrastructure development. It requires voivodships to prepare a *development strategy* and a *land use plan* for their regions, taking environmental considerations (e.g. protection of special areas) into account in project planning including for transport infrastructure. Also under this Act, transport infrastructure development is subject to land use planning regulations; protecting the natural environment, human health and landscape values is among the main considerations. The *2001 Environmental Protection Act* consolidated the legal framework for incorporating environmental concerns into land use planning by making such policy integration a statutory requirement. In line with the 2001 National Transport Policy, land use planning and regulations should be utilised more effectively to reduce transport demand.

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Environmental impact assessment (EIA) has existed in Poland since the early 1990s. It became a statutory requirement in 1994, under land use planning regulations for projects likely to have significant environmental impacts including motorway, airport and harbour construction. By the late 1990s coverage had been made consistent with the EU's EIA Directive, but it was not until 2001 that public participation in EIA procedures was ensured by the 2000 Act on Access to Information on the Environment and its Protection and on Environmental Impact Assessments (Table 6.3).

Market based integration: fiscal measures

Polish road fuel prices, which increased sharply in the late 1990s, are among the highest in any OECD country when adjusted for purchasing power parities (Figure 7.2). Despite the increase, however, they are not as high as prices in some central European OECD transition countries. *Excise duty on road fuels* increased in real terms in the 1990s, with rate differentiation taking environmental externalities into account (Table 6.2). Part of the revenue (30%) is earmarked for road maintenance. *VAT on road fuels*, introduced at 11% in 1993, was increased to its present rate (22%) the following year (Chapter 2, Section 1.3).

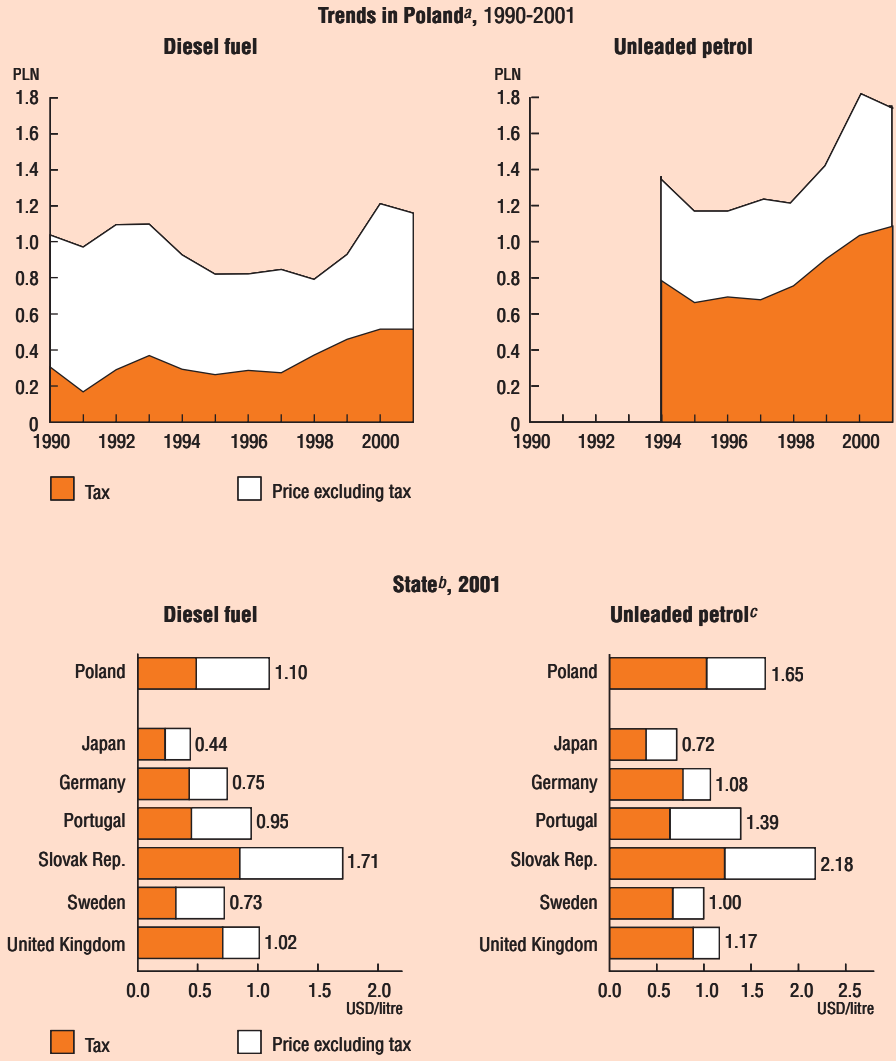
Vehicle excise duty, introduced in 1993, has been differentiated according to engine size (above/below 2000 cc) since late 1999 (Table 6.2). The considerable difference in rates between the two categories discourages the purchase of large vehicles. The rates of the annual vehicle tax on lorries and buses are differentiated according to loading capacity (two categories). Since 2000 there have been fees for automotive fuels used by company cars, differentiated according to vehicle and fuel types; these fees are rarely collected, as the implementation mechanism is inadequate.

A range of environmental externalities result from transport (e.g. from air emissions, traffic noise, or the fragmentation and disturbance of natural habitats). Overall, *external environmental costs associated with the Polish transport sector* were estimated at PLN 12 billion in 2000. Revenue from transport related excise duties and VAT represented 71% of this amount; thus external costs are not fully recovered from transport users. Such analysis should be further elaborated. The tax system could be improved by reviewing the allocation of financial burdens among different transport modes and the way it internalises social and environmental externalities. Earmarking part of the excise duty on road fuels for road maintenance should only be a transitional measure, as it would have counterproductive effects on the modal split in the longer term.

Apart from taxes, economic instruments are relatively little used to implement Polish transport policy. One *toll road* (a 61 km motorway between Kraków and Katowice) opened in 2000 and a second (between Września and Konin) in 2002.

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Figure 7.2 **Road fuel prices and taxes**



a) At constant 1995 prices.
b) In USD at current prices and purchasing power parities.
c) Unleaded premium (RON 95); Japan: unleaded regular.
Source: IEA-OECD.

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Since the early 1990s, municipalities have been allowed to impose *parking charges*, but so far their use has been limited to tourist areas (e.g. the historic centre of Kraków) and their purpose has mainly been revenue raising. Aircraft are subject to a noise *non-compliance fee* whose rate is calculated according to exceedance of permissible noise levels (e.g. PLN 11.3 to PLN 45.2 per dB). Development and wider application of economic instruments to better internalise environmental externalities should be further explored.

1.5 Modal mix

Transport market reform has the potential to rebalance the transport modal mix and to lead to environmental benefits. Whether (and to what extent) this reform produces concrete environmental benefits will depend on the effectiveness of individual incentives to improve the quality of transport services (e.g. public transport, long-distance rail freight transport, multi-modal services) and to provide alternatives to road transport. Benefits will also be determined by the degree to which external transport costs are integrated into transport prices. The *environmental implications of ongoing transport market reform* should therefore be reviewed and reforms adjusted in conformity with the sustainable transport objectives of the 2001 National Transport Policy.

Infrastructure development

Responding to rapid motorisation, *transport infrastructure* development in the 1990s was mainly focused on extending and upgrading roads. The total length of paved public roads increased by 15% between 1990 and 2000, but investment in road construction during the decade did not reach the level envisaged by the government in the 1993 motorway construction programme (Chapter 7, Section 2.1); the total length of railway lines and inland waterways decreased by 19% and 5%, respectively. Investment in public transport infrastructure was minimal in the 1990s, reflecting shrinking demand and the mounting deficit in this sector. Investment in infrastructure to facilitate combined transport (e.g. multi-modal terminals) and to reduce demand for road transport (e.g. freight consolidation centres) was also minimal. The 2001 National Transport Policy sets out a new road construction programme, including over 3 000 kilometres of new motorways and expressways (Chapter 7, Section 2.1), along with a sustainable transport policy that advocates a shift from road transport to other modes.

Passenger transport

Decentralisation of urban public transport responsibilities to municipalities in the early 1990s was accompanied by almost entire withdrawal of State financial support. This led to a sharp increase in fares and lack of infrastructure investment, while reinforcing the decline in urban public transport use already associated with rapid

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motorisation. There have been efforts to curb this trend since the mid-1990s in some large cities (e.g. Krakow, Warsaw). While implementation of local sustainable transport policies has generally been slow, the tramway system was modernised and extended in Krakow and Katowice and Poland's first metro line opened in Warsaw in 1995 (Chapter 7, Section 2.2). Comparable initiatives should be encouraged in other cities with a special focus on tramways, which are still very common in Polish cities and have substantial potential to attract more passengers cost-effectively.

The 2000 law that mandates *restructuring and privatisation of the Polish State Railways* requires national government commitment to cover public service obligation losses. Subsidisation (PLN 800 million/year) is channelled through voivodships, with the aim of making decisions more responsive to local needs. Whether the voivodships will make effective use of it to improve the quality (and thus the attractiveness) of passenger rail service remains to be seen.

There are signs that the number of public transport passengers is beginning to increase in some large cities, but there is still considerable room for improvement. The government's minimum involvement in urban public transport issues should be reviewed, above all with a view to strengthening urban public transport services financially and administratively where necessary. General *transport financing policy* could be re-examined in order to balance the priority being given to road construction with greater attention to public transport (e.g. tramways and railways). Introduction of *dedicated bus lanes*, *park and ride* schemes, and better parking control in city centres are among measures that could be developed. Safe use of non-motorised transport should be actively promoted (e.g. through designation of bicycle lanes).

Freight transport

Despite State financial support and considerable growth in shipping volume, *combined freight transport* (e.g. rail-road) remains negligible. The 2001 National Transport Plan, which strongly recognises the environmental and social benefits of combined transport, has established a target of increasing shipping by combined transport to 2% of the total (in tonne-km), with six to eight inter-modal logistics centres to be created. Meeting the target would largely depend on private initiatives, as the government has not yet developed an investment programme for combined transport at this level.

2. Focus on Selected Topics

2.1 Road transport infrastructure development

Road transport *infrastructure investment* since 1990 was moderate. Only a small share of this investment was used for new infrastructure. Of PLN 31 billion invested between 1990 and 1998, about 20% was allocated to construction of new roads.

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In 1993 the government adopted a very ambitious programme to construct five toll motorways totalling 2 300 kilometres over 20 years. Almost ten years later only one 61-kilometre motorway is operational, reflecting State budget constraints. In 2000 the government began to seek public-private partnerships to raise the required funds.

In 1999 Poland approved the *Transport Infrastructure Needs Assessments (TINA*) commissioned by the EC. The TINA is the basis for extending the Trans-European Network in Poland. Several Trans-European Network rail and road projects were initiated in 1998 with EU support. The 2001 National Transport Policy has replaced the 1993 motorway construction programme with a *new road construction plan*. This plan includes 1 570 kilometres of new motorways, 1 500 kilometres of new expressways, and upgrading of 2 400 kilometres of existing motorways/expressways to conform to EU standards (i.e. they should be able to support up to 11.5 tonne-per-axle lorries) as well as some 10 000 kilometres of other roads by 2015. The feasibility of the road construction plan is unclear, particularly in view of its cost (PLN 150 billion).

Table 7.3 **Estimated environmental and economic implications of different transport policy options,** 2010

Policy option	Estimated traffic volume		Air emissions		Costs				
	Passenger transport (p-km)	Freight transport (tonne-km)	NO_x (kt)	CO_2 (kt)	Maintenance costs	External costs[a]	Costs of travel time (PLN billion)	Total =annual costs	Investment
Strongly pro-motorisation[b]	395	205	230-421	47-56	139	86	213	438	158
Pro-motorisation[c]	365	200	210-380	42-50	129	78	224	431	106
Moderate motorisation[d]	325	135	139-238	29-35	87	55	186	328	98
"Sustainable" option[e]	220	110	83-128	16-19	57	33	131	221	99

a) Accidents, noise, air pollution and climate change are taken into account based on a methodology developed by EC.
b) Assumes full implementation of proposed motorway construction programme, closure of unprofitable railway lines, complete freedom of car access to cities, unattractive urban public transport, etc.
c) Same assumptions as "strongly pro-motorisation" option except that there would be limited implementation of motorway construction programme, some limits on car access to city centres, more attractive urban public transport, etc.
d) Assumes extremely limited implementation of motorway construction programme, promotion of railway development substantial restrictions on car access to city centres, wide range of public urban transport options, support for pedestrian and bicycle traffic, etc.
e) Assumes abandoning the motorway construction programme, broad promotion of railway development, tight restrictions on car access to city centres, well developed urban public transport, full access by bicycle and pedestrian traffic, etc.
Source: Institute for Sustainable Development.

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Environmental pressures from road transport are likely to increase significantly in the future in any case. A study by the Institute for Sustainable Development in Warsaw, a non-governmental, not-for-profit organisation, predicts that a large-scale road development programme that gives relatively little attention to public transport could lead to *emission and energy consumption levels up to three times higher* than the levels to be expected if no such programme were implemented, and if investment were instead mainly in public transport (Table 7.3). Consistency of any road construction programme with the requirements of the EU habitats Directive is also an issue of basic importance.

2.2 Towards a sustainable urban transport system

There are *tramways* in some 30 cities. They are generally slow (around 15 km/h), reflecting chronic underinvestment. Poland's first *metro*, in Warsaw, became operational in 1995. Planned construction of a second and third line has not begun due to lack of financing. Modernisation of *suburban railways*, which is associated with the politically sensitive issue of restructuring the Polish State Railways, has been delayed.

Administrative and financial responsibilities for urban transport were decentralised in the early 1990s. With the withdrawal of most State support for urban transport, there was a sharp increase in fares at the same time as underinvestment in rolling stock and infrastructure (except in the case of the new Warsaw metro). The real price of a single-ride ticket increased two-fold by the mid-1990s (i.e. three times faster than average net salary increase) and monthly public transport tickets represented over 10% of monthly expenditure by an average citizen in 1997. Annual wagon replacement in the late 1990s was equivalent to only 0.6% of the fleet, with the result that service deteriorated and there was substantial passenger loss.

Since the mid-1990s, some cities have begun taking initiatives to improve their public transport systems. Krakow was the first to adopt a long-term urban transport policy, in 1993. Warsaw and several other cities (e.g. Katowice, Poznan) followed. These policies, largely based on the concept of *sustainable transport*, aim to limit the use of cars and to improve public transport service. Modernisation and more effective utilisation of tramways is envisaged as one of the main ways to achieve the objectives of such policies in many cities. In Warsaw higher priority has been given to metro construction, although financing is still uncertain. In 1996 Krakiw adopted a programme of tramway upgrading and development, including creation of a new fast line. This programme was implemented in co-operation with the European Development Bank (EBRD).

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Part III

INTERNATIONAL COMMITMENTS

8

INTERNATIONAL COMMITMENTS AND CO-OPERATION*

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Poland:

- adopt and implement a coherent *national climate protection policy* which identifies priority policy measures based on their cost-effectiveness (e.g. in terms of cost per unit of avoided emissions) and is co-ordinated with energy and transport policies (e.g. taking ancillary benefits into account);
- ratify relevant Protocols to the UN-ECE Convention on *Long-range Transport of Air Pollutants*, and pursue their reduction targets (e.g. for SO_x, NO_x, VOCs, NH_3) through the national air management strategy;
- complete investment in *municipal waste water treatment* stations and strengthen measures to reduce nutrient run-off from agriculture, as necessary, to comply with pollution reduction commitments made in the framework of HELCOM;
- strengthen *monitoring and inspection of fish catches* (in harbours, on ships, by satellite) and work to improve information collection on by-catch and discards in offshore fisheries; take further steps to reduce fishing capacity;
- strengthen enforcement against *illegal trade* in ozone-depleting substances, endangered species and hazardous waste;
- ensure better integration of *environmental concerns into development projects* financed by international and EU funding

* The present chapter reviews progress in the last ten years, and particularly since the OECD Environmental Performance Review of 1995. It also reviews progress with respect to the objective "global environmental interdependence" of the 2001 OECD Environmental Strategy. Selected international commitments are discussed in other chapters: transboundary movements of hazardous waste (Chapter 4), local Agenda 21 (Chapter 6).

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Conclusions

Poland has strengthened its *international environmental commitments* in a global context (e.g. ratification of the UNFCCC and its Kyoto Protocol), and in a European context during the EU accession process (e.g. transposition of EU Directives into national legislation). It has reduced its emissions of CO_2 from energy use by 16% since 1990 through economic restructuring, energy conservation and fuel switching. By participating in several pilot Joint Implementation projects, it has contributed to international experience with the *Kyoto flexible mechanisms*. Poland has reduced its contribution to regional transfrontier pollution in recent years, achieving large reductions in its emissions of *acidifying air pollutants* in line with the protocols to the UN-ECE Convention on Long-range Transboundary Air Pollution (i.e. Oslo, Sofia, Gothenburg, Aarhus), which it has signed but not yet ratified. It has considerably reduced pollutant loading to transboundary rivers and to the Baltic Sea. Poland has also updated its legal framework for *transfrontier shipments of hazardous waste* to be consistent with the Basel Convention, as well as strengthening and expanding its enforcement capacity.

Poland has not yet adopted a coherent *national climate protection policy*, despite some steps to integrate climate protection concerns into energy policy. Such a policy would facilitate identification of the climate protection measures that would most cost-effectively reduce emissions of other air pollutants (e.g. SO_x, NO_x, VOCs) as well as GHGs, thus contributing to more efficient use of limited pollution control resources. Poland's emissions of acidifying pollutants (e.g. SO_x, NO_x) per unit of GDP remain among the highest in the OECD. To fully comply with its HELCOM commitments, it will need to further reduce *nutrient loading to coastal waters*, in particular by completing waste water treatment networks in the Vistula and Odra basins and by ensuring the use of port waste reception facilities. Given the overexploitation of a number of important fish stocks in the Baltic Sea, Poland should strengthen its management of *shared fish stocks* (i.e. through increased surveillance and inspection), and take further steps to reduce fishing fleet capacity.

1. Evaluation of Performance

1.1 Context for co-operation

Objectives and commitments

In pursuing international environmental co-operation, Poland's stated *main objectives* are:

– facilitating the EU accession process;

– ensuring the country's ecological safety;

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– strengthening relations with neighbouring countries;

– facilitating transfer of technology and know-how in support of ecologically sustainable development;

– stimulating new initiatives to engage foreign capital to help implement the National Environmental Policy;

– promoting further eco-conversion of Polish debt by members of the Paris Club.

As a party to some 50 international conventions addressing environmental issues, Poland has made numerous *international commitments* concerning environmental management on a global scale. Since 1995 these commitments have expanded, with the ratification of a number of major international conventions including the Convention on Biological Diversity (1996), the Convention on Environmental Impact Assessment in a Transboundary Context (1997) and the Kyoto Protocol (2002) (Annex IIA). Poland has made commitments regarding shared environmental issues with its neighbours (Germany, the Czech and Slovak Republics, Ukraine, Belarus, Lithuania and Russia) through bilateral or multilateral agreements (Annex IIB). Major regional environmental issues are related to transboundary air and river pollution and protection of shared living resources (e.g. the Baltic Sea, the Bialowieza-Belovezhskaya Border Park). Poland's performance in meeting its internationally agreed objectives is evaluated in selected policy areas (e.g. climate protection, transboundary pollution, protection of the Baltic Sea, trade and environment). The cost-effectiveness of its efforts is also evaluated when available information permits.

1995 OECD Environmental Performance Review

The *1995 OECD Environmental Performance Review* contained five recommendations specifically related to improving international environmental co-operation. It recommended that Poland:

– continue and strengthen legal work aimed at introducing into its laws the concepts and approaches developed in other European countries, such as the fundamental principles underpinning EC environmental law and recent international conventions;

– achieve short and long-term national and international goals; develop action plans and strategies that are implementable and do not exceed reasonably available financial means;

– make full use of opportunities for foreign assistance with the aim of further strengthening environmental management capacity, introducing cleaner technologies and contributing to the resolution of priority international environmental problems;

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– continue co-operation with neighbouring countries to solve severe environmental problems arising in frontier regions;
– report regularly to international forums on progress actually achieved and obstacles encountered in solving international environmental problems (e.g. transboundary air pollution in frontier areas and in Europe, pollution of international rivers and of the Baltic Sea).

Much progress has been made overall with respect to these recommendations. As a result, Poland has had considerable success in addressing transfrontier environmental issues (Chapter 8, Section 1.3), harmonising its legislation with that of the EU, and targeting of foreign funds to improve domestic environmental management. Reinforced efforts are needed, however, to ensure that available financial resources are used efficiently to achieve Poland's internationally agreed goals.

Strong international influences

In recent years, while Poland has been engaged in negotiations on *EU accession*, it has made wide-ranging efforts to transpose EU Directives concerned with the environment. Issues regarding implementation (e.g. transition periods, investment programs) have also been addressed (Chapter 8, Section 2.1). In parallel with integration of legal commitments arising from international environmental conventions into national legislation, this process has resulted in significant and more or less continuous change in Poland's legislative and institutional landscape since the 1995 EPR (Chapter 6, Section 2.1). Negotiation of the environment chapter of the EU accession agreement, although problematic, proceeded rather quickly and was provisionally closed in 2001. Very little, however, has been done to ensure that environmental concerns are systematically taken into account in negotiating other chapters of the agreement (e.g. transport) which could have significant environmental implications.

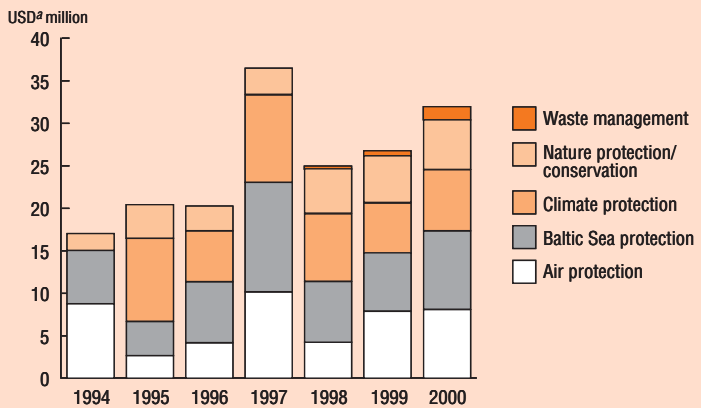
The *EcoFund* is an independent, non-profit foundation established by Poland's Ministry of Finance in 1992. It has been an effective catalyst for initiating needed environmental investment in Poland, in a setting where there are many competing priorities. Created when six creditor countries (the "Paris Club") agreed to waive repayment of part of Poland's public debt on condition that the funds be used for environmental protection (so called "*debt-for-environment swaps*"), the EcoFund received about USD 235 million from 1992 to 2001 through the debt-for-environment mechanism. The EcoFund's revenue between 2000 and 2009 is projected to be an additional USD 335 million. Although funds provided by the EcoFund constituted only about 1% of total environmental expenditure from 1992 to 2000, projects financed with EcoFund support have accounted for over 10% of all environmental investment expenditure in Poland since 1992. The EcoFund finances investments which help address: i) regional environmental issues (reducing SO_x and NO_x

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transboundary emissions, reducing pollution in the Baltic Sea); ii) reduction of GHG emissions; iii) biodiversity conservation; or iv) rationalisation of waste management and treatment of contaminated soils. To date, investments related to reducing air emissions (SO_x, NO_x, CO_2) have accounted for over half of EcoFund expenditure (over 90% of these investments have been directed to improvements in the energy production/heating sector). Investments in water supply and sanitation have accounted for a growing share of total EcoFund expenditure (Figure 8.1). Waste management has recently been designated as a priority area for investment.

Poland receives significant *funding inflows* of official assistance and foreign direct investment. The MOE works to ensure that part of these funds are used to stimulate transfer of innovative environmental protection technology and know-how. For example, such funds have been used to help promote cleaner production as recommended in the 1995 OECD EPR. In 2000 Poland received *official assistance* from OECD Development Assistance Committee (DAC) members totalling USD 1 396 million, representing 22% of their total assistance to Central and Eastern Europe. Additional funds were received through international sources (e.g. EBRD, UNDP, World Bank) and through bilateral projects funded by a number of OECD countries and by EU pre-accession funds. Since 1995 Poland has rather consistently received the highest inflows of *foreign direct investment* among non-DAC OECD

Figure 8.1 **EcoFund expenditure by environmental sector,** 1994-2000



a) At 1995 prices and exchange rates.
Source: EcoFund 2000.

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countries, although it was surpassed in 2000 by Korea (USD 10.1 billion FDI to Korea; USD 9.3 billion to Poland). Consistent with world trends, the inflow of FDI to Poland fell off steeply (by 27%) in 2001. Most of this FDI has been associated with privatisation of previously State-owned enterprises, but greenfield investment has also been supported.

1.2 Climate protection

Poland ratified the *UN Framework Convention on Climate Change* (UNFCCC) in 1994 and has submitted three national communications summarising progress (1994, 1998 and 2001). In 2002 it ratified the Kyoto Protocol to the UNFCCC, thus committing to reduce its aggregate emissions of greenhouse gases (GHG), so that average annual emissions in the period 2008-12 are at least 6% lower than 1988 levels. The MOE's Climate Convention Implementation Office takes the lead in implementing Poland's commitments under the UNFCCC, but the Ministry of the Economy's Energy Department has the main responsibility for energy policy. Poland experienced a 30% reduction in national GHG emissions between 1988 and 1999, largely reflecting restructuring of its economy and energy sector. The greatest emission reductions were achieved in the energy production and residential/commercial sectors, while emissions from the transport sector increased (Chapter 8, Section 2.2). Nonetheless, there is considerable room for further progress, as Poland's CO_2 emission intensities (e.g. per unit GDP, per capita) are particularly high in the OECD context (Figure 8.2). Overall, the Kyoto target of –6% is expected to be reached easily.

A *vulnerability analysis of the Polish coastline* with respect to sea level rise, conducted by the MOE in 2001, concluded that a rise of one metre would result in submersion of about 7% of the national territory (estimated damage, PLN 173 billion) and that a considerably larger area would be in danger of periodic major flooding (estimated damage, PLN 104 billion). The MOE calculated that construction of an extensive system of sea walls, offshore breakwaters and drainage pumps to minimise Poland's vulnerability would cost about PLN 35 billion.

Towards a climate protection policy

The Polish government has not yet adopted an official climate policy. However, *objectives specifically related to reducing GHG emissions* can be found in government documents, including:

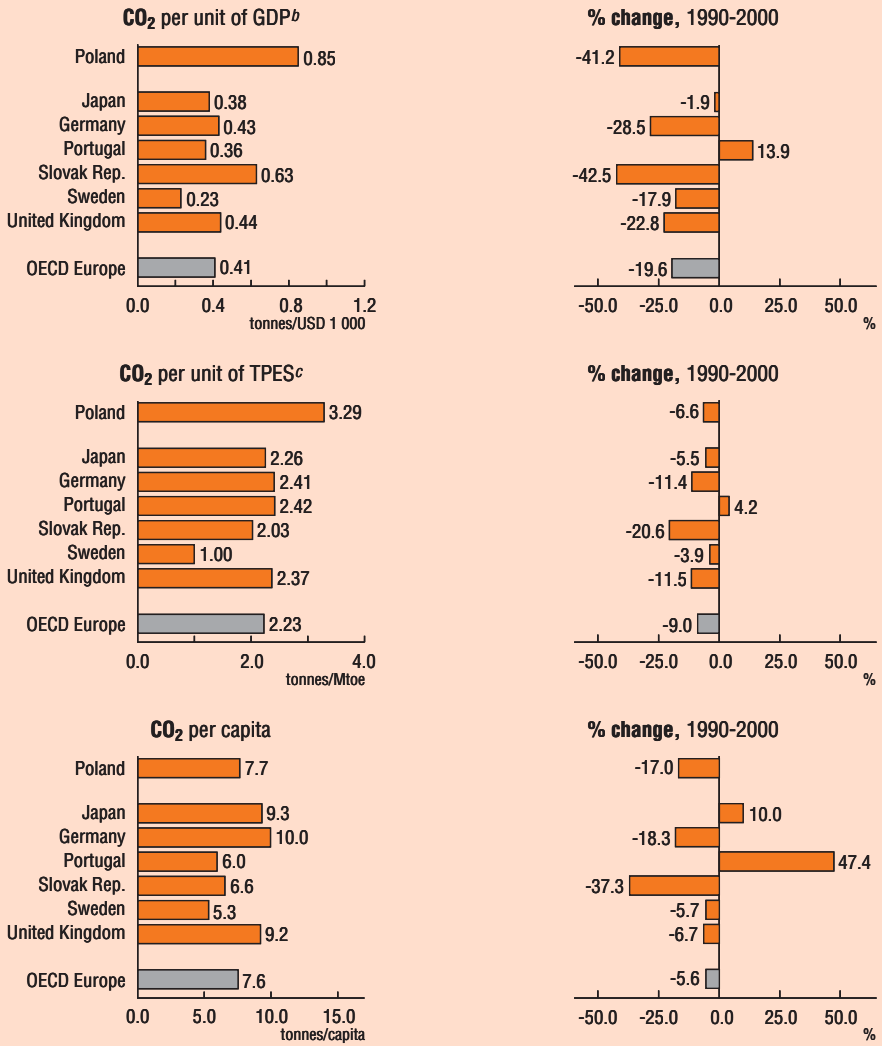
– the First and Second National Environmental Policies (1991 and 2000);

– The Assumptions for Poland's Energy Policy until 2020 (2000);

– Poland 2025 – The Long-term Strategy for Sustainable Development (2000).

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Figure 8.2 **CO_2 emission intensities,**[a] 2000



a) Includes CO_2 emissions from energy use only; excludes international marine and aviation bunkers.
b) At 1995 prices and purchasing power parities.
c) Total primary energy supply.
Source: IEA-OECD.

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Reflected in all these documents are three key policy approaches that will contribute to the reduction of national GHG emissions: i) improvement of energy efficiency, ii) shifting of the energy supply mix towards less carbon-intensive fuels, iii) promotion of use of renewable energy sources.

As could be expected in a national setting where there are rapid changes and strong competition for limited resources (and with the Kyoto target probably within easy reach), there is an emphasis on "*no-regrets*" *measures*. Reducing emissions associated with energy use is one such measure. CO_2 emissions, mainly from fuel combustion, still constitute nearly 85% of Polish GHG emissions (in terms of CO_2 equivalents). It is regrettable that until now no effort has been made to consolidate existing data concerning the marginal costs of reductions (e.g. costs per tonne of avoided GHG emissions) achieved using various policy instruments already in effect or under consideration. Lack of data on relative costs of GHG reductions in different sectors and from different activities signals a lack of commitment to the announced policy of choosing the most cost-effective measures, and precludes a strategic orientation to the planning of future climate protection policy. To improve this situation, Poland should develop a comprehensive climate change policy identifying priority measures based on their cost-effectiveness (in terms of reducing GHG emissions and of anticipated ancillary benefits such as reductions of other air emissions and energy efficiency improvements).

Energy policy

Poland's recent progress towards national climate protection goals has been the result of major economic changes, particularly in the energy sector, but also of environmental policy. Trends in the energy sector reflect a *contraction of primary energy supply* following energy efficiency improvements in the industrial sector, reduced household consumption due to higher end-user energy prices, and some switching from coal to less carbon-intensive fuels (Chapter 6, Section 3.2). Recent fuel supply diversification efforts offer the prospect of large GHG emission reductions. However, according to the current scenario of shrinking energy demand, plentiful domestic reserves of coal and lignite, and serious socio-economic concerns in coal mining areas, these reductions are unlikely to occur very quickly.

The Polish economy's *energy intensity* (per unit of GDP) decreased by 37% since 1990, reflecting the restructuring of energy-intensive industry (e.g. iron and steel production) as well as the modernisation of some manufacturing and fuel combustion processes. In the early 1990s, EUR 250 million in foreign assistance, disbursed through 236 projects, was spent to improve the energy efficiency of power and heat production systems; these projects included modernisation of power plants, thermo-insulation of heating pumps and enrichment of coal. From 1993 to 1994,

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about PLN 88 million was allotted from the EcoFund for conversion from coal to gas heating, connection of buildings to district heating systems, and development of geothermal resources. Despite these improvements, Poland's energy intensity is still almost 20% higher than the OECD average and 42% higher than the OECD Europe average (Figure 2.3). The government has established the objectives of reducing energy intensity by 25% between 2000 and 2010 and by 50% between 2000 and 2025. Meeting these objectives will require consideration of environmental costs in energy pricing and further improvements in the efficiency of energy use by large combustion sources and by end users. As concluded in a recent IEA assessment, Poland will need to develop an ambitious national energy efficiency policy, implemented by action plans in the energy sector. It will be of crucial importance to reinforce the capacity of relevant implementing institutions and to clarify their relations with the government. Overall, such progress will bring about gains in energy efficiency, GHG emission reductions, and reductions of traditional pollutant emissions (i.e. a win-win-win situation).

The government recently introduced several *demand side measures* designed to encourage energy conservation in the framework of Poland's 1997 Energy Act. A major reform of the electricity market was initiated in the late 1990s, with partial liberalisation of electricity prices (Chapter 6, Section 1.3). As electricity prices for households increase, private consumers reduce their energy consumption; consequently there was a drop in GHG emissions in 1998 and 1999. The 1998 Thermo-Modernisation Act introduced building standards aimed at improving energy efficiency in the commercial/residential sector, whose energy consumption was still twice as high as the OECD Europe average. This Act raised heating efficiency standards for new buildings and introduced a co-financing scheme designed to stimulate investments in improving the energy efficiency of existing buildings. The scheme has led to energy savings, although these have been less than expected. Prices for district heating are still subject to approval by the Energy Regulatory Authority (URE), which uses a cost-plus approach that functions as a disincentive to reduce costs, especially with respect to energy consumption. As recommended in a 2001 IEA study, an incentive to reduce energy consumption could be provided by a price cap per Gcal.

A number of supply side measures aimed at shifting the *structure of the energy supply* towards less carbon-intensive fuels have also been introduced. In 1998 the Council of Ministers adopted a reform programme, entitled Reform of the Hard Coal Mining Sector in Poland, 1998-2002, with a budget of PLN 4.4 billion. In the programme's first two years this sector's production capacity was reduced by 26 Mt per year, 21 mines were closed (nine partially) and the workforce was trimmed by 33% (88 000 jobs). A social package introduced to help those who had lost their jobs find other work benefited 61 000 people. By the end of 2002, annual coal extraction

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capacity is to be stabilised at 80-90 Mt (about 63% of average annual production in the 1990s). The government projects that by 2025 the collective share of hard coal and lignite in primary energy supply will fall below 60% (compared to 63% in 2000) as it is offset by increased shares of oil, gas and renewables (Chapter 6, Section 3.2). Between 1997 and 2000 the share of hard coal in primary fuel supply fell from 58 to 51% while that of lignite increased from 13 to 14%. The requirement in the 1997 Energy Act that a portion of large consumers' heat and electricity be produced from renewable or unconventional energy sources is intended to reinforce progress towards recently established targets for renewables in the energy supply (7.5% by 2010 and 14% by 2020).

Joint Implementation efforts

Poland has participated in a number of *pilot projects* in the framework of the Kyoto Protocol's Joint Implementation (JI) mechanism, in co-operation with Annex parties (e.g. the United States, Norway, Canada, Finland, the Netherlands). These projects have mainly involved support for switching to lower carbon-content fuels, greater utilisation of renewable energy sources, and afforestation. Concerning *cost-effectiveness* (in USD/tonne of avoided CO_2 emissions), SENTER (a Dutch agency) has financed Polish JI projects to develop renewable energy sources and achieved emission reductions at under USD 10 per tonne of CO_2 equivalent; in other projects the unit cost of reduction ranged from USD 1 (biomass) to USD 130 (thermo-modernisation) per tonne. The World Bank estimates the international market for JI projects will eventually support reduction costs lower than USD 25 per tonne of CO_2 equivalent.

In 2001 an international conference on Capacity for Climate Protection identified several ways in which the *market for JI projects* could be rendered more efficient. Central European and Western government officials, together with representatives of international organisations, NGOs and businesses, assessed JI projects implemented to date including those in Poland. They concluded that there was still a long way to go before a true market for emissions credits could be established, as transaction costs are still unacceptably high and self-regulating market forces are totally lacking (i.e. prices are established through bilateral agreements between governments). To reduce *transaction costs*, it was recommended that there be more transparency in the project approval process, less government involvement once the contract has been signed, and freer circulation of information. The conference also concluded that there is a need for host countries to establish routine procedures and institutions for project initiation, certification and verification, and that greater involvement of experts from central European host countries in JI projects would go a long way towards ensuring needed feedback to policy-setting processes.

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1.3 Transfrontier environmental issues

As pointed out in the 1995 Environmental Performance Review, Poland is working with other countries on a number of transfrontier or *regional environmental problems*, including pollution in the "Black Triangle" area, pollution of the Baltic Sea, and regional acidifying air pollution. In recent years it has made considerable progress towards limiting its contributions to such environmental problems, which has helped strengthen co-operation with its neighbours (Chapter 8, Section 2.3). Of course further progress still needs to be made. Further efforts should be planned in a coherent way that seeks to make the greatest contribution to solving international environmental problems as cost-effectively as possible.

Long-range transport of air pollution

Poland has not ratified any of the protocols to the *UN-ECE Convention on Long-range Transboundary Air Pollution* which contain emission reduction targets, although it has signed several of them (i.e. the Oslo, Sofia, Gothenburg, and Aarhus Protocols). It should determine priorities for prompt ratification of relevant protocols, especially as it is among the European countries most affected by acidification (e.g. it has one of the highest rates of SO_x deposition per unit area). Poland's recent performance in terms of air emissions indicates that minimal efforts would be required to comply with these protocols (Chapter 2, Section 2.1). It has already more than met the targets of the Oslo Protocol for SO_2 and of the Sofia Protocol for NO_x and has made very good progress towards meeting the targets for NO_x, VOCs, SO_2 and NH_3 in the 1999 Gothenburg Protocol (Table 8.1).

Poland's progress in reducing emissions of acidifying air pollutants has been as much the result of economic structural change as of environmental policy. In the framework of EU accession, it recently established several *emission reduction targets for 2010* (Table 2.1). While ambitious, these targets are attainable as Poland's pollution intensities are still among the highest in the OECD for most criteria air pollutants (Figure 2.1). Since significant investments are likely to be necessary to meet future targets (e.g. in installation of flue gas desulphurisation equipment, low-NO_x burners, large-scale fuel switching), Polish authorities should ensure that the most cost-effective measures are chosen, seeking when possible to target investments to projects that optimise the additional benefit of reducing GHG emissions.

Despite a 53% decrease in national SO_x emissions since 1990, Poland remains the largest *exporter of SO_x* in the EMEP area, exporting 753 kt in 2000 to its seven neighbouring countries and the Baltic Sea. Poland is a net importer of SO_x from Germany (81.7 kt in 2000) and the Czech Republic (10.3 kt), but a net exporter to its five other neighbours (153.7 kt in total). Per unit of GDP, Poland continues to emit more SO_x than most other OECD Europe countries (Figure 2.1). Further investments will be necessary to reduce

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Poland's contribution to transfrontier acidification. Most of its seven refineries (average age over 30 years, total output of 350 000 barrels per day in 2000) are in need of modernisation. In 2001 modernisation of the Plock refinery (260 000 barrels per day) began.

Poland reduced NO_x emissions by 35% in the 1990s but remains the sixth most important *exporter of NO_x* in the EMEP area. It is a net importer of NO_x from Germany (42 kt in 2000), the Czech Republic (16 kt) and Belarus (3 kt) and a net exporter to Russia (24 kt), Ukraine (23 kt), Lithuania (6 kt) and Slovakia (1 kt). Including exports to the Baltic Sea, total net exports were 79 kt in 2000. Per unit of GDP, Poland's NO_x emissions are still 70% above the OECD Europe average (Figure 2.1). There has been good progress towards the Gothenburg reduction target for 2010 (Table 8.1). Further reductions appear feasible, although increasing motorization may slow progress.

Table 8.1 **Convention on Long-range Transboundary Air Pollution:[a] Poland's performance compared to targets**

	Protocol[b, c, d]		Commitments		Performance	
			Target Period	Target change (%)	Observed Period	Change (%)
Sulphur dioxide (SO_2)	Oslo	(1994)	1980-2000	*–37*	1980-00	*–63*
			1980-2005	*–47*	1980-00	*–63*
			1980-2010	*–66*	1980-00	*–63*
	Gothenburg	(1999)	1990-2010	*–56*	1990-00	*–53*
Nitrogen oxides (NO_x)	Sofia	(1988)	1987-1994	*0*	1987-94	*–28*
	Gothenburg	(1999)	1990-2010	*–31*	1990-00	*–35*
Volatile organic compounds (VOCs)	Gothenburg	(1999)	1990-2010	*–4*	1990-00	*–28*
Ammonia (NH_3)	Gothenburg	(1999)	1990-2010	*–8*	1990-99	*–41*
Heavy metals	Aarhus	(1998)				
Cadmium (Cd)			1990 cap	*0*	1990-99	*–40*
Lead (Pb)			1990 cap	*0*	1990-99	*–46*
Mercury (Hg)			1990 cap	*0*	1990-99	*–11*
Persistent organic pollutants (POPs)	Aarhus	(1998)				
Polycyclic aromatic hydrocarbons			1990 cap	*0*	1990-99	*+10*
Dioxins/furans			1990 cap	*0*	1990-99	*–21*
Hexachlorobenzene			1990 cap	*0*	1990-99	*0*

a) 1979 Geneva Convention.
b) Date opened for signature indicated in parenthesis.
c) 1985 Helsinki Protocol (SO_x) and 1991 Geneva Protocol (VOCs) are not listed as Poland has neither signed nor ratified them.
d) Poland has signed but not yet ratified the Oslo, Sofia, Gothenburg and Aarhus Protocols.
Source: EMEP; OECD.

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Between 1990 and 1999 Poland's net *imports of VOC emissions* from neighbouring countries fell by 25% (from 32 to 24 kt per year), largely owing to emission reductions in the Czech Republic and Germany. Poland did not sign the 1991 Geneva Protocol on VOC emissions, as it did not consider the 30% reduction to be feasible in view of national growth in road traffic. Polish NMVOC emissions decreased by 29% in the period 1988 to 1999. At the end of the 1990s Poland signed the Gothenburg Protocol, which establishes the target of reducing VOC emissions by 4% between 1990 and 2010. Meeting this target seems feasible, as it leaves margin for growth compared with current emission levels (Table 8.1).

Transboundary river pollution

By ratifying the *Convention on the Protection and Use of Transboundary Watercourses and International Lakes* in 2000, Poland committed to take steps to prevent, control and reduce pollution of transboundary surface waters. This includes participating in programmes on monitoring, research and development, warning and response systems, mutual assistance and information exchange. Poland's co-operation with its neighbours through bilateral agreements pre-dates this Convention. For example, a 1992 agreement between Poland and Germany on joint management and protection of transfrontier waters has led to specific measures to protect ground and surface waters in the Odra-Neisse catchment, as well as to the elaboration of a regional flood action programme. Poland and Germany have also set up a joint emergency response system for the Odra and Nysa rivers, in case of industrial accidents.

The scope of Polish co-operation on *protection of the Odra River* broadened after 1996, when an action programme adopted at the Ministerial Meeting of the Council of the Baltic States in Kalmar, Sweden, recognised the need for transboundary management of water resources (particularly in the Odra basin) to limit inputs to the Baltic Sea. Poland has hosted the International Commission for the Protection of the Odra River Against Pollution (headquartered in Wroclaw) since its establishment in 1996. Germany, the Czech Republic and the EU are also members of the Commission, whose *programme for 1997-2002* set targets for reduction of total loading to the Odra of BOD_5 (–85%), nitrates (–25%), phosphorous (–63%) and COD (–50%). A preliminary assessment report in 2000 found that progress towards these ambitious targets was satisfactory, although further efforts would be needed to achieve full compliance. The Commission recently issued a Common Strategy for Flood Protection in the Odra River Catchment, which is the basis for broader co-operation in this area.

The transboundary *Bug River*, which drains into the Baltic Sea, flows through Ukraine, Belarus and Poland. Co-operation among these three countries has been strengthened in recent years, following a 1997 memorandum of understanding. The Bug is an important source of water for the 2.5 million people living in its

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catchment area, particularly in the city of Warsaw. Recent intensification of agricultural activity in the Bug basin, especially in Belarus, has resulted in higher levels of pesticide and herbicide pollution. Several industrial cities located on the Bug are responsible for considerable inputs of heavy metals. In the 1997 MOU, the three countries agreed to apply the UN-ECE guidelines on water quality monitoring and assessment in transboundary rivers to evaluate water quality. By 2000 an inventory of available information concerning water quality, an evaluation of current legislation and regulations, and monitoring and sampling methods had been compiled.

Transboundary nature protection

Poland's *Bialowieza National Park* (10 502 hectares, including a 4 747 hectare core zone) is contiguous with Belovezhskaya Pushcha National Park (87 600 hectares) in Belarus. Both parks are UNESCO Biosphere Reserves and are on the UNESCO World Heritage list. The Bialowieza-Belovezhskaya transfrontier park contains one of the last and largest areas of European lowland mixed forest (pine, beech, oak, alder and spruce), which is partly pristine (it is estimated to date to 8000 B.C.). About 11 000 species of fauna live in the park, including some 200 species of birds (e.g. the Pomeranian eagle, black stork, tawny owl), seven reptile species, 11 amphibian species and 60 mammal species, including the European bison (reintroduced in 1929) and the tarpan (Polish wild forest horse). Plant life is also very diverse (over 1 200 species) and includes many unique specimens, such as the mountain arnica. Issues that Poland and Belarus must work to resolve to ensure a stable future for this transfrontier park include the effects of acidifying air pollution, local pollution from a nearby railway line, and disturbance of natural water flows by the creation of a reservoir in Belarus on the Narew River, 13 kilometres from the park. Since less than 25% of the total forest area is covered by the strict core zone protection regime, there is concern that some old growth forest could still be vulnerable to logging.

Poland contains a portion of two transfrontier Biosphere Reserves in the *Carpathian Mountains* (the Tatra Park in Poland and Slovakia, and the East Carpathians Park in Poland, Slovakia and the Ukraine). The Carpathians, which extend over seven countries, have a surface area of over 200 000 km^2. In 2002 the World Wildlife Fund (WWF) estimated that these mountains are the home of nearly 500 endemic plant species, as well as some of Europe's largest populations of predatory mammals (e.g. 8 000 brown bears, 3 000 lynxes and 4 000 wolves). The portion of the Tatras (the central and highest section of the Carpathian range) on Polish territory has been entirely consecrated to the Tatra National Park, whose equivalent on the Slovak side is the Tatransky Narodny Park. Poland and its partner countries enforce special regulations on economic activities in the transboundary parks to preserve the original fauna and flora. However, a recent WWF report

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emphasised the need for a strategic approach to deal with threats facing these parks, including land reform and consequent fragmentation of habitats, the decline in rural economies and resulting out-migration, and acid rain.

1.4 Marine pollution

Pollution from on-shore sources

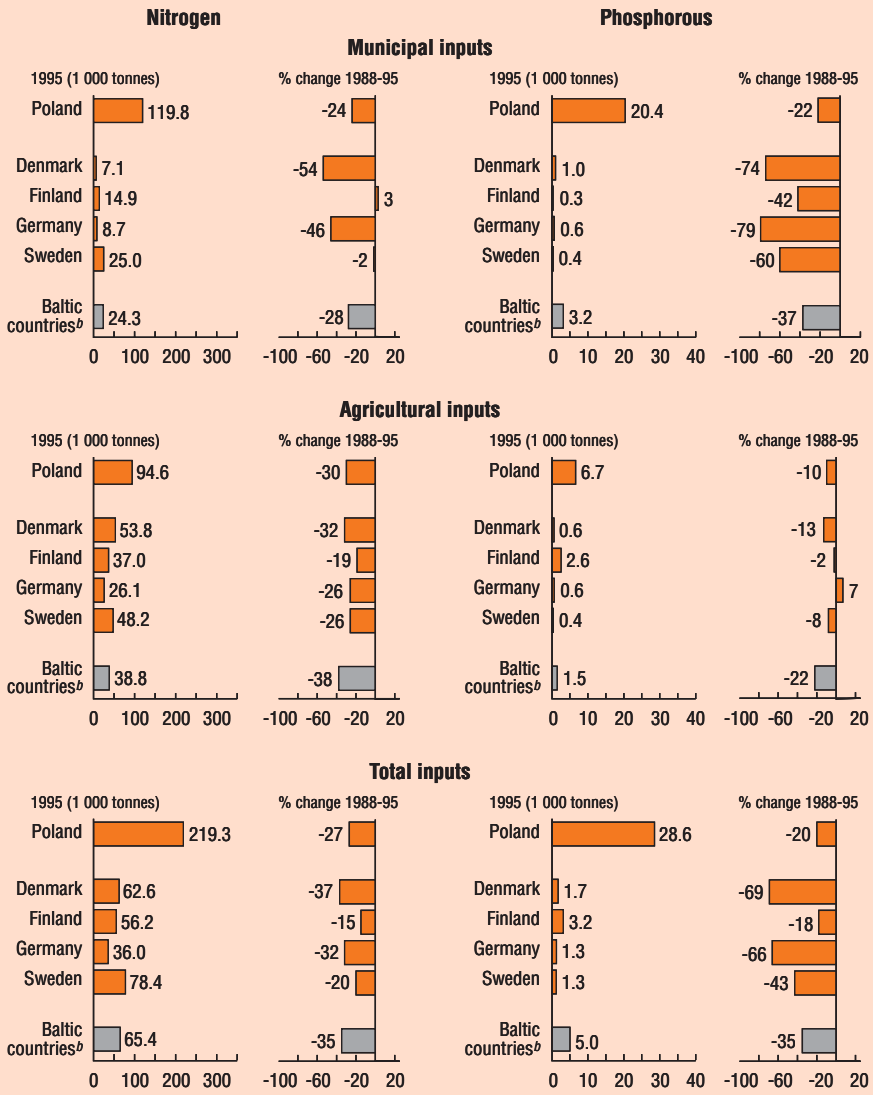
The *Baltic Sea* is almost totally enclosed by land, and is rather shallow (average depth 50 m). It is connected to the North Sea by narrow straits around Denmark and Sweden. This limits the exchange of water with the open sea, so that it takes 25 to 30 years for all the water in the Baltic Sea to be replaced. Over 200 large rivers bring fresh water into the Baltic, making it the world's largest brackish sea. Two of Poland's main rivers, the Vistula and the Odra, collect and discharge to the Baltic Sea pollutants not only from Poland, but also from upstream countries. Fourteen countries are in the Baltic catchment area, where 85 million people live. In Poland, Germany and Denmark 60 to 70% of land in the catchment area is used for agriculture. But Poland, with 50% of the total catchment area's population and 40% of its arable land, is naturally the major contributor of pollution to the Baltic Sea.

At the 1988 ministerial meeting, HELCOM countries expressed their resolve to reduce total *loading of nutrients (nitrogen and phosphorous) to the Baltic Sea* at least 50% by 1995. Nitrogen and phosphorus inputs have caused significant eutrophication, with large-scale and persistent algal blooms destabilising coastal ecosystems including the traditional spawning ground for cod in the Gulf of Gdansk. Between 1988 and 1995, Poland reduced its overall loading of nitrogen by 27%, compared with an average 35% for the Baltic countries (Figure 8.3). This achievement was largely due to its expenditure of PLN 2 billion to expand waste water treatment facilities in the period, as part of its participation in the Baltic Sea Joint Comprehensive Environmental Action Programme (JCP) (Chapter 8, Section 2.3). This expenditure was partially facilitated by funds from the EU PHARE programme and Danish and Swedish bilateral assistance.

Nutrient loading of the Baltic Sea originating in Poland is mainly from municipal sewage discharges (55% of nitrogen loading, 71% of that of phosphorous). These include industrial discharges that enter municipal sewerage systems. Agriculture is the second largest source (43% of nitrogen loading and 25% of that of phosphorous), although the intensity of use of agrochemicals remains relatively low in Poland (Figure 3.4). Poland invested in public waste water treatment plants in the late 1990s, and total discharges from municipalities have fallen by about 25% relative to 1988 levels. Nitrogen and phosphorus discharges from agriculture have decreased by 30 and 10%, respectively (Figure 8.3). Poland has reduced its nitrogen discharges from fertilisers by 26% since 1990; however, use of nitrogen fertilisers was still responsible for 56% of

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Figure 8.3 **Performance compared to Baltic Declaration Targets,**[a] 1988-1995, selected countries



a) The 1988 Baltic Declaration set the target of reducing HELCOM countries' nutrient input to the Baltic Sea by at least 50% between 1988 and 1995.
b) Average.
Source: Finnish Institute for Environmental Protection.

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Poland's agricultural inputs to the Baltic Sea in 2000. Poland has halved its agricultural run-off since 1990, but it still contributes 54 to 64% of total inputs, reflecting progress by other Baltic countries in controlling their inputs, as well as the fact that Poland has more arable land and population in the basin than do other Baltic countries.

Concerning elimination of discharges of DDT, according to the 2000 Summary Report on Implementation of HELCOM Recommendations, annual input via Polish rivers is estimated at 178 kg. Poland has successfully implemented regulations on cadmium use in electroplating, resulting in a steep decrease in cadmium loading to the Baltic Sea.

Discharges from ships

All *releases of oily wastes or effluent* to the Baltic Sea from ships is prohibited under MARPOL. Poland regularly participates in aerial surveillance in co-operation with other HELCOM countries. These exercises help assess the amounts of oil being discharged. They also provide aircraft crews of different nationalities experience in working together, which would be important in the case of a major accident. In 2001 Poland's surveillance of the Baltic Sea totalled 187 hours. Since 2000 the "no special fee" system has been applied at Baltic Sea ports, eliminating the former economic disincentive to use port waste reception facilities.

Oil imports and maritime traffic in the Polish EEZ have more than doubled in the past decade, increasing the risk of *marine oil spills*. Poland participates in joint response exercises with other HELCOM countries. The Ministry of the Environment co-ordinates all emergency actions related to possible oil spills in the coastal zone and on international rivers; the Ministry of Infrastructure is responsible for responding to possible spills in the Baltic Sea. Modern response equipment, including seagoing tugboats, specialised skimmers and salvage vessels, is kept ready for deployment. Poland has not yet ratified the 1990 Convention on Oil Pollution Preparedness, Response and Co-operation (the OPRC Convention), but plans to do so in 2003.

1.5 Management of shared fish stocks

Exploitation of major fish stocks (e.g. sprat, cod, herring and salmon) in the *Polish EEZ* (central Baltic Sea) is regulated by the International Baltic Sea Fishery Commission (IBSFC), established by the 1973 Gdansk Convention, which sets annual total allowable catch (TAC) quotas for the Baltic. The Polish Ministry of Agriculture and Rural Development assigns individual quotas to vessels (not transferable except within companies). The fishery in the Baltic Sea employs about 4 200 persons and operates

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about 413 cutter vessels (33 000 GRT, 94 000 kW), and 925 smaller vessels. According to ICES data, in 2001 the Polish fish catch in the Baltic Sea was some 180 000 tonnes, dominated by sprat (86 000 tonnes), herring (38 000 tonnes) and cod (22 000 tonnes); approximately 144 000 salmon were also caught in Polish fisheries in 2001 (Table 8.2). Economically the most important fish species is cod, representing about 20% of total catch weight and 70% of value. Recently, high dioxin levels in some species of Baltic fish were identified as a risk to human health. In July 2002 the EU called for a ban on the sale of the Baltic herring in member States because of the excessive dioxin levels found in this fish. Sweden and Finland have been granted an exemption from the ban until 2006 on condition that their health authorities inform consumers of the risks. Poland has been monitoring dioxin levels in Baltic herring since 2001.

Poland has strengthened *domestic management* of shared fish stocks in recent years. With privatisation of the cutter fleet completed (average age nearly 30 years), market prices for fish have increased. In the 1996 Sea Fishery Act and related regulations, Poland transposed specific technical conservation measures defined by the IBSFC related to minimum mesh size for nets, allowable types of fishing equipment and closed seasons for certain fisheries. It has participated increasingly actively in IBSFC efforts to collect, analyse and disseminate data on fish catches and fishing activities, with greater exchange of information on individual quotas, and vessel-specific landing and catch statistics. In the late 1990s none of the *government transfers* to Polish fisheries (about PLN 35 million per year) took the form of direct payments or cost reduction measures. However, fuels used by fishing vessels were exempt from VAT and excise taxes, while preferential credits were available for purchase and storage of fish.

Despite these positive trends, Poland should determine priorities for further efforts to decrease exploitation of key Baltic Sea stocks to sustainable levels as most commercially exploited stocks are now classified as *outside safe biological limits* (Table 8.2). For example, Poland accounts for about one-third of the catch of the severely depleted Eastern Baltic cod. In 2002 the ICES recommended that exploitation of this stock be halted altogether. This recommendation was disregarded, and a TAC of 76 000 tonnes was set by the IBSFC. Poland should nonetheless ensure, through increased inspections (e.g. in harbours, at sea, by satellite), that catches are not under-reported. It should also strengthen regulation of the sprat fishery to ensure adequate protection of the over-exploited herring stock (sprat and herring are caught in a mixed pelagic fishery). A 2002 ICES study of Baltic pelagic fisheries pointed out that catch sampling by Polish authorities (e.g. aboard fishing cutters, in harbours) had fallen by 50% in recent years compared with the period 1997-2001, when sampling was financially supported by the EU.

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Table 8.2 **Biological status of key Baltic Sea stocks exploited by Poland**

Species (stock)	Minimum spawning stock[a] (kt)	Estimated spawning stock biomass (kt)		Status of stock W/C/O[b]	Catches in 2001[c] (kt)	
		2001	2002		Poland	Total
Cod (western Baltic)[d]	23.0	25.0	20.8	O	0.6	34.2
Cod (eastern Baltic)[d]	240.0	76.2	84.2	O	21.3	67.7
Herring (central Baltic)[d]	. .	43.1	42.5	O	28.4	149.0
Herring (south-western Baltic)[d]	. .	137.3	139.7	O	9.3	152.0
Sprat (entire Baltic)[d]	275.0	1 369.8	1 052.9	W	85.8	342.2
Salmon (main basin)[d]	. .	. .	. .	. .	144.0[e]	1 410.0[e]

a) B_{pa} (precautionary approach spawning stock biomass).
b) Within, close to or outside of safe biological limits as assessed by ICES, 2002.
c) Includes reported catches by Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia, and Sweden.
d) Stock definitions by ICES: western Baltic corresponds to subdivisions 22 and 24; eastern Baltic corresponds to subdivisions 25-32 central Baltic corresponds to subdivisions 25-29 and 32; entire Baltic corresponds to subdivisions 22-32; main basin corresponds to subdivisions 25-29.
e) Salmon catches reported in thousands of fish.
Source: ICES, Advisory Committee on Fishery Management.

1.6 Trade and environment

Polish accession to the EU will entail *trade liberalisation* at the regional level, which can be expected to have some environmental impacts. The accession process has already resulted in the adoption of higher environmental standards. Poland should ensure that environmental objectives are reflected in the use of EU structural and cohesion funds following accession (Chapter 8, Section 2.1).

Poland is a party to the Montreal Protocol and has met nearly all the phase-out deadlines for *ozone depleting substances (ODS)* as established in the Protocol amendments. In 2000 Poland did not produce CFCs or halons and was only a small consumer of these chemicals. CFC consumption (production plus imports minus exports in bulk) dropped from 4 940 tonnes in 1990 to 310 tonnes in 1998; Poland considers its remaining consumption necessary for "essential uses". Halon consumption dropped from 330 tonnes in 1990 to 33 tonnes in 1993 and has remained at zero since (thus meeting the 1994 deadline for complete phase-out). A Global Environment Facility project initiated in 1997 facilitated transfer of ODS-free technologies to the industrial sector, development of a national network for recovery of refrigerants, and strengthening of enforcement capacity through training.

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Poland limits and regulates *international trade in hazardous waste* rather strictly. In the early years of economic transition there were plans to export hazardous waste from OECD countries to Poland. However, Poland became a party to the Basel Convention in 1992 and banned all imports of hazardous waste in 1993. These early proactive actions helped protect it against illegal imports of obsolete chemicals and allegedly recyclable material, which have been sent to other central European countries (e.g. Hungary, Romania and Albania). Although data on inspection and enforcement are not available, the Ministry of the Environment reports that controls of waste shipments in transit on Polish territory are very effective. This is partly due to co-operation among the Inspectorate for Environmental Protection, the Sanitary Inspectorate, the Customs Office and the Border Police.

As a party to the Convention on International Trade in Endangered Species (CITES), Poland has taken measures to prevent *illegal trade in endangered species* since 1989. Customs officials have been trained, and efforts have been made to improve co-ordination with neighbouring countries. Comprehensive data on searches and seizures are not available. Illegal smuggling of caviar (i.e. without CITES permits) from Poland to the United States became an issue in the late 1990s. Warsaw's Deputy Police Chief pled guilty to conspiracy to smuggle wildlife in a 1999 case involving some 9 500 kg of caviar. Poland is among the world's top ten exporters of medicinal and aromatic plants and plant parts, an increasing number of which are on endangered species lists; a recent WWF/IUCN report called for tighter regulation of commercial exploitation and exportation of these plants. In 2000 Poland began co-operation with France to increase public awareness of CITES issues in Poland and to improve Polish inspectors' understanding of EU CITES regulations.

Table 8.3 **Protected status of some mammals offered for commercial hunting**

Name	Price (EUR)[a]	CITES	EU Reg 338/97	IUCN (1996) Red List
Grey wolf (Canis lupus)	1 200	II, I	A	Removed 1996
Beach marten (Martes foina)	100	III	C	–
Pine marten (Martes martes)	100	–	–	–
Racoon dog (Nyctereutes procyonoides)	90	–	–	–
Red fox (Vulpes vulpes)	70	–	–	–
European bison (Bison bonasus)	5 050	–	–	EN A2ce C2a

a) Prices reported are the maximum quoted in published offers by commercial agencies; may be considerably higher in reality.
Source: Traffic 2002.

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According to a 2002 report by Traffic (the WWF/IUCN wildlife trade monitoring programme) on *commercial hunting*, approximately 15 000 tourists per year come to Poland to hunt (mostly from Germany, Italy, France, Austria and Spain), generating annual revenue of about EUR 2 million. Hunting tourism in Poland is mainly focused on non-CITES species. However, some listed species are commercially hunted, with permit prices roughly corresponding to their rareness (Table 8.3). Demand for hunting tourism has been increasing in the last few years.

2. Focus on Selected Topics

2.1 Pre-accession negotiations and commitments

The environment chapter of the accession agreement

Poland began *negotiations on the environment chapter* of the draft EU accession agreement in December 1999. These negotiations concerned Poland's implementation of the EU environmental "acquis", which aims to ensure a high level of environmental quality in Europe as well as an environmental "level playing field". They therefore covered the full range of EU environmental legislation, including nature protection, water quality, industrial pollution and risk assessment, air quality, noise, chemicals and genetically modified organisms, waste management, and nuclear safety and radiation protection. Of the chapters negotiated, the environment chapter was among the most difficult. During the negotiations Poland submitted 16 plans for implementing environmental Directives, including work schedules and timelines for completing the main stages, together with cost estimates and an indication of financing sources.

2001 was a turning point, not only because the *environment chapter was provisionally closed* in that year but also because there was considerable progress in transposing EU Directives (Table 6.3). Provisional closure of negotiations on the environment chapter does not mean the negotiating process has been terminated. Rather, it indicates that the agreements reached during the negotiations are considered acceptable but may still be reconsidered until overall agreement is reached on all chapters. Poland will still have to negotiate with the EU on legislation passed between 2000 and the date of signing of the accession treaty. EU environmental legislation includes tens of new regulations per year. Poland will either have to declare itself capable of implementing them by the deadlines foreseen or negotiate additional implementation delays.

Under the present agreement, Poland is to comply fully with all EU environmental legislation in the decade following accession. *Transition periods* have been granted for implementing nine key environmental Directives (Table 8.4). In particular, significant

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Table 8.4 **Transition periods for complying with EU environmental legislation**[a]

EU Legislation	Subject	Specific concern	Transition period
99/32/EC	Reduction in sulphur content of certain liquid fuels	Article 3	4 years
94/63/EC	Control of VOC emissions resulting from storage of petrol and its distribution from terminals to service stations	Articles 3, 4, 5, 6	2 or 3 years, depending on article
94/62/EC	Recovery of packaging and packaging waste	Article 6	5 years
99/31/EC	Landfilling of waste[b]	Article 14c, Ann 2, 3, 4, 6	10 years
259/93/EC	Supervision and control of shipments of waste within, into or out of the EC	"Amber list" wastes	5 years, with possibility of prolongation until 2012 in relation to plastics and other amber list wastes
91/271/EC	Urban waste waster treatment	Articles 3, 4, 5, 7, 13	6, 8 or 10 years, depending on article and size of agglomeration
76/464/EC	Pollution caused by certain dangerous substances discharged to the aquatic environment	"Daughter Directives" concerning particular substances	5 years
96/61/EC	Integrated pollution prevention and control	392 existing installations requiring modernisation or integrated permitting	3 years
97/43/Eurotom	Protection of individuals from dangers of ionising radiation from medical exposure	Article 8	4 years

a) Agreed in the process of negotiating the environment chapter of the EU accession agreement (chapter provisionally closed in 2001).
b) Poland has accepted the regulations of Article 14d of the Directive, but has reserved the right to change its position in case changes should be introduced to the draft of Annex 2.
Source: MOE.

delays were granted for implementation of EU legislation on urban waste water treatment in view of the large capital investment and the time required for full implementation. Poland has also been granted significant derogations for full implementation of EU waste legislation (e.g. on landfilling, recovery of packaging materials, international shipments) and certain legislation pertaining to formulation and distribution of motor vehicle fuels.

Investments and financing

Estimates of the amount of *investment necessary to implement the EU acquis* in the area of environment range from EUR 22 billion to EUR 50 billion; spread over ten years, this would entail investing 1.2 to 2.7% of GDP per year. However, it should

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be noted that some investment costs would also have resulted from implementation of national environmental legislation and international commitments; thus they do not strictly represent the "additional costs" of implementing the environmental acquis. Still, necessary investment will be considerably more than the 1% of GDP spent by Poland for pollution abatement and control investment in 2000 (Table 6.4). It is anticipated that future expenditure will be borne primarily by companies and local governments. Modernisation of enterprises will be financed by the enterprises themselves or facilitated through loans. Investments by local governments will be financed from their own budgets and local environment funds. The continued existence of the *environment funds* (Chapter 6, Section 2.1) will no doubt be instrumental in ensuring that Poland meets its deadlines for full implementation of EU environmental legislation.

Investments in environmental infrastructure are also eligible for co-financing (before EU accession) by *pre-accession assistance sources (e.g. PHARE, SAPARD, ISPA)* or will be eligible after accession by structural or cohesion funds. The PHARE programme, established in 1990 to assist central European applicants in their preparations to join the EU, was refocused in 1999. PHARE funds liberated by the creation of SAPARD and ISPA were redirected towards promoting economic and social cohesion, particularly through institutional strengthening (e.g. institutional twinning, technical assistance). PHARE helped familiarise candidate countries with the structures and procedures they will need to use Structural Funds efficiently and effectively. SAPARD (Special Accession Programme for Agricultural and Rural Development) has taken the lead in promoting modernisation of agriculture and the development of rural areas, with the aim of helping accession countries comply with the Common Agricultural Policy. Annual financing available for Poland is approximately EUR 175 million.

ISPA (Instrument for Structural Policies for Pre-accession) has become the main instrument for promoting development of transport and environmental infrastructure in Poland. ISPA, a precursor to the Cohesion Funds, has committed to funding projects totalling EUR 7.3 billion (approximately EUR 1.0 billion per year) in the ten candidate countries between 2000 and 2006. Poland will receive about 35% of the total during this period. The rate of assistance will be up to 75% of eligible public expenditure (EPE), and in exceptional cases up to 85%. In 2000 and 2001, 35 Polish ISPA projects were approved, with ISPA's grant contribution totalling EUR 1.4 billion and EPE totalling EUR 2.06 billion. Of these projects, 14 were for environmental infrastructure (ISPA grant contribution of EUR 545 million, EPE of EUR 916 million). Polish environmental projects approved thus far have mainly been oriented towards helping Poland upgrade and expand environmental infrastructure, with the aim of complying with Directives on waste water treatment (approximately 65% of total investment), drinking water supply (17%) and solid waste management (15%).

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2.2 Greenhouse gas emissions, 1988-2000

Between 1990 and 2000 Poland made remarkable progress in *decoupling CO_2 emissions* from economic growth. It reduced emissions from energy combustion by 16% while GDP grew by 45% (Table 6.1). However, its CO_2 emissions remain high in both absolute and relative terms, largely due to continued heavy reliance on coal for energy supply (Table 8.5; Figure 8.2). In 2000, Poland was the fifth largest emitter of CO_2 in OECD Europe (296 Mt) and its CO_2 emissions per unit of GDP were twice as high as the OECD Europe average.

Poland achieved a *30% reduction in national greenhouse gas emissions* between 1988 and 1999. The greatest reduction (–76.4 MtC) was achieved in the energy sector, which still accounted for 52% of total emissions in 1999. A large reduction (–56.4 MtC) was also achieved in the commercial/residential sector, which accounted for 14% of the total in 1999. GHG emissions from manufacturing, which accounted for 17% of the total in 1999, decreased by nearly 19% (–15.7 MtC) between 1988 and 1999. Transport was the only sector in which GHG emissions increased (by 12%) during this period.

CH_4 and N_2O emissions made up 12 and 5% of total GHG emissions (in CO_2 equivalents) in 1999. CH_4 emissions, emanating mainly from energy production (40%), agriculture (30%) and landfills, decreased by 28% between 1988 and 1999 (in which year they totalled 47 MtC). However, N_2O emissions increased by 9% in the same period. Agriculture, responsible for 75% N_2O emissions, was the greatest contributor to this increase. N_2O emissions from agriculture increased by 30% between 1988 and 1999 (when they totalled 56 Mt). There is little data on Polish emissions of the "*F-gases*" *(SF_6, PFCs, HFCs*).

In its Third National Communication to the UNFCCC, Poland presented some *projections of sectoral emissions* in 2005 and 2010. As different assumptions are used in the sectoral analyses, it is not possible to compare overall expected reductions (i.e. the sum of sectoral reductions) for these years. Poland expects to achieve further large reductions in emissions from the energy production sector (on the order of 40%), mainly through fuel switching. The projections indicate that emission reductions in the commercial/residential sector between 1990 and 1999 could be eroded by greater consumption.

Poland attaches great importance to the *carbon sequestration capacity* of its forests (28.4% of the national territory). In 1999 this was estimated at 43.5 Mt of CO_2 (about 10% of total GHG emissions). Since 1988 forest cover has increased slightly and average annual wood harvesting has accounted for 1.5% of the standing biomass of forests, never exceeding the current increase in the tree stand capacity.

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Table 8.5 **CO_2 emissions from fuel combustion by source and sector,** 1990-2000

(MtC)

	Oil[a]		Natural gas[a]		Coal and coal products[a]		Total[a]		
	1990	2000	1990	2000	1990	2000	1990	2000	Change 1990-00 (%)
Total	35.31	52.44	18.42	21.09	286.93	217.25	344.17	292.82	*–14.9*
	10.3	*17.9*	*5.4*	*7.2*	*83.4*	*74.2*	*100.0*	*100.0*	
Energy production and transformation	6.65	4.85	1.99	3.79	214.16	160.94	223.95	169.96	*–24.1*
	18.8	*9.2*	*10.8*	*18.0*	*74.6*	*74.1*	*65.1*	*58.0*	
Of which:									
Electricity and heat production	1.27	1.01	0.03	1.01	157.13	147.98	158.45	150.06	*–5.3*
	3.6	*1.9*	*0.2*	*4.8*	*54.8*	*68.1*	*46.0*	*51.2*	
Other	5.38	3.84	1.96	2.78	57.03	12.96	65.50	19.90	*–69.6*
	15.2	*7.3*	*10.6*	*13.2*	*19.9*	*6.0*	*19.0*	*6.8*	
Manufacturing industries and construction	4.23	6.90	8.81	8.17	31.76	33.86	47.11	50.58	+7.4
	12.0	*13.2*	*47.8*	*38.7*	*11.1*	*15.6*	*13.7*	*17.3*	
Transport	20.11	25.79	0.00	0.14	0.72	0.00	20.84	25.93	*+24.4*
	57.0	*49.2*	*0.0*	*0.7*	*0.3*	*0.0*	*6.1*	*8.9*	
Of which:									
Road transport	17.98	24.85	0.00	0.00	0.00	0.00	17.98	24.85	*+38.2*
	50.9	*47.4*	*0.0*	*0.0*	*0.0*	*0.0*	*5.2*	*8.5*	
Residential	0.11	2.57	6.82	7.12	25.39	16.76	32.32	26.45	*–18.2*
	0.3	*4.9*	*37.0*	*33.8*	*8.8*	*7.7*	*9.4*	*9.0*	
Other	4.20	12.34	0.79	1.87	14.90	5.68	19.95	19.90	*–0.3*
	11.9	*23.5*	*4.3*	*8.9*	*5.2*	*2.6*	*5.8*	*6.8*	

a) Percentages of total emissions are shown in italics, as well as in % change column.
Source: IEA-OECD.

2.3 Regional co-operation to address trans-boundary pollution

Emission reductions in the Black Triangle

The largest *lignite deposits* in Europe stretch from Lower Silesia in Poland to Southern Saxony in Germany, and into Northern Bohemia in the Czech Republic. As this lignite was used for energy production, this region became known as "the Black

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Triangle" because of its high pollution levels. In the early 1990s approximately 200 Mt of brown coal was mined in the region each year. A number of lignite-fired electric power plants (total capacity 15 000 MW, about 25% of the European capacity) were operating in the region with virtually no pollution controls, emitting some 3 Mt of SO_2 and 1 Mt of NO_x per year. Other large emitters included district heating, petrochemical plants and refineries, copper mining and processing, textile manufacturing, glassworks and coal extraction. In Poland pollution discharges were especially concentrated in the Katowice District (Silesia), which emitted nearly 25% of total national emissions of SO_x, NO_x and particles. An estimated 75% of German and Czech emissions in the Black Triangle were deposited in Poland.

In the framework of a 1991 agreement between the Ministers of the Environment of Poland, Germany and the Czech Republic, *vast emission reductions* have been made in the region during the past decade (i.e. reductions in emissions of SO_x by 70%, NO_x by 69%, particles by 90%). Over EUR 13 million in *PHARE funds* have been used to improve environmental quality in the Czech and Polish parts of the Black Triangle; Poland has also made national funds available. The role of large power plants in the region as major polluters has been effectively eliminated through pollution control measures (e.g. electrostatic precipitators, flue gas desulphurisation, low-NO_x technologies), by modernisation of combustion processes or simply by plant closure. Data provided by the joint air monitoring system established as part of international co-operation on the Black Triangle demonstrate that, as of 1998, annual mean concentrations of SO_x, NO_x, CO and particles no longer exceed the corresponding limit values in EU Directives and WHO guidelines. However, ozone exceedences continue to pose problems in the area and nitrogen emissions (primarily from cars) appear to be increasing.

Clean-up of pollution hotspots in the Baltic Sea catchment

In January 2000 the *Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM, 1992)* entered into force. Poland is a party to HELCOM, along with Denmark, Estonia, the EU, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden. Parties to the convention have committed to take all appropriate measures, individually or through regional co-operation, to prevent and eliminate pollution of the sea and preserve its ecological balance. HELCOM regularly disseminates recommendations on reducing pollution inputs.

In 1992 HELCOM countries approved the *Baltic Sea Joint Comprehensive Environmental Action Programme* (JCP), whose long-term objective is ecological restoration and preservation of ecological balance. The JCP promotes both preventive actions to ensure sustainable use of Baltic Sea resources and curative actions to remediate environmental degradation caused by point and non-point source pollution. It also

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promotes development of environmental policies and legislation to encourage environmentally sound actions, strengthen institutional capacity and human resources, and increase local capacity to finance environmental measures. Implementation of the JCP took place in two phases: 1993-97 (joint expenditure of about EUR 5 billion by HELCOM countries) and 1998-2012 (projected expenditure of EUR 13 billion by all HELCOM countries). Priority was given to controlling point source pollution and diffuse source pollution. The programme focused on 132 hot spots, 40 of them in Poland. Ten Polish hot spots were removed from the list in 2002, as they met environmental standards.

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ANNEXES

I.A Selected environmental data

I.B Selected economic data

I.C Selected social data

II.A Selected multilateral agreements (worldwide)

II.B Selected multilateral agreements (regional)

III. Selected environmental events (1995-2001)

IV. Physical context

V. Selected websites concerning environmental management

ANNEX I.A: SELECTED ENVIRONMENTAL DATA (1)

		CAN	MEX	USA	JPN	KOR	AUS	NZL	AUT	BEL	CZE	DNK	FIN
LAND													
Total area (1000 km^2)		9971	1958	9364	378	99	7713	270	84	31	79	43	338
Major protected areas (% of total area)	*2*	9.6	8.2	21.2	6.8	6.9	7.7	23.5	29.2	2.8	16.2	32.0	8.4
Nitrogenous fertiliser use (t/km^2 of arable land)		3.8	4.9	5.7	11.3	21.9	1.9	59.0	7.9	17.0	7.1	10.3	7.1
Pesticide use (t/km^2 of arable land)		0.07	0.13	0.20	1.50	1.29	0.06	0.82	0.24	1.15	0.13	0.12	0.05
FOREST													
Forest area (% of land area)		45.3	33.4	32.6	66.8	65.2	19.4	29.5	47.6	22.2	34.1	10.5	75.5
Use of forest resources (harvest/growth)		0.4	0.2	0.6	0.3	0.1	0.6	0.6	0.6	0.9	0.7	0.6	0.8
Tropical wood imports (USD/cap.)	*3*	1.6	0.2	2.2	10.7	6.1	4.0	3.4	0.4	24.2	0.3	3.8	1.4
THREATENED SPECIES													
Mammals (% of species known)		17.1	33.2	10.5	24.0	17.0	23.2	15.2	26.2	31.6	33.3	22.0	11.9
Birds (% of species known)		9.6	16.9	7.2	12.9	14.1	12.1	25.3	26.0	27.5	55.9	13.2	13.3
Fish (% of species known)		7.1	5.7	2.4	24.0	1.3	0.7	0.8	41.7	54.3	29.2	15.8	11.8
WATER													
Water withdrawal (% of gross annual availability)		1.7	15.3	19.9	21.2	34.3	6.8	0.6	4.2	45.1	12.4	12.3	2.1
Public waste water treatment (% of population served)		75	24	71	62	68	..	80	81	39	62	89	80
Fish catches (% of world catches)		1.0	1.4	5.0	5.3	1.9	0.2	0.6	-	-	-	1.6	0.2
AIR													
Emissions of sulphur oxides (kg/cap.)		89.7	12.2	62.7	6.9	24.7	95.8	11.6	5.0	20.1	25.8	5.2	14.6
(kg/1000 USD GDP)	*4*	3.7	1.6	2.0	0.3	2.1	4.1	0.7	0.2	0.9	2.0	0.2	0.6
% change (1990-late 1990s)		-19	..	-20	-3	-29	-4	20	-55	-37	-86	-85	-71
Emissions of nitrogen oxides (kg/cap.)		67.4	12.0	84.4	13.1	23.3	135.2	53.4	22.6	35.7	38.6	38.9	45.6
(kg/1000 USD GDP)	*4*	2.6	1.6	2.7	0.5	2.0	5.7	3.1	0.9	1.5	3.0	1.5	1.9
% change (1990-late 1990s)		-2	18	5	-	17	17	18	-9	16	-47	-25	-21
Emissions of carbon dioxide (t./cap.)	*5*	16.7	3.8	20.8	9.3	9.5	17.2	8.4	7.7	11.8	11.9	9.4	10.8
(t./1000 USD GDP)	*4*	0.62	0.45	0.63	0.38	0.68	0.71	0.45	0.32	0.48	0.91	0.37	0.45
% change (1990-1999)		22	24	18	13	88	26	38	9	14	-19	2	5
WASTE GENERATED													
Industrial waste (kg/1000 USD GDP)	*4, 6*	..	50	..	40	60	110	30	80	60	70	20	150
Municipal waste (kg/cap.)	*7*	330	320	760	410	360	690	380	560	550	330	660	460
Nuclear waste (t./Mtoe of TPES)	*8*	4.7	0.1	0.9	1.7	3.5	-	-	-	2.2	1.0	-	2.2
PAC EXPENDITURE (% of GDP)	*9*	1.1	0.8	1.6	1.4	1.7	0.8	..	1.7	0.9	2.0	0.9	1.1

.. not available. - nil or negligible. x data 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, ITA, LUX, NOR, POL TUR: national data.
3) Total imports of cork and wood from non-OECD tropical countries.
4) GDP at 1995 prices and purchasing power parities.

Source: OECD Environmental Data Compendium.

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FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	**POL**	PRT	ESP	SLO	SWE	CHE	TUR	UKD*	OECD*
549	357	132	93	103	70	301	3	42	324	**313**	92	506	49	450	41	779	245	34777
10.1	26.9	2.6	9.1	9.5	0.9	9.1	6.5	11.6	7.6	**9.7**	6.6	8.4	21.6	8.1	18.0	3.8	20.4	12.4
12.4	15.3	7.3	6.4	9.8	43.1	7.6	x	30.5	11.4	**6.0**	3.9	5.8	4.5	6.9	11.8	5.1	16.0	6.2
0.51	0.26	0.29	0.10	-	0.25	0.44	0.63	0.98	0.04	**0.06**	0.50	0.18	0.21	0.06	0.33	0.13	*0.52*	*0.21*
31.4	30.1	22.8	18.9	1.3	8.8	23.3	34.4	9.2	39.2	**29.7**	37.9	32.3	42.2	73.5	31.7	26.9	10.5	33.9
0.7	0.4	0.6	0.6	-	0.6	0.3	0.5	0.6	0.5	**0.6**	0.8	0.5	0.5	0.7	0.5	0.4	0.7	0.5
6.8	1.8	2.8	0.1	2.8	11.2	7.1	-	15.6	3.6	**0.3**	17.9	6.2	0.1	2.2	0.6	0.5	2.7	4.0
19.7	36.7	37.9	71.1	-	6.5	40.7	51.6	15.6	3.4	**14.6**	17.3	21.2	22.2	23.1	34.2	22.2	*21.9*	..
14.3	29.2	13.0	18.8	34.7	21.8	18.4	50.0	27.1	7.7	**14.7**	13.7	14.1	14.4	19.2	42.6	6.7	*6.4*	..
7.5	68.2	24.3	32.1	-	33.3	31.8	27.9	82.1	-	**9.6**	18.6	29.4	23.8	7.9	44.7	9.9	*11.1*	..
15.9	22.3	12.1	4.7	0.1	2.6	32.1	3.7	4.9	0.7	**16.9**	15.2	36.8	1.4	1.5	4.8	16.8	*17.4*	*11.7*
77	91	56	26	16	61	63	95	98	73	**55**	55	48	49	93	96	12	92	63
0.6	0.2	0.1	-	2.1	0.3	0.3	-	0.5	2.9	**0.2**	0.2	1.0	-	0.4	-	0.5	0.8	27.4
14.2	10.1	51.4	58.5	33.4	42.2	16.0	7.1	5.7	6.4	**39.1**	37.6	40.4	33.2	8.0	3.9	33.0	19.9	32.8
0.7	0.4	3.7	5.7	1.3	1.7	0.8	0.2	0.2	0.2	**4.3**	2.4	2.4	3.3	0.4	0.1	5.3	1.0	1.5
-34	-84	7	-41	14	-14	-46	-79	-55	-46	**-53**	4	-25	-67	-48	-35	..	-68	-33
28.1	19.9	36.4	22.0	91.7	32.2	25.8	38.8	26.6	53.7	**21.7**	37.0	33.0	24.1	30.2	14.8	14.1	26.9	40.3
1.3	0.9	2.6	2.1	3.5	1.4	1.2	0.9	1.1	2.1	**2.4**	2.4	2.0	2.4	1.4	0.6	2.3	1.3	1.9
-12	-40	17	-7	-2	3	-24	-27	-27	6	**-35**	17	6	-43	-23	-32	48	-42	-4
6.0	10.0	8.0	5.5	7.7	11.0	7.4	18.4	10.9	7.7	**7.7**	6.0	7.2	6.6	5.3	5.6	3.1	9.2	11.2
0.26	0.43	0.54	0.49	0.29	0.40	0.34	0.43	0.44	0.29	**0.85**	0.36	0.40	0.63	0.23	0.20	0.49	0.44	0.51
-3	-15	23	-18	8	29	8	-23	11	21	**-16**	49	35	-36	-2	-5	49	-3	13
80	30	50	20	1	60	20	140	30	30	**160**	80	40	80	110	10	30	40	70
510	540	430	450	700	560	500	640	610	620	**290**	450	660	320	450	650	390	560	540
4.4	1.2	-	1.8	-	-	-	-	0.2	-	**-**	-	1.4	2.5	4.6	2.4	-	3.4	1.5
1.4	1.5	0.8	0.7	..	0.6	0.9	..	1.8	1.2	**1.1**	0.9	0.8	1.5	1.2	1.6	..	1.0	..

* UKD: pesticides and threatened species: Great Britain; water withdrawal: England and Wales.

5) CO_2 from energy use only; international marine and aviation bunkers are excluded.

6) Waste from manufacturing industries.

7) CAN, 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) Household expenditure excluded; HUN, POL: investments only.

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ANNEX I.B: SELECTED ECONOMIC DATA (1)

		CAN	MEX	USA	JPN	KOR	AUS	NZL	AUT	BEL	CZE	DNK
GROSS DOMESTIC PRODUCT												
GDP, 2001 (billion USD at 1995 prices and PPPs)		842	812	9156	3131	674	474	72	198	258	139	138
% change (1990-2001)		33.4	40.7	39.1	14.6	87.1	44.0	32.6	27.0	24.6	3.8	26.9
per capita, 2001 (1000 USD/cap.)		27.1	8.2	32.1	24.6	14.2	24.5	18.7	24.4	25.1	13.6	25.8
Exports, 2001 (% of GDP)		43.3	27.5	10.3	10.4	42.9	22.4	36.6	52.2	86.8	71.4	45.3
INDUSTRY	*2*											
Value added in industry (% of GDP)		31	28	25	32	44	26	27	33	28	41	27
Industrial production: % change (1990-2001)		36.0	42.6	41.6	-5.3	135.8	28.2	19.1	45.4	15.2	-18.6	41.9
AGRICULTURE												
Value added in agriculture (% of GDP)	*3*	3	4	2	1	5	4	8	2	1	4	3
Agricultural production: % change (1990-2001)		13.9	33.4	20.3	-9.2	26.2	28.0	29.0	4.3	17.2	..	2.3
Livestock population, 2001 (million head of sheep eq.)		103	276	786	55	27	295	102	18	30	14	25
ENERGY												
Total supply, 2000 (Mtoe)		251	154	2300	525	194	110	19	29	59	40	19
% change (1990-2000)		20.0	23.8	19.3	19.6	109.1	25.9	32.9	13.3	22.3	-14.8	7.7
Energy intensity, 2000 (toe/1000 USD GDP)		0.30	0.19	0.25	0.17	0.30	0.24	0.26	0.15	0.23	0.30	0.14
% change (1990-2000)		-8.7	-12.2	-13.2	3.9	15.1	-10.5	2.1	-9.8	-0.8	-15.0	-14.4
Structure of energy supply, 2000 (%)	*4*											
Solid fuels		12.0	4.6	23.6	17.9	21.7	43.1	5.4	12.5	14.2	52.2	20.7
Oil		34.7	61.8	38.7	50.5	53.6	33.2	33.9	41.1	40.4	19.1	45.0
Gas		29.4	21.7	23.7	12.3	8.8	17.5	27.1	22.7	22.7	18.2	22.9
Nuclear		7.5	1.4	9.1	16.0	14.7	..	..	..	21.3	8.6	..
Hydro, etc.		16.5	10.4	5.0	3.3	1.3	6.3	33.5	23.7	1.3	1.9	11.3
ROAD TRANSPORT	*5*											
Road traffic volumes per capita, 1999 (1000 veh.-km/cap.)		9.4	0.6	15.8	6.0	1.8	9.3	8.0	7.8	8.7	3.1	8.4
Road vehicle stock, 1999 (10 000 vehicles)		1784	1459	21533	7003	1116	1199	231	485	512	373	223
% change (1990-1999)		7.8	47.7	14.1	24.0	228.9	22.7	25.2	31.3	20.2	43.7	17.9
per capita (veh./100 inh.)		59	15	79	55	24	63	61	60	50	36	42

.. not available. - nil or negligible. x data included under Belgium.

1) Data may include provisional figures and Secretariat estimates. Partial totals are underlined.

2) Value added: includes mining and quarrying, manufacturing, gas, electricity and water and construction; production: excludes construction.

Source: OECD Environmental Data Compendium.

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OECD EPR / SECOND CYCLE

FIN	FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	**POL**	PRT	ESP	SLO	SWE	CHE	TUR	UKD	OECD
124	1393	1921	165	117	8	112	1288	20	398	120	**352**	167	739	58	206	200	391	1293	24965
24.6	22.0	19.0	31.2	12.2	31.8	115.0	19.0	86.5	34.4	41.9	**44.6**	33.7	33.5	14.9	20.6	10.3	31.6	28.3	30.6
23.9	23.5	23.3	15.5	11.5	26.8	29.1	22.2	44.5	24.9	26.5	**9.1**	16.6	18.4	10.8	23.2	27.7	5.7	21.6	22.0
40.4	28.2	35.0	24.5	60.6	39.8	94.5	28.3	153.6	65.8	46.2	**29.8**	31.5	29.9	75.9	46.5	43.8	35.0	27.1	21.6
34	25	30	21	34	29	41	29	21	27	43	**35**	31	30	35	28	30	30	28	28
63.2	19.0	14.0	14.1	54.0	..	256.6	14.2	28.9	20.7	41.1	**64.3**	24.7	21.7	0.2	40.0	26.1	38.2	10.0	23.6
4	3	1	8	4	11	4	3	1	3	2	**4**	4	4	5	2	2	15	1	2
-13.7	2.0	-2.9	16.9	-13.0	9.1	10.3	7.2	x	-0.6	-15.2	**-16.2**	0.5	12.8	..	-9.3	-7.0	7.8	-11.2	..
9	164	124	21	13	1	54	71	x	46	9	**57**	19	96	7	13	12	117	117	2682
33	257	340	28	25	3	15	172	4	76	26	**90**	25	125	17	47	27	77	233	5317
15.0	13.8	-4.5	27.9	-12.9	63.5	39.8	13.1	3.1	14.0	19.4	**-9.9**	43.4	37.9	-19.5	1.7	6.1	46.4	9.5	17.8
0.27	0.19	0.18	0.18	0.22	0.46	0.14	0.14	0.20	0.19	0.22	**0.26**	0.15	0.17	0.31	0.23	0.13	0.18	0.18	0.22
-7.0	-4.8	-19.3	1.5	-19.4	27.8	-30.7	-3.2	-41.9	-14.2	-14.6	**-37.0**	9.3	6.2	-27.6	-14.6	-2.5	3.0	-12.7	-8.9
15.7	5.7	23.7	32.5	16.2	2.9	18.2	7.5	3.9	10.8	3.9	**62.2**	15.5	16.8	24.1	5.5	0.9	30.5	15.5	20.4
30.4	33.2	38.8	56.1	28.0	24.5	56.5	52.6	73.3	38.5	33.1	**22.1**	63.4	52.1	16.2	28.6	46.8	40.5	35.9	40.8
10.6	13.4	21.2	6.1	39.3	..	23.5	34.5	21.0	46.8	13.3	**11.0**	8.3	12.2	32.6	1.5	8.9	16.4	37.8	21.6
18.2	41.1	13.0	..	14.9	..	..	..	..	1.4	..	**..**	..	13.0	24.3	32.0	25.4	..	9.6	11.0
24.9	6.6	3.3	5.3	1.6	72.6	1.8	5.4	1.8	2.6	49.6	**4.7**	12.8	5.9	2.7	32.4	17.9	12.6	1.2	6.2
8.9	8.4	7.4	7.3	3.5	6.5	8.3	8.0	8.9	7.0	7.2	**4.5**	5.8	4.2	2.2	8.4	7.2	0.8	7.8	8.0
240	3309	4503	389	271	17	148	3545	31	675	225	**1104**	461	2048	141	424	376	548	2909	57281
7.6	16.3	20.7	54.1	12.7	27.3	55.8	15.9	40.2	17.7	16.0	**72.6**	109.5	41.8	..	7.9	13.9	132.1	15.4	21.7
46	56	55	37	27	62	39	61	71	43	51	**29**	46	52	26	48	53	8	49	51

3) Agriculture, forestry, hunting, fishery, etc.

4) Breakdown excludes electricity trade.

5) Refers to motor vehicles with four or more wheels, except for Japan and Italy, which include three-wheeled goods vehicles.

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ANNEX I.C: SELECTED SOCIAL DATA (1)

		CAN	MEX	USA	JPN	KOR	AUS	NZL	AUT	BEL	CZE	DNK
POPULATION												
Total population, 2001 (100 000 inh.)		311	991	2850	1273	473	194	39	81	103	102	54
% change (1990-2001)		12.2	22.0	14.0	3.0	10.4	13.6	14.5	5.3	3.2	-1.3	4.2
Population density, 2001 (inh./km^2)		3.1	50.6	30.4	336.9	476.7	2.5	14.3	96.9	336.9	129.6	124.4
Ageing index, 2001 (over 64/under 15)		67.1	17.0	58.4	125.1	36.3	61.0	52.4	92.5	94.5	84.4	79.3
HEALTH												
Women life expectancy at birth, 2000 (years)		81.7	77.9	79.4	84.6	79.2	82.0	80.8	81.2	80.8	78.5	79.0
Infant mortality, 2000 (deaths /1 000 live births)		5.3	24.9	7.1	3.2	7.7	5.2	5.4	4.8	5.2	4.0	5.3
Expenditure, 2000 (% of GDP)		9.3	5.4	13.0	7.8	5.9	8.3	8.2	8.0	8.7	7.2	8.4
INCOME AND POVERTY												
GDP per capita, 2001 (1000 USD/cap.)		27.1	8.2	32.1	24.6	14.2	24.5	18.7	24.4	25.1	13.6	25.8
Poverty (% pop. < 50% median income)		10.3	21.9	17.0	8.1	..	9.3	..	7.4	7.8	..	5.0
Inequality (Gini levels)	*2*	28.5	52.6	34.4	26.0	..	30.5	25.6	26.1	27.2	..	21.7
Minimum to median wages, 2000	*3*	42.5	21.1	36.4	32.9	23.8	57.9	46.3	x	49.2	30.4	x
EMPLOYMENT												
Unemployment rate, 2001 (% of total labour force)		7.2	2.5	4.8	5.0	3.7	6.8	5.3	4.9	6.6	8.2	4.3
Labour force participation rate, 2001 (% 15-64 year-olds)		77.5	55.7	66.9	78.2	65.3	75.4	66.0	76.9	64.0	71.5	80.1
Employment in agriculture, 2001 (%)	*4*	2.9	17.6	2.4	4.9	10.3	4.9	9.1	5.7	2.2	4.8	3.3
EDUCATION												
Education, 2001 (% 25-64 year-olds)	*5*	81.9	21.6	87.7	83.1	68.0	58.9	75.7	75.7	58.5	86.2	80.2
Expenditure, 1999 (% of GDP)	*6*	6.6	5.2	6.5	4.7	6.8	5.8	..	6.3	5.5	4.7	6.7
OFFICIAL DEVELOPMENT ASSISTANCE	*7*											
ODA, 2001 (% of GNI)		0.23	..	0.11	0.23	..	0.25	0.25	0.25	0.37	..	1.01
ODA, 2001 (USD/cap.)		51	..	38	76	..	44	29	56	84	..	298

.. not available. - nil or negligible. x not applicable.

1) Data may include provisional figures and Secretariat estimates. Partial totals are underlined.

2) Ranging from 0 (equal) to 100 (inequal) income distribution; figures relate to total disposable income (including all incomes, taxes and benefits) for the entire population.

3) Minimum wage as a percentage of median earnings including overtime pay and bonuses.

Source: OECD.

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OECD EPR / SECOND CYCLE

FIN	FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	**POL**	PRT	ESP	SLO	SWE	CHE	TUR	UKD	OECD
52	592	823	106	102	3	38	579	4	160	45	**386**	101	403	54	89	72	686	600	11367
4.2	4.4	3.7	5.3	-1.7	11.9	9.6	2.1	14.8	7.0	6.4	**1.4**	1.9	3.6	1.5	3.9	7.7	22.1	4.2	9.1
15.4	107.8	230.6	80.5	109.5	2.8	54.6	192.3	170.6	385.0	13.9	**123.6**	109.4	79.6	109.7	19.8	175.1	88.0	245.0	32.7
84.4	86.2	116.3	111.9	92.4	50.0	52.2	124.9	74.6	73.0	75.0	**67.0**	90.7	116.3	60.2	100.1	95.6	18.4	82.3	65.9
81.0	82.5	80.7	80.6	75.6	81.4	79.1	81.6	81.2	80.6	81.4	**78.0**	79.1	82.4	77.2	82.1	82.5	71.0	79.8	..
3.8	4.5	4.4	6.1	9.2	3.0	5.9	5.1	5.1	5.1	3.8	**8.1**	5.5	4.6	8.6	3.4	4.9	38.7	5.6	..
6.6	9.5	10.6	8.3	6.8	8.9	6.7	8.1	6.0	8.1	7.5	**6.2**	8.2	7.7	5.9	7.9	10.7	4.8	7.3	..
23.9	23.5	23.3	15.5	11.5	26.8	29.1	22.2	44.5	24.9	26.5	**9.1**	16.6	18.4	10.8	23.2	27.7	5.7	21.6	22.0
4.9	7.5	9.4	13.8	7.3	..	11.0	14.2	..	6.3	10.0	**..**	..	..	..	6.4	6.2	16.2	10.9	..
22.8	27.8	28.2	33.6	28.3	..	32.4	34.5	..	25.5	25.6	**..**	..	..	..	23.0	26.9	49.1	32.4	..
x	60.8	x	51.3	35.6	x	x	x	48.9	46.7	x	**35.5**	38.2	31.8	..	x	x	..	x	..
9.1	8.7	7.4	10.4	5.7	1.5	3.9	9.6	2.6	2.2	3.6	**18.2**	4.1	10.5	19.3	4.0	1.9	8.4	5.1	6.4
74.8	69.7	75.1	63.0	58.0	76.8	70.4	60.8	65.3	67.0	80.7	**65.1**	75.7	69.3	69.5	77.0	81.8	51.5	75.9	68.5
5.7	3.7	2.6	16.0	6.3	7.8	7.0	5.3	1.4	2.9	3.9	**19.1**	12.7	6.4	6.1	2.3	4.2	32.6	1.4	6.6
73.8	63.9	82.6	51.4	70.2	56.9	57.6	43.3	52.7	65.0	85.2	**45.9**	19.9	40.0	85.1	80.6	87.4	24.3	63.0	64.2
5.8	6.2	5.6	3.9	5.2	..	4.6	4.8	..	4.7	6.6	**5.3**	5.7	5.3	4.4	6.7	5.9	3.9	5.2	5.5
0.33	0.34	0.27	0.19	..	..	0.33	0.14	0.80	0.82	0.83	**..**	0.25	0.30	..	0.76	0.34	..	0.32	0.22
75	73	59	18	..	..	74	26	322	197	298	**..**	27	43	..	177	126	..	78	60

4) Civil employment in agriculture, forestry and fishing.

5) Upper secondary or higher education; OECD: average of rates.

6) Public and private expenditure on educational institutions; OECD: average of rates.

7) Official Development Assistance by Member countries of the OECD Development Assistance Committee.

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ANNEX II.A: SELECTED MULTILATERAL AGREEMENTS (WORLDWIDE)

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

			CAN	MEX	USA	JPN
1946 Washington	Conv. - Regulation of whaling	Y	D	R	R	R
1956 Washington	Protocol	Y	R	R	R	R
1949 Geneva	Conv. - Road traffic	Y	R		R	R
1954 London	Conv. - Prevention of pollution of the sea by oil	Y	R	R	R	R
1971 London	Amendments to convention (protection of the Great Barrier Reef)		R			
1957 Brussels	Conv. - Limitation of the liability of owners of sea-going ships	Y	S			D
1979 Brussels	Protocol	Y				
1958 Geneva	Conv. - Fishing and conservation of the living resources of the high seas	Y	S	R	R	
1960 Geneva	Conv. - Protection of workers against ionising radiations (ILO 115)	Y		R		R
1962 Brussels	Conv. - Liability of operators of nuclear ships					
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
1964 Copenhagen	Conv. - International council for the exploration of the sea	Y	R		R	
1970 Copenhagen	Protocol	Y	R		R	
1969 Brussels	Conv. - Intervention on the high seas in cases of oil pollution casualties (INTERVENTION)	Y		R	R	R
1973 London	Protocol (pollution by substances other than oil)	Y		R	R	
1969 Brussels	Conv. - Civil liability for oil pollution damage (CLC)	Y	R	D	S	D
1976 London	Protocol	Y	R	R		R
1992 London	Protocol	Y	R	R		R
1970 Bern	Conv. - Transport of goods by rail (CIM)	Y				
1971 Brussels	Conv. - International fund for compensation for oil pollution damage (FUND)	Y	D	D	S	D
1976 London	Protocol	Y	R	R		R
1992 London	Protocol	Y	R	R		R
1971 Brussels	Conv. - Civil liability in maritime carriage of nuclear material	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
1971 Ramsar	Conv. - Wetlands of international importance especially as waterfowl habitat	Y	R	R	R	R
1982 Paris	Protocol	Y	R	R	R	R
1987 Regina	Regina amendment	Y	R	R		R
1971 Geneva	Conv. - Protection against hazards of poisoning arising from benzene (ILO 136)	Y				
1972 London, Mexico, Moscow, Washington	Conv. - Prevention of marine pollution by dumping of wastes and other matter (LC)	Y	R	R	R	R
1996 London	Protocol to the Conv. - Prevention of marine poll. by dumping of wastes and other matter		R		S	
1972 Geneva	Conv. - Protection of new varieties of plants (revised)	Y	R	R	R	R
1978 Geneva	Amendments	Y	R	R	R	R
1991 Geneva	Amendments	Y			R	R
1972 Geneva	Conv. - Safe container (CSC)	Y	R	R	R	R
1972 London, Moscow, Washington	Conv. - International liability for damage caused by space objects	Y	R	R	R	R
1972 Paris	Conv. - Protection of the world cultural and natural heritage	Y	R	R	R	R
1973 Washington	Conv. - International trade in endangered species of wild fauna and flora (CITES)	Y	R	R	R	R
1974 Geneva	Conv. - Prev. and control of occup. hazards caused by carcinog. subst. and agents (ILO 139)	Y				R
1976 London	Conv. - Limitation of liability for maritime claims (LLMC)	Y		R		R
1996 London	Amendment to convention		S			
1977 Geneva	Conv. - Protection of workers against occupational hazards in the working environment due to air pollution, noise and vibration (ILO 148)	Y				
1978 London	Protocol - Prevention of pollution from ships (MARPOL PROT)	Y	R	R	R	R
1978 London	Annex III	Y			R	R
1978 London	Annex IV					R

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OECD EPR / SECOND CYCLE

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

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

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ANNEX II.A: SELECTED MULTILATERAL AGREEMENTS (WORLDWIDE) (cont.)

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

			CAN	MEX	USA	JPN
1978 London	Annex V	Y		R	R	R
1997 London	Annex VI					
1979 Bonn	Conv. - Conservation of migratory species of wild animals	Y				
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				
1996 Monaco	Agreem. - Conservation of cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area	Y				
1996 The Hague	Agreem. - Conservation of African-Eurasian migratory waterbirds	Y				
1982 Montego Bay	Conv. - Law of the sea	Y	S	R		R
1994 New York	Agreem. - relating to the implementation of part XI of the convention	Y	S		S	R
1995 New York	Agreem. - Implementation of the provisions of the convention relating to the conservation and management of straddling fish stocks and highly migratory fish stocks	Y	R		R	S
1983 Geneva	Agreem. - Tropical timber	Y	R		R	R
1994 New York	Revised agreem. - Tropical timber	Y	R		R	R
1985 Vienna	Conv. - Protection of the ozone layer	Y	R	R	R	R
1987 Montreal	Protocol (substances that deplete the ozone layer)	Y	R	R	R	R
1990 London	Amendment to protocol	Y	R	R	R	R
1992 Copenhagen	Amendment to protocol	Y	R	R	R	R
1997 Montreal	Amendment to protocol	Y	R			
1999 Beijing	Amendment to protocol		R			
1986 Vienna	Conv. - Early notification of a nuclear accident	Y	R	R	R	R
1986 Vienna	Conv. - Assistance in the case of a nuclear accident or radiological emergency	Y	S	R	R	R
1989 Basel	Conv. - Control of transboundary movements of hazardous wastes and their disposal	Y	R	R	S	R
1995 Geneva	Amendment					
1999 Basel	Prot. - Liability and compensation for damage					
1989 London	Conv. - Salvage	Y	R	R	R	
1990 Geneva	Conv. - Safety in the use of chemicals at work (ILO 170)	Y		R		
1990 London	Conv. - Oil pollution preparedness, response and co-operation (OPRC)	Y	R	R	R	R
1992 Rio de Janeiro	Conv. - Biological diversity	Y	R	R	S	R
2000 Montreal	Prot. - Biosafety		S	S		
1992 New York	Conv. - Framework convention on climate change	Y	R	R	R	R
1997 Kyoto	Protocol		S	R	S	R
1993 Paris	Conv. - Prohibition of the development, production, stockpiling and use of chemical weapons and their destruction	Y	R	R	S	R
1993 Geneva	Conv. - Prevention of major industrial accidents (ILO 174)	Y				
1993	Agreem. - Promote compliance with international conservation and management measures by fishing vessels on the high seas		R	R	R	R
1994 Vienna	Conv. - Nuclear safety	Y	R	R	R	R
1994 Paris	Conv. - Combat desertification in those countries experiencing serious drought and/or desertification, particularly in Africa	Y	R	R	R	R
1995 Rome	Code of conduct on responsible fishing					
1996 London	Conv. - Liability and compensation for damage in connection with the carriage of hazardous and noxious substances by sea		S			
1997 Vienna	Conv. - Supplementary compensation for nuclear damage				S	
1997 Vienna	Conv. - Joint convention on the safety of spent fuel management and on the safety of radioactive waste management	Y	R		S	
1997 New York	Conv. - Law of the non-navigational uses of international watercourses					
1998 Rotterdam	Conv. - Prior informed consent procedure for hazardous chemicals and pesticides (PIC)				S	S
2001 London	Conv. - Civil liability for bunker oil pollution damage					
2001 Stockholm	Conv. - Persistent organic pollutants		R	S	S	

Source: IUCN; OECD.

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OECD EPR / SECOND CYCLE

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

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

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ANNEX II.B: SELECTED MULTILATERAL AGREEMENTS (REGIONAL)

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

			CAN	MEX	USA	JPN
1946 London	Conv. - Regulation of the meshes of fishing nets and the size limits of fish	Y				
1958 Dublin	Amendments	Y				
1960 London	Amendments	Y				
1961 Copenhagen	Amendments	Y				
1962 Hamburg	Amendments	Y				
1963 London	Amendments	Y				
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 uniform conditions of approval and reciprocal recognition of approval for motor vehicle equipments and parts	Y				
1959 Washington	Treaty - Antarctic	Y	R		R	R
1991 Madrid	Protocol to the Antarctic treaty (environmental protection)	Y	S		R	R
1988 Vienna	Joint protocol relating to the application of the Vienna Convention and the Paris Convention	Y				
1962 Stockholm	Agreem. - Protection of the salmon in the Baltic Sea	Y				
1972 Stockholm	Protocol	Y				
1964 Brussels	Agreem. - Measures for the conservation of Antarctic Fauna and Flora	Y			R	R
1964 London	Conv. - Fisheries	Y				
1967 London	Conv. - Conduct of fishing operations in the North Atlantic	Y	S		S	
1972 London	Conv. - Conservation of Antarctic seals	Y	R		R	R
1973 Gdansk	Conv. - Fishing and conservation of the living resources in the Baltic Sea and the Belts	Y				
1982 Warsaw	Amendments	Y				
1992 Helsinki	Conv. - Protection of the marine environment of the Baltic Sea area	Y				
1978 Ottawa	Conv. - Future multilateral co-operation in the Northwest Atlantic fisheries (NAFO)	Y	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		R	
1998 Aarhus	Protocol (persistent organic pollutants)		R		S	
1999 Gothenburg	Protocol (abate acidification, eutrophication and ground-level ozone)		S		S	
1980 Madrid	Conv. - Transfrontier co-operation between territorial communities or authorities	Y				
1995 Strasbourg	Additional protocol	Y				
1998 Strasbourg	Second protocol	Y				
1980 Canberra	Conv. - Conservation of Antarctic marine living resources	Y	R		R	R
1980 London	Conv. - Future multilateral co-operation in North-East Atlantic fisheries	Y				
1982 Paris	Memorandum of understanding on port state control	Y	R			
1982 Reykjavik	Conv. - Conservation of salmon in the North Atlantic Ocean	Y	R		R	
1989	Agreem. - Co-operation in environmental protection					
1991 Espoo	Conv. - Environmental impact assessment in a transboundary context	Y	R		S	
1992 Helsinki	Conv. - Transboundary effects of industrial accidents		S		S	

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OECD EPR / SECOND CYCLE

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

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

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ANNEX II.B: SELECTED MULTILATERAL AGREEMENTS (REGIONAL) (cont.)

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

		CAN	MEX	USA	JPN
1992 Helsinki	Conv. - Protection and use of transboundary water courses and international lakes	Y			
1999 London	Prot. - Water and health				
1992 La Valette	European Conv. - Protection of the archaeological heritage (revised)	Y			
1992 Vienna	Agreem. - Forecast, prevention and mitigation of natural and technological disasters				
1994 Lisbon	Treaty - Energy Charter	Y			S
1994 Lisbon	Protocol (energy efficiency and related environmental aspects)	Y			S
1994 Washington	Conv. - Conservation and management of pollock resources in the Central Bering Sea			S	S
1996	Agreem. - Exchange of immissions data in the Black Triangle				
1996 Wroclaw	Agreem.-International commission for the protection of the Oder river against pollution				
1998 Aarhus	Conv. - Access to env. information and public participation in env. decision-making	Y			
2000 Florence	Conv. - European lanscape convention				
2000 Geneva	Agreem. - Iinternational carriage of dangerous goods by inland waterways (AND)				

Source: IUCN; OECD.

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OECD EPR / SECOND CYCLE

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

KOR	AUS	NZL	AUT	BEL	CZE	DNK	FIN	FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	**POL**	PRT	ESP	SLO	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
				S	R	S	S	S	S	S	R	S		S	R	S	S	**S**	S	S	R	S	S		S	
				S	R	S	R	R	S	S	R		R	S	S	S	R	**R**	R	S	R	R	R	R	R	
	S										S			R				**S**								
	S		R	R	R	R	R	R	R	R	R	S	R	R	R	R	S	**R**	R	R	R	R	R	R	R	R
	S		R	R	R	R	R	R	R	R	R	S	R	R	R	R	S	**R**	R	R	R	R	R	R	R	R
S																		**S**								
					S				S									**S**								
					S				S									**S**								S
			S	S	S	R	S	R	S	S	R	S	S	R	S	S	S	**R**	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					

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Annex III

SELECTED ENVIRONMENTAL EVENTS (1995-2001)

1995

- Establishment of Magurski National Park.
- Establishment of seven Forest Promotional Complexes (Bialowieska, Tucholskie, Gostynińsko-Wlocawskie, Kozienicka, Janowskie, Dolnoślaskie, Silesian Beskid).
- Parliament passes Act on Protection of Agricultural and Forest Land.
- Parliament passes Act on Prevention of Marine Pollution by Ships (entered into force August 1995).
- Signing of Convention on Conservation of European Wildlife and Natural Habitats (Bern Convention).
- Agreement on common action in environmental education field signed by Ministers of Environment and Education.
- Biebrzański National Park, Slowiński National Park and Milicz Fishponds Nature Reserve added to list of Wetlands of International Importance (Ramsar Convention).
- Council of Ministers accepts document concerning National Programme on Extension of Wooded Areas (expansion of forest acreage to 30% of national territory by 2020 and 33% by 2050).
- Parliament passes Act on Hunting (entered into force February 1996).

1996

- Parliament passes Sea Fishery Act (entered into force June 1996).
- Ratification of Convention on Biological Diversity.
- Ratification of Convention on Conservation of Migratory Species of Wild Animals (Bonn Convention).
- Ratification of Agreement on Conservation of Small Cetaceans of the Baltic and North Seas.
- Ratification of Agreement on Conservation of Bats in Europe.
- Establishment of Tucholski Forest National Park.

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- First International Environmental Education Fair, ECO MEDIA FORUM.
- Establishment of Narwiański National Park.
- Establishment of three additional Forest Promotional Complexes (Oliwsko-Darlubskie, Bukowa and Goleniowska, Rychtalskie).
- First concession for exploitation of thermal waters for heating purposes (Pyrzyce, Zachdniopomorskie Voivodship).
- Parliament passes Act on Maintenance and Upkeep in Gminas (entered into force January 1997).
- Third International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe (Warsaw).
- Establishment of European Integration Comity as organ responsible for co-ordinating State administrative activities in field of European integration.
- Poland becomes OECD member.

1997

- National Strategy for Environmental Education adopted by Ministers of Environment and Education.
- Council of Ministers adopts State Policy on Forests.
- Bialowieża National Park acquires Council of Europe accreditation.
- Sejm of Republic of Poland adopts National Integration Strategy.
- Parliament passes Waste Act (in force until 30 September 2001).
- Catastrophic flood on unprecedented scale caused extensive damage.
- Parliament passes Protection of Animals Act (entered into force October 1997).
- Amendment to Environmental Protection and Management Act results in introduction of first regulations concerning genetically modified organisms.
- Luxembourg Summit decision to open EU accession negotiations with six candidate countries including Poland.

1998

- Official opening of negotiations on Polish EU accession.
- Establishment of Negotiation Team, presided over by Government Plenipotentiary for Poland's Accession to the EU, Chief Negotiator, and consisting of competent Ministers including the Under Secretary of State in the Ministry of the Environment, responsible for co-ordinating environmentally related activities.

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- First Baltic Conference on Forest Fires under auspices of UN-ECE/FAO.
- Minister of Environment signs Declaration on Co-operation with Non-Governmental Organisations.
- New Educational Programme for Protection of Historic Landscape and Proper Shaping of Historic and Nature Sites in Poland signed by the Ministers of Culture and Arts, Environment, Education, the President of State Office for Housing and Urban Development and the Commissioner for Historic Monuments.

1999

- Screening of Polish environmental legislation to assess its conformity with EU legislation. Areas of environmental policy with alignment problems defined, including waste management, water quality and an integrated system of environmental pollution prevention.
- Ratification of Convention on Protection of the Marine Environment of the Baltic Sea Area (entered into force January 2000).
- Bieszczadzki National Park acquires Council of Europe accreditation.
- Resolution of Sejm of Republic of Poland on increased consumption of energy from central sources.
- Poland joins European Organisation of Meteorological Satellites (EUMETSAT).

2000

- Kampinoski National Park becomes UNESCO Biosphere Reserve.
- Ratification of Convention on Protection and Use of Transboundary Watercourses and International Lakes.
- Visit by Margaret Wallstrom, EC Environment Commissioner.
- Signing of Protocol on Biological Security.
- Signing of Gothenburg Protocol on Acidification, Eutrophication and Tropospheric Ozone.
- Council of Ministers adopts Poland 2025 – The Long-term Strategy for Sustainable Development.
- Polish-German Guide to Nature Protection published.
- Establishment of National Emission Centre within Institute for Environmental Protection, and opening of Centre for Treatment of Ozone Depleting Substances.

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- Signing of Agreement between EU and Poland on participation in European Environment Agency and European Environment Information and Observation Network.
- Parliament passes Act on Access to Information on the Environment and its Protection and on Environmental Impact Assessments (incorporated from October 2001 in the Environmental Protection Act).
- Parliament passes Act on Nuclear Energy (entered into force January 2002).
- Second National Environmental Policy adopted (superseding the First National Environmental Policy, adopted in 1991).
- Introduction of Central Geological Data Base (information system in National Geological Institute).

2001

- Ministers for Environment and Education accept National Programme on Environmental Education.
- Establishment of 11th Forest Promotional Complex (Birczańskie Forest).
- Parliament passes Organic Farming Act (entered into force November 2001).
- Parliament passes Environmental Protection Act (entered into force October 2001).
- Parliament passes Waste Act (entered into force October 2001).
- Parliament passes Packaging and Packaging Waste Act (entered into force January 2002).
- Parliament passes Act on Economic Operators' Obligations in Managing Certain Types of Wastes and on Product and Deposit Charges (entered into force January 2002).
- Preparation of Natura 2000 ecological network concept in Poland.
- Parliament passes Act on Forest Reproductive Material (to enter into force the day of Poland's EU accession).
- Parliament passes Act on Genetically Modified Organisms (entered into force October 2001).
- Ratification of Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention).
- Council of Ministers accepts Long-term Governmental Programme on Environment and Health.
- Establishment of Warta River Estuary National Park.

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- Parliament passes Water Act (entered into force January 2002).
- Parliament approves Introduction of Long-term Odra River Programme 2006.
- Parliament adopts Strategy for Development of Renewable Energy.
- Minister of Environment issues Decree on Quality Standards for Soil and Land.
- Negotiations with EU on environment chapter provisionally closed.
- First national wolf and lynx inventory completed.
- European Landscape Convention signed.

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Annex IV

PHYSICAL CONTEXT

Poland covers a land area of some 312 000 km^2 in central Europe and *shares borders with seven countries* (Germany, the Czech and Slovak Republics, Ukraine, Belarus, Lithuania and Russia). The total length of its borders is 3 538 kilometres, including 528 kilometres of Baltic Sea coastline.

Poland is a lowland country, with a mean altitude of 173 metres. Only 2.9% of the territory is above 500 metres. *Three main topographical zones* extend in east-west bands across the country. The north is predominantly lowland, part of the Great European Lowland stretching from northern France to the Ural Mountains. It features sparse, low hills and two major lake districts in the north-west and north-east; there are over 9 300 lakes with over a hectare of surface area. The second zone covers most of southern Poland and is made up of hilly upland areas crossed by long, flat river valleys. Finally, there are two mountain ranges along Poland's southern border, the Sudety (up to 1 602 metres) in the west and the Carpathians (up to 2 499 metres) in the east.

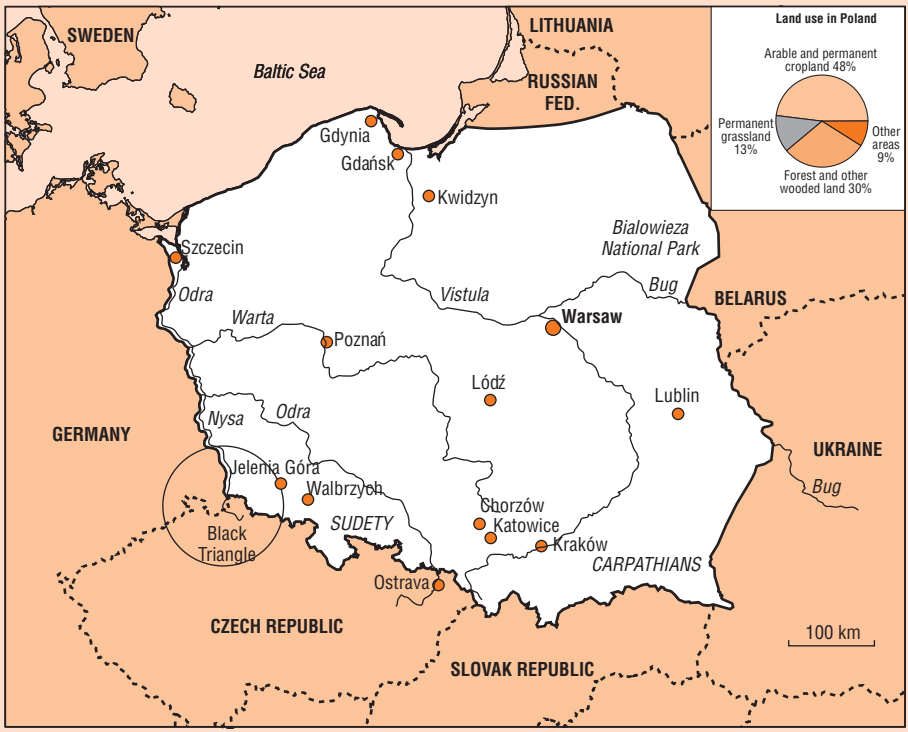
Hydrographically, nearly 100% of Polish territory lies in the Baltic Sea basin. The Vistula River provides some 55% of Poland's total water input to the Baltic Sea and the Odra River 34%; smaller rivers contribute the remainder. Surface water is the main source of drinking water for urban residents and of water for industry. High pollution levels, low available water reserves and limited storage capacity lead to drinking water shortages in some areas.

The *climate* is temperate, influenced by both continental and maritime factors. The mean temperature is –5 C in winter and +18 C in summer. Westerly winds prevail throughout the country. Average annual rainfall is 600 mm.

In terms of *land use*, 60% of the total area is used for agricultural purposes, mainly animal husbandry and cultivation of potato, sugar beet, oil plants and grains. About 9% of the total area is urbanised or used for industrial activities. *Forests* cover nearly 30% of land area. In terms of the overall size of its forested areas, Poland ranks fifth in Europe after Sweden, Finland, Spain and France. Coniferous species, particularly pine (70% of total cover) and spruce (7%), are the most common; the north-western and south-western parts of the country also have beech forests (4% of total cover) and mixed forests (composed of 28 native tree species).

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Map of Poland



Source: OECD.

Poland has *significant energy reserves*, including large quantities of hard coal (45 000 Mt) and major lignite deposits (14 000 Mt), mainly in the south-western and central parts of the country. Poland's oil reserves total 115 million barrels (14 Mt); its oil production supplies only about 3% of domestic consumption. Natural gas reserves are estimated at 5.1 trillion cubic feet; domestic natural gas meets about 40% of demand. There are also major deposits of copper, zinc and lead ore, sulphur and salt, predominantly in the southern and central parts of the country.

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Annex V

SELECTED WEBSITES CONCERNING ENVIRONMENTAL MANAGEMENT IN POLAND

Website	Host institution
www.poland.pl/index_eng.html	Polish government hub site
www.president.pl/dflt/en_index.php3	President of the Republic of Poland
www.kprm.gov.pl/english/index.html	Office of the Prime Minister
www.mos.gov.pl/index_main.shtml	Ministry of the Environment
www.mofnet.gov.pl/	Ministry of Finance
www.mst.gov.pl/starte.php	Ministry of the Treasury
www.minrol.gov.pl/glowna-eng.html	Ministry of Agriculture and Rural Development
www.mpips.gov.pl/	Ministry of Labour and Social Policy (Polish version only)
www.stat.gov.pl/english/index.htm	Polish Official Statistics
www.un.org/esa/agenda21/natlinfo/countr/poland/	United Nations Sustainable Development : National Information on Poland
www.europa.eu.int/comm/enlargement/poland/index.htm	EU Enlargement: Poland
www.rec.org/	Regional Environmental Center for Central and Eastern Europe
www.foeeurope.org/	Friends of the Earth Europe
wwf.pl/index_en.php	WWF Poland

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