



OECD Environmental Performance Reviews

CZECH REPUBLIC

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ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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FOREWORD

The principal aim of the OECD's Environmental Performance Reviews programme is to help *member countries improve their individual and collective performances in environmental management* with the following primary goals:

- 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 present report reviews environmental performance of the Czech Republic. 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 (Italy, Portugal, Spain and Slovak Republic) and their experts. The OECD is particularly indebted to the Government of the Czech Republic for its co-operation in expediting the provision of information and the organisation of the experts' mission to Czech Republic, and in facilitating contacts with many individuals both inside and outside administrative and governmental structures. The present review benefited from grant support from Japan, Norway and Switzerland.

The OECD Working Party on Environmental Performance conducted the review of the Czech Republic at its meeting on 17-19 May 2005 and approved its conclusions and recommendations.

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Signs

The following signs are used in Figures and Tables:

- . . : not available
- : nil or negligible
- . : decimal point.

Country Aggregates

OECD Europe: All European member countries of the OECD (Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey and the United Kingdom).

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: koruna (CZK)

In 2004, CZK 25.85 = USD 1.

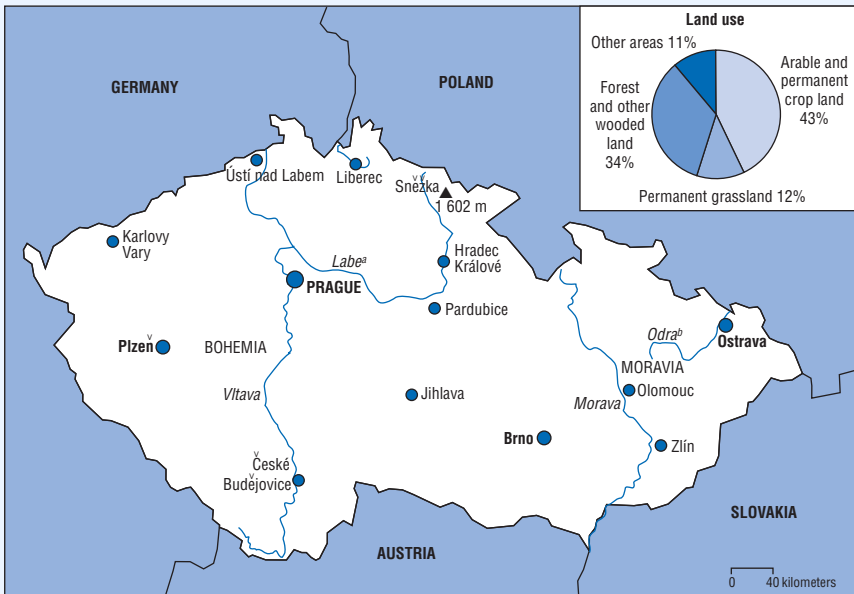
Cut-off Date

This report is based on information and data available up to April 2005.

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Map of the Czech Republic



- a) Elbe.
- b) Oder.

1

CONCLUSIONS AND RECOMMENDATIONS*

Over the review period (1998-2005), the Czech Republic's economy grew relatively slowly (+16%), and underwent further *structural changes* and integration in the European economy. The country acceded to the *European Union* in May 2004. *Imports and exports* of goods and services represent more than two-thirds of GDP, and more than 75% of the economy has been privatised. In percentage of GDP, the country has been the leading recipient of *foreign direct investment* among OECD countries. While the service sector share in the economy has grown to 58.2%, agriculture has declined to 3.4% and industry still represents 38.4%.

Further to rapid environmental progress during 1990-98, the review period saw *consolidation* of this progress and *transposition* of EU environmental Directives, but also *reduction of environmental efforts*, with indicators of pollution, energy and material intensities still remaining among the highest of OECD countries. In 2002, exceptionally *severe floods* and related very large damages (on the order of 4% of GDP) affected the country again. Priority environmental challenges include: i) nature conservation, protection of the landscape and biodiversity; ii) sustainable use of natural resources (including water), material flows and waste management; iii) environment and the quality of life; and iv) protection of the earth's climate system and prevention of long-range transport of air pollution. Overall, the *road towards environmental convergence* within the EU *will be a long one*, on a number of issues.

To meet these *challenges*, the Czech Republic will need to: i) strengthen its environmental efforts in infrastructure building (e.g. for waste and waste water treatment) and in implementation of environmental policies; ii) further integrate

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 19 May 2005.

environmental concerns into economic and social decisions; and iii) reinforce international co-operation on environmental issues.

This report examines progress made by the Czech Republic *since the latest OECD Environmental Performance Review* in 1998, 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 53 recommendations are made that could help strengthen the Czech Republic's environmental performance in the context of sustainable development.

1. Environmental Management

Strengthening the implementation of environmental policies

After a first wave of changes to environmental legislation in the early 1990s, the EU accession process led, during the review period, to *intensive work to transpose EU environmental legislation* into Czech environmental legislation (e.g. the Act on Integrated Pollution Prevention and Control, the Act on Environmental Impact Assessment, the Act on the Protection of the Air, the Water Act, the Act on Waste and many others). In May 2004, the Czech Republic joined the EU, with *transition exceptions for only three European Directives*: the Directive on Packaging and Packaging Waste, the Directive on Urban Waste Water Treatment, and the Directive on the Limitation of Emissions of Certain Pollutants into the Air from Large Combustion Plants. A new *State Environmental Policy* was adopted for the period 2004-10. As recommended in the first OECD review, the Ministry of the Environment has strengthened both *its monitoring capacity and its economic analysis*; a wide range of *economic instruments* (e.g. pollution charges and fines, water charges) is in use and *broadly in line with the polluter pays principle*. Environmental management systems are being promoted (ISO 14001 and EMAS) as well as eco-labelling and green purchasing.

While economic changes and environmental legislation and investments rapidly reduced emissions of pollutants in the 1990s, *environmental investment dropped sharply over the review period*, falling from 2.5% of GDP in 1997 to 0.7% in 2002. This partially explains the *lack of progress in reducing the high levels of*

** 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).

pollution and energy intensity. Expenditure for pollution abatement and control (estimated at 1.3% of GDP in 2003) will need to be increased to implement new legislation and EU-related commitments. Overall, EU accession requirements related to the environment are expected to necessitate EUR 9 billion between 2004 and 2010, with a large part for water issues. This is despite important support expected from the EU through the European Cohesion Fund and Structural Funds. It is therefore essential for the Czech Republic to improve the *cost-effectiveness* of its environmental policies. The rates of *economic instruments*, which have in many cases been eroded by inflation, will need to be strengthened to help finance environmental investment, continue to remediate past damage and dissuade potential polluters. Further use of technologies that prevent pollution, rather than end-of-pipe technologies, should be considered. *Land-use planning* needs to integrate environmental concerns. *Regional and municipal administrations* should strengthen their environmental capacities.

Recommendations:

- take steps to adjust existing *pollution charges* for inflation and to increase their rate of collection; consider adopting *product charges* and work toward more internalisation of external costs;
- increase *environmental expenditure* to levels needed to implement the EU environmental *acquis*, including by use of revenues from economic instruments and EU financing;
- develop the use of *economic analysis* of environmental projects and policies (e.g. cost-benefit analysis);
- develop public-private *partnerships* (e.g. among national authorities, local authorities, industry, NGOs) and strengthen environmental capacities at regional and municipal levels to ensure environmental progress; *monitor this progress* through appropriate targets and indicators;
- strengthen *enforcement of laws and regulations* at national, regional and local levels; further ensure that polluters are effectively sanctioned.

Air

During the review period, *SO₂ concentrations in ambient air* were significantly reduced. Emissions of *SO₂* and *VOCs* decreased by 48% and 16% respectively, dropping below the 2010 ceilings of the Convention on Long-range Transboundary Air Pollution and related European Directives. Monitoring and

reporting of air quality has improved, notably for heavy metals and persistent organic pollutants. The Czech Republic is one of the few OECD countries with a national legal basis for combating light pollution. During the review period, the Czech Republic reformed the *institutional framework for the energy sector*. It enacted two new energy laws, created new institutions, adopted an energy policy with energy efficiency and environmental objectives, and partially opened up energy markets. Energy companies were restructured and partially privatised. Price distortions among different types of energy (including direct subsidies to producers) were generally reduced and prices paid by end-users are now much closer to the cost of supply, while prices paid by industry for electricity and oil remain well below the OECD average.

Several of the strongly positive trends that characterised the early 1990s slowed, stalled or even reversed during the review period. The steady reduction of NO_x emissions that began in 1985 continued until 1999, but emissions have hovered around the same level since. Particle emissions reversed their downward trend and rose after 2000, partly as a result of changes in measurement methods. GHG emissions were decoupled from economic growth, but stayed broadly constant during most of the review period at about three-quarters of their 1990 level. The decline in heavy metal (Cd, Hg, Pb) emissions that began in 1990 continued during the early part of the review period, but appears to have halted in the latter part. The Czech economy remains *pollution intensive*: its SO₂ and NO_x intensities (i.e. emissions per unit of GDP) remain about double those of the OECD Europe average as well as the EU-15 average, and its CO₂ intensity is the highest in the OECD area. This partly reflects its energy supply (with predominance of solid fuels) and its economic structure (with energy intensive industries). But it also reflects a strong decline (during the review period) in air pollution abatement expenditure and insufficient energy savings efforts. The *energy intensity* of the Czech economy (i.e. energy use per unit of GDP) has stayed broadly constant since 1999 and remains well above the OECD Europe average. *Ambient air quality problems* persist across the country (e.g. Prague, industrial areas in northern Bohemia, Silesia and northern Moravia). Particles and ground-level ozone are of particular concern as two-thirds of the Czech population live in areas where current or future health standards are not always met. Polycyclic aromatic hydrocarbons (PAHs), nickel, benzene, cadmium and arsenic are problem pollutants. Important *health and economic benefits* thus remain to be obtained.

Recommendations:

- strongly implement measures to achieve *ambient air quality* standards, especially for PM₁₀, NO₂, ozone and toxics in and near large cities;
- give renewed impetus to measures for further *reducing air emissions*, to capture health and related economic benefits (e.g. reduced health expenditure, increased productivity) including special attention to implementation of such measures for small sources of pollution;
- maintain the incentive value of *air emission charges* by regularly reviewing their rates;
- improve *energy efficiency* by vigorously implementing and adequately funding the national programme for the promotion of energy savings;
- review the environmental and economic performance of the energy sector, and revise accordingly *energy taxes and prices*.

Water

The return of long-absent fish species to the Elbe is a sign of the distinct improvement in the *quality of Czech rivers* over the review period. The hotspots of “very highly polluted” river reaches have all but disappeared and some reaches are now classified in the two top quality classes. The connection rates for *sewerage and waste water treatment* are above the OECD and OECD Europe averages. Point discharges from urban agglomerations and industry have continued the downward trend established since 1990, thanks to the commissioning of new, and the rehabilitation of existing, sewerage networks and waste water treatment plants. The authorities have put in place a comprehensive strategy to minimise the risk of further *catastrophic flooding* (about 3.5% GDP damage in 1997 and 3.2% in 2002). *Czech water legislation* has been brought into line with EU Directives, water management institutions have been reformed, and correct water pricing has been established. A comprehensive set of *economic instruments* is in place and contributes towards financing further environmental investment.

Although a few river reaches are now in the two highest quality classes, the predominant share of rivers and streams remain classified as either “polluted” or “highly polluted”, while lakes, reservoirs and aquifers showed little improvement over the review period. Concentration limits for *dangerous substances* (AOX, chlorinated organic compounds, PAHs, heavy metals) were exceeded during the

review period at a number of measuring stations. The legacy of the past persists in the form of highly *contaminated sediments* in rivers. Quality control and benchmarking systems to ensure the *efficient operation and adequate maintenance* of the large amount of new water infrastructure have yet to be put in place. More than half of sewage sludge does not meet quality standards for use in agriculture. Implementation of measures to reduce the impact of agriculture on surface and ground waters has only just begun. Some of the artificial reservoirs and recreational fishponds do not meet EU microbiological standards. The *national flood control strategy* needs to be adjusted to ensure it provides the right balance of incentives and sanctions for stakeholders at national and local levels, in order to achieve the optimal mix of active and passive flood protection. Important *health, recreational and economic benefits* thus remain to be obtained.

Recommendations:

- carry out the planned construction and rehabilitation of *sewerage systems and waste water treatment plants* to meet the deadlines under the transition period agreed for the EU Urban Waste Water Directive;
- monitor and report on the *performance of waste water treatment utilities*; encourage the use of benchmarking methods to continuously improve management at treatment stations;
- implement the action plan to reduce *nitrate pollution* from agriculture;
- formulate and implement action programmes to prevent the discharge of *dangerous substances* into water;
- make further efforts to improve compliance with microbiological *bathing water standards*;
- deal with *floodplain management* as part of the EU Water Framework Directive implementation; use various EU funding mechanisms to reduce exposure to *flood risks*.

Waste

The annual volumes of *total waste* and *hazardous waste* fell by 18 and 55% respectively during the review period. A *modern waste management framework* was put in place. The requirements of the EU waste legislation and other international commitments were incorporated into a new Waste Act and Packaging Act approved in 2001. A national Waste Management Plan and 14 regional plans were adopted with many long- and medium-term quantitative

targets. A nationwide system for the recovery and recycling of *packaging waste* was established and the 2001 targets of the EU Packaging Directive were met. Many *below-standard landfills* and waste incinerators were closed down. Landfill fees were steadily increased and further economic instruments were introduced. The promotion of *cleaner production* became a prominent feature of government waste policies. A specialised agency (Centre for Waste Management in the Water Research Institute) now manages a national waste information database. Further progress has been made on cleaning up contaminated sites.

However, the production of municipal waste began to increase again after 2001. Production of hazardous waste per unit of GDP remains two to three times that of most other EU countries. The results of *waste prevention* efforts have so far been disappointing, possibly due to a lack of information on the costs and benefits of waste prevention options. *Recovery and recycling* lag behind the rates achieved in other countries for many waste streams. About 60% of municipal waste is still landfilled, partly because landfill fees remain too low to encourage the use of more environmentally sound waste management techniques. The *economic* sector dealing with waste management is to be further constructed. The clean-up of the *contamination burden of the past* is far from

Recommendations:

- make further efforts to bolster the *waste prevention ethic in business*, for example by providing information about the costs and benefits of various options and promoting cleaner technology;
- pursue with determination the 22 *implementation programmes* of the national and regional waste management plans;
- further develop separate collection and recycling of *municipal waste*, by encouraging the development of *markets in recycled products* and by introducing economic instruments as incentives; encourage citizen participation in municipal separate collection systems;
- move towards greater *cost-recovery* in waste management services and gradually increase the incentive value of waste-related economic instruments;
- further develop and improve the necessary facilities for proper disposal of *hazardous waste* and take the necessary regulatory and economic measures to ensure these facilities are used;
- continue to remediate *contaminated sites*.

complete. Perhaps most important of all, business and citizenry have not yet sufficiently taken the waste prevention message on board.

Nature and biodiversity

During the review period, good progress was made with legislation and institutions. The EU accession process was the driving force behind a revision of the legislative framework for biodiversity protection and nature conservation. Improvements in administrative capacity, including inspection and enforcement, were also made. A *network of protected areas* was established, within the national ecological network of protected areas (including landscape sites and monuments, elements of the *Territorial System of Ecological Stability*). The list of *Natura 2000 sites* under the Habitat and Bird directive (SCI and SPA) was adopted by the government. The *return of some fish species* was observed. The *natural renewal* of the forests increased. *Land-use* planning and land-use mapping helped bridge the gap between the management of landscape and protected areas and the use of natural resources. *Environmentally sound agriculture* developed. *Ecological restoration of landscape* was supported at all administrative levels.

However, direct destruction or gradual disappearance of *valuable ecosystems* continues. *On-site monitoring of target species and habitats is inadequate*. While several rescue programmes for selected protected species have been launched, there are no action plans at the scale of the challenge. Implementation of the *CITES agenda* needs to be greatly improved, with co-operation among inspectors, police investigators and courts. The landscape *outside protected areas* has been dramatically affected by extraction of mineral resources, urbanisation, industrial facilities and related pollution damages. The *fragmentation, isolation and destruction* of dominant habitats are important issues. Consumption of fertiliser and pesticides is slowly increasing, though the intensity of their use is relatively low. The *integration of biodiversity and nature protection* concerns into sectoral policies is to be improved, including by use of EU Cohesion and Structural Funds and other financial resources (State or non-State) for specific projects. In particular, the service functions provided by nature (e.g. protection against flooding and climate change, recreational and tourism services) and the economic and health benefits of recreational activities (e.g. reduced obesity) should be recognised. A *strategy for sustainable tourism* should be prepared. *Scientific and technical capacities* for protecting biodiversity and nature conservation are not commensurate to the pressures from development.

Recommendations:

- finalise, adopt and implement the *national biodiversity strategy* and related action plans;
- establish the *Natura 2000 network* and related management, with appropriate co-ordination and consultation among national, regional and local authorities, and participation of civil society;
- further integrate *biodiversity concerns in agriculture, forestry and tourism*; evaluate the impact of agricultural chemicals (fertilisers, pesticides) on ecosystems; take measures against soil erosion; promote natural processes in the forest restoration activity; develop the strategy for sustainable tourism for protected areas;
- consistently apply nature and biodiversity criteria in the *environmental impact assessment* and *strategic environmental assessment* of development projects and programmes, especially for land use and transport infrastructure projects;
- enhance the *service functions* provided by nature and biodiversity, and the *economic assessment* of these functions (e.g. protection against the impacts of flooding and climate change, support of recreational and tourism services);
- improve funding for nature conservation and biodiversity; ensure consistency in *financial assistance* (e.g. in the agricultural sector).

2. Towards Sustainable Development

Integration of environmental and economic decisions

Over the review period, some progress was made in decoupling environmental pressures from economic growth with respect to SO_x and VOC emissions, water withdrawals, and waste generation from the energy, manufacturing and agriculture sectors, although often at a slower rate than in the early and mid-1990s. Integration of environmental concerns into *sectoral policies* (e.g. transport, industry, mining) also progressed, with the least success in the energy sector. The restructuring process initiated in the 1990s to rationalise coal production and reduce subsidies is still underway and cross-subsidies to households from industrial consumers in the energy sectors are ended. A *National Strategy for Sustainable Development of the Czech Republic* was approved at the end of 2004 and monitoring of its implementation has been proposed. An *ecological tax reform* is currently under consideration.

Although economic growth was relatively modest during the review period, decoupling was not achieved for several important indicators. *Pollution intensities* are well above the OECD average (e.g. SO_x, NO_x and CO₂ emissions per unit of GDP). The use of fertilisers and pesticides has increased over the review period, although, per hectare of agriculture land, it remains lower than the EU-15 average. *Energy intensity* is the second highest among OECD countries. Further efforts are needed to *decouple environmental pressures* from economic growth to capture consequent *health, economic and environmental benefits*. High priority should be given to improving the *energy efficiency* and *resource efficiency* of the Czech economy. *Environmental impact assessment* as well as strategic environmental assessment should be made more influential. More focus is needed at the planning level; the confusion between targets and instruments should be eliminated. Contradictions between governmental targets (e.g. between the State Environmental Policy and the State Energy Policy) should be addressed. At the strategic level, Czech authorities may wish to consider whether EU targets are sufficient in scope and level, and whether additional benefits could be captured beyond the EU targets, given the country-specific conditions (e.g. floods).

Recommendations:

- further decouple environmental pressures from economic growth, including by reducing the *energy and material intensities* of the economy, making the maximum possible use of the EU greenhouse gas trading system;
- foster the introduction of an *ecological tax reform* within a context of fiscal neutrality;
- continue to eliminate *environmentally harmful subsidies*;
- ensure *consistency between the State Environmental Policy and other State policies*; strengthen the integration of environmental concerns into energy policies;
- strengthen the use of *environmental impact assessment* and strategic environmental assessment;
- increase the involvement of relevant ministries and agencies in implementing the *Strategy for Sustainable Development* of the Czech Republic and monitoring its implementation.

Integration of environmental and transport decisions

The transport sector plays an increasingly important role in the Czech economy. Institutional integration of *environmental concerns in transport policies* has progressed at strategic, project, regulation and local transport planning levels. Environmental sustainability is part of the proposed State Transport Policy. *Strategic environmental assessment* of transport policies and *environmental impact assessment* of transport projects have been extensively used. Concerning vehicle and fuel quality standards, the process of *harmonisation with EU regulations* is completed. The ban on importing cars more than eight years old, the import duties on used cars and the vehicle emission inspection programme have contributed to the renewal of the car fleet. Lead gasoline was phased out in 2001 and limits on fuel sulphur content were introduced in 2003. Financial and fiscal incentives are provided for LPG, CNG and biofuel. *Public transport networks in urban areas* are well developed, integrated transport systems are in place in major cities, and sustainable mobility plans are being introduced in some municipalities. Overall, the review period has witnessed a steady decline in *transport emissions* of carbon monoxide, volatile organic compounds and lead, a slight decrease in emissions of nitrogen oxides, and a recent decrease in sulphur dioxide emissions. Some progress has also been made in *preventing noise* from air transport.

Despite this progress, the transport sector is an important and growing source of environmental concerns. Freight and passenger transport volumes have been steadily rising and are likely to continue to rise. The share of *road transport* in the modal split is increasing and is a major and growing source of *air pollution* (e.g. emissions of CO₂, PM, NO_x and other precursors of ozone) and noise pollution. Ambient particulate matter and ozone concentrations are high in cities (e.g. due to the relative old age of freight vehicles and passenger buses) and threaten *the health of inhabitants*. A large population is exposed to high noise levels. With heavy investments in new road infrastructure, the quality of the rest of the road network remains poor, and the railway system has not progressed significantly. The renewal of the vehicle fleet has been mainly driven by restrictive measures rather than by market-based incentives. Fuel price adjustments have not managed to moderate road transport demand. Road taxes and fees are not differentiated on the basis of distance travelled. In large urban areas, the use of public transport has fallen and demand management is still not adequate to influence car use.

Recommendations:

- increase the consistency between *transport infrastructure investment programmes* and environmentally sustainable transport objectives, giving higher priority to road network quality, railways and combined transport, as well as to efficient use of EU funds; increase the use of *cost-benefit analysis* and the effectiveness of *environmental impact assessment*;
- further develop *traffic management in urban areas* (e.g. traffic restrictions in city centres, parking and road pricing, incentives to commute by public transport, establishing mobility managers in major companies and government departments);
- improve *institutional co-ordination of transport and land use plans* among the State, regions and municipalities, especially in developing and managing the road network; develop the infrastructure for cycling;
- enforce *vehicle inspection and maintenance* obligations, to better control emissions from older vehicles and to stimulate renewal of cars, lorries and bus fleets;
- review *transport prices and taxes* to better internalise external costs; create incentives to influence transport decisions by firms and individuals (e.g. gradually extend the road tax to passenger vehicles and link it to distance travelled, introduce highway electronic tolls, implement measures to compensate for rail VAT and price increases).

Integration of environmental and social decisions

Environmental information is generally of high quality and easily accessible. Annual national reports on the state of the environment have been available since 1993, supported by annual reports for the 14 regions. Acts on the *access to environmental information* have been in place since 1998, and the Aarhus Convention was ratified in 2004. The Government Council for Sustainable Development, created with the participation of civil society representatives, has established several working groups, including for the promotion of Local Agenda 21. Good inter-ministerial co-operation led to adoption of the National Programme on *Health and Environment*. An ongoing survey evaluates contamination levels in several products, materials and environmental media, and monitors public health. A National Programme on *Environmental Education* benefits from co-operation among the Ministry of the Environment, the Ministry of Education, Youth and Sports and the regional

authorities. Environment is taught at all educational levels, and a network of 100 Environmental Education Centres works with NGOs on its management.

As *access to courts* in environmental matters was regulated only in 2003, an effort must be made in preparing the justice system for this new challenge, with appropriate environmental training programmes. Neither the administration nor the representatives of civil society were able to quantify the impacts on *employment* of environmental policy or of the large investments made to clean up black spots and to upgrade old technologies. The public's concern about global environmental issues is not reflected in *consumption patterns*, probably due to a certain lack of awareness of national issues.

Recommendations:

- continue to establish objectives and targets for *public health and the environment*, building on annual health and environment surveys;
- evaluate the effects of environmental policy on *employment*;
- promote the role of the not-for-profit sector in *environmental employment*, especially in environmentally sensitive areas;
- continue to develop the system for providing *environmental information* and implement the principles of free and easy access to this information; support citizen participation in environmental decision-making and access to justice in environmental issues; implement the OECD Council Recommendation on Pollutant Release and Transfer Registers;
- reinforce *public participation* in the context of environmental impact assessment licensing processes;
- continue to promote the *Local Agenda 21* among municipalities, building on support schemes such as the Healthy Cities and Environmental Education Centres;
- further develop the *environmental training* of elected officials, civil servants and teachers, and establish a training system for justice officials.

3. International Co-operation

The Czech Republic has managed its international and European action concerning the environment both rigorously and efficiently. It has been timely in preparing and adopting documents with precise objectives and deadlines for

ratifying and implementing *multilateral environmental agreements* (MEAs) and in preparing for accession to the European Union. It has also satisfactorily negotiated the *environmental acquis*, transposing numerous EU Directives into national law and negotiating transition periods for just three Directives that are particularly expensive to implement. The Czech Republic has fulfilled or is on its way to fulfilling its international obligations, especially with regard to the Montreal Protocol, the Geneva Convention on Long-range Transboundary Air Pollution (CLRTAP) and the Kyoto Protocol. Lastly, the Czech Republic has taken active steps to increase its *development assistance* and foster bilateral co-operation.

However, despite these very significant results, much remains to be done. The extent of the Czech Republic's contribution to reducing acidity in the region remains questionable: the Czech Republic still has *very high emissions* of SO₂ and NO_x per capita and per unit of GDP compared to other OECD countries. It also has very high emissions of CO₂ per capita and per unit of GDP. As an upstream country, and despite real progress, much remains to be done about transboundary water pollution. It is not certain that the *National Strategy for Sustainable Development of the Czech Republic* will offer a transition to different modes of production and consumption, a decoupling of energy use from

Recommendations:

- implement the measures in the national programme to abate the *climate change* impacts so as to get closer to the European average for greenhouse gas emissions per capita and per unit of GDP; use economic analysis to increase the efficiency of policies and measures to reduce the economy's carbon intensity;
- improve the *capacity to absorb* European environmental support (e.g. Cohesion and Structural Funds);
- continue to *reduce air emissions* (e.g. NO_x emissions) to meet the 2010 targets of relevant EU Directives and CLRTAP protocols;
- continue to reduce the *pollution of transboundary rivers* (e.g. Elbe, Oder, Morava rivers and tributaries);
- strengthen the implementation of the *Washington Convention* on International Trade in Endangered Species of Wild Fauna and Flora;
- continue to increase *development assistance* and environmental development assistance;
- continue to ensure that *foreign direct investment* in the Czech Republic strictly conforms to environmental law.

economic growth, or the responses needed for participation in the single European market, especially as regards *transport*. There have been delays in adopting a national biodiversity strategy. The current environmental enforcement system may not be able to guarantee effective monitoring of offences relating to *trade in endangered species* and the Washington CITES.

2

POLLUTION MANAGEMENT*

Features

- The challenge of implementing EU environmental Directives
- Further reducing air emissions
- Combating light pollution
- Improving energy efficiency
- Achieving good surface and groundwater quality
- Becoming less vulnerable to flooding
- Implementing waste management plans
- Achieving full cost-recovery of waste management services

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1998. It also reviews progress with respect to the objectives of the 2001 OECD Environmental Strategy.

Recommendations

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

Air management

- strongly implement measures to achieve *ambient air quality* standards, especially for PM₁₀, NO₂, ozone and toxics in and near large cities;
- give renewed impetus to measures for further *reducing air emissions*, to capture health and related economic benefits (e.g. reduced health expenditure, increased productivity) including special attention to implementation of such measures for small sources of pollution;
- maintain the incentive value of *air emission charges* by regularly reviewing their rates;
- improve *energy efficiency* by vigorously implementing and adequately funding the national programme for the promotion of energy savings;
- review the environmental and economic performance of the energy sector, and revise accordingly *energy taxes and prices*;

Water management

- carry out the planned construction and rehabilitation of *sewerage systems and waste water treatment plants* to meet the deadlines under the transition period agreed for the EU Urban Waste Water Directive;
- monitor and report on the *performance of waste water treatment utilities*; encourage the use of benchmarking methods to continuously improve management at treatment stations;
- implement the action plan to reduce *nitrate pollution* from agriculture;
- formulate and implement action programmes to prevent the discharge of *dangerous substances* into water;
- make further efforts to improve compliance with microbiological *bathing water standards*;
- deal with *floodplain management* as part of the EU Water Framework Directive implementation; use various EU funding mechanisms to reduce exposure to *flood risks*;

Waste management

- make further efforts to bolster the *waste prevention ethic in business*, for example by providing information about the costs and benefits of various options and promoting cleaner technology;

Recommendations (cont.)

- pursue with determination the 22 implementation programmes of the national and regional waste management plans;
- further develop separate collection and recycling of *municipal waste*, by encouraging the development of *markets in recycled products* and by introducing economic instruments as incentives; encourage citizen participation in municipal separate collection systems;
- move towards greater *cost-recovery* in waste management services and gradually increase the incentive value of waste-related economic instruments;
- further develop and improve the necessary facilities for proper disposal of *hazardous waste* and take the necessary regulatory and economic measures to ensure these facilities are used;
- continue to remediate *contaminated sites*.

Conclusions

Air

During the review period, SO₂ concentrations in ambient air were significantly reduced. Emissions of SO₂ and VOCs decreased by 48% and 16% respectively, dropping below the 2010 ceilings of the Convention on Long-range Transboundary Air Pollution and related European Directives. Monitoring and reporting of air quality has improved, notably for heavy metals and persistent organic pollutants. The Czech Republic is one of the few OECD countries with a national legal basis for combating light pollution. During the review period, the Czech Republic reformed the *institutional framework for the energy sector*. It enacted two new energy laws, created new institutions, adopted an energy policy with energy efficiency and environmental objectives, and partially opened up energy markets. Energy companies were restructured and partially privatised. Price distortions among different types of energy (including direct subsidies to producers) were generally reduced and prices paid by end-users are now much closer to the cost of supply, while prices paid by industry for electricity and oil remain well below the OECD average.

Several of the strongly positive trends that characterised the early 1990s slowed, stalled or even reversed during the review period. The steady reduction of NO_x emissions that began in 1985 continued until 1999, but emissions have hovered

around the same level since. Particle emissions reversed their downward trend and rose after 2000, partly as a result of changes in measurement methods. GHG emissions were decoupled from economic growth, but stayed broadly constant during most of the review period at about three-quarters of their 1990 level. The decline in heavy metal (Cd, Hg, Pb) emissions that began in 1990 continued during the early part of the review period, but appears to have halted in the latter part. The Czech economy remains *pollution intensive*: its SO₂ and NO_x intensities (i.e. emissions per unit of GDP) remain about double those of the OECD Europe average as well as the EU-15 average, and its CO₂ intensity is the highest in the OECD area. This partly reflects its energy supply (with predominance of solid fuels) and its economic structure (with energy intensive industries). But it also reflects a strong decline (during the review period) in air pollution abatement expenditure and insufficient energy savings efforts. The *energy intensity* of the Czech economy (i.e. energy use per unit of GDP) has stayed broadly constant since 1999 and remains well above the OECD Europe average. *Ambient air quality problems* persist across the country (e.g. Prague, industrial areas in northern Bohemia, Silesia and northern Moravia). Particles and ground-level ozone are of particular concern as two-thirds of the Czech population live in areas where current or future health standards are not always met. Polycyclic aromatic hydrocarbons (PAHs), nickel, benzene, cadmium and arsenic are problem pollutants. Important *health and economic benefits* thus remain to be obtained.

Water

The return of long-absent fish species to the Elbe is a sign of the distinct improvement in the *quality of Czech rivers* over the review period. The hotspots of “very highly polluted” river reaches have all but disappeared and some reaches are now classified in the two top quality classes. The connection rates for *sewerage and waste water treatment* are above the OECD and OECD Europe averages. Point discharges from urban agglomerations and industry have continued the downward trend established since 1990, thanks to the commissioning of new, and the rehabilitation of existing, sewerage networks and waste water treatment plants. The authorities have put in place a comprehensive strategy to minimise the risk of further *catastrophic flooding* (about 3.5% GDP damage in 1997 and 3.2% in 2002). Czech *water legislation* has been brought into line with EU Directives, water management institutions have been reformed, and correct water pricing has been established. A comprehensive set of *economic instruments* is in place and contributes towards financing further environmental investment.

Although a few river reaches are now in the two highest quality classes, the predominant share of rivers and streams remain classified as either “polluted” or “highly polluted”, while lakes, reservoirs and aquifers showed little improvement over the review period. Concentration limits for *dangerous substances* (AOX, chlorinated organic compounds, PAHs, heavy metals) were exceeded during the review period at a number of measuring stations. The legacy of the past persists in the form of highly *contaminated sediments* in rivers. Quality control and benchmarking systems to ensure the *efficient operation and adequate maintenance* of the large amount of new water infrastructure have yet to be put in place. More than half of sewage sludge does not meet quality standards for use in agriculture. Implementation of measures to reduce the impact of agriculture on surface and ground waters has only just begun. Some of the artificial reservoirs and recreational fishponds do not meet EU microbiological standards. The *national flood control strategy* needs to be adjusted to ensure it provides the right balance of incentives and sanctions for stakeholders at national and local levels, in order to achieve the optimal mix of active and passive flood protection. Important *health, recreational and economic benefits* thus remain to be obtained.

Waste

The annual volumes of *total waste* and *hazardous waste* fell by 18 and 55% respectively during the review period. A *modern waste management framework* was put in place. The requirements of the EU waste legislation and other international commitments were incorporated into a new Waste Act and Packaging Act approved in 2001. A national Waste Management Plan and 14 regional plans were adopted with many long- and medium-term quantitative targets. A nationwide system for the recovery and recycling of *packaging waste* was established and the 2001 targets of the EU Packaging Directive were met. Many *below-standard landfills* and waste incinerators were closed down. Landfill fees were steadily increased and further economic instruments were introduced. The promotion of *cleaner production* became a prominent feature of government waste policies. A specialised agency (Centre for Waste Management in the Water Research Institute) now manages a national waste information database. Further progress has been made on cleaning up contaminated sites.

However, the production of municipal waste began to increase again after 2001. Production of hazardous waste per unit of GDP remains two to three times that of most other EU countries. The results of *waste prevention* efforts have so far been disappointing, possibly due to a lack of information on the costs and benefits of waste prevention options. *Recovery and recycling* lag behind the rates achieved in other

countries for many waste streams. About 60% of municipal waste is still landfilled, partly because landfill fees remain too low to encourage the use of more environmentally sound waste management techniques. The *economic* sector dealing with waste management is to be further constructed. The clean-up of the *contamination burden of the past* is far from complete. Perhaps most important of all, business and citizenry have not yet sufficiently taken the waste prevention message on board.



1. Objectives

The overarching Czech policy document applicable to the review period, the *State Environmental Policy* (SEP) 1999, 2001 and 2004, contains objectives for the whole range of environmental policy, including air, water and waste management. A common objective for these three domains was to incorporate European Union (EU) environmental laws and multilateral environmental agreements into the Czech legislative framework. This task was successfully achieved by the time the country joined the EU in May 2004. The following laws and their associated regulations now constitute the core for pollution management in the Czech Republic: Air Protection Act No. 86/2002 and implementing regulation No. 350/2002, including a section on light pollution (Box 2.1); Water Act No. 254/2001 and its Euro-amendment No. 20/2004; the Act on Water Supply and Sewerage Systems No. 274/2001; the Public Health Act No. 258/2000 and their associated regulations; Waste Act No. 185/2001 and the Packaging Act No. 477/2001.

1.1 Air pollution

The main axes of the SEP for air pollution management are:

- decrease emissions from *small stationary sources*;
- introduce stricter NO_x emission limits for large enterprises in the *fuel-energy industry* in line with the EU requirements;
- decrease emissions of NO_x, VOCs and particulates from *mobile sources*;
- decrease emissions of VOCs from *production, business and distribution chains*;
- continue integration of environmental concerns in *sectoral policies*;
- implement a general strategy for *sustainable transport*;

- utilise more effective combinations of *economic instruments* and strengthen the role of emission charges;
- improve collection of *data* and reporting on heavy metals and other hazardous air pollutants, including fine dust particulates and persistent organic pollutants;
- decrease overall emissions of air pollutants so as to comply with the *ceilings* by 2010;
- introduce emission limits for NO_x, SO_x and particulates for *new, important sources*, in line with EU legislation and the Gothenburg Protocol of the Convention on Long-range Transboundary Air Pollution (CLRTAP);
- reduce emissions of ammonia through the adoption of good *agricultural practice*, in line with the Gothenburg Protocol of the CLRTAP;
- introduce *principles* of evaluating and managing air quality, according to EU Directives.

Box 2.1 Combating light pollution

The Czech Republic became the first country in the world to regulate light pollution at a national level by adoption of the *Air Protection Act* No. 86/2002. The Czech law defines “light pollution” as “any form of illumination by artificial light which is dispersed outside the areas to which intended, particularly in cases when directed over the horizon level”. The law sets out the conditions under which it applies and allows municipalities to make bylaws to prevent light pollution. Key to compliance with the law is the use of fully shielded light fixtures. The International Dark-Sky Association (a diverse group of astronomers, lighting designers and manufacturers, environmentalists, ecologists and government officials) defines these as “fixtures that emit no light above the horizontal direction”. Citizens and organisations found in violation of the law’s provisions may be fined CZK 500 to 150 000.

Regional and local regulations against light pollution have also been passed in other countries in the European and American continents. For example, the Czech legislation closely resembles the “Lombardy Law” enacted in the Lombardy region of Italy after 25 000 citizens signed petitions demanding action against obtrusive outdoor lighting. Several US states restrict outdoor lighting, as do cities and counties in Arizona, where several astronomical observatories are located. Regional laws to restrict light pollution were adopted for the same *astronomical reason* in areas of Chile.

Czech air management performance can also be evaluated against the *recommendations of the 1998 OECD Environmental Performance Review (EPR)*:

- review air quality priorities and make cost-effective choices of quantitative targets, including: i) further reducing emissions from small stationary sources; ii) tightening NO_x emission standards for large combustion plants; iii) reducing emissions of NO_x and VOCs from mobile sources; iv) focusing on emissions of VOCs in the fuel distribution chain;
- use a more cost-effective mix of policy instruments, including increasing the incentive function of emission charges;
- further integrate environmental concerns into energy policies, including through accelerating the reduction of energy price distortions that discourage energy saving and renewable energy use;
- develop, assess the environmental impacts of, and implement a comprehensive sustainable transport strategy incorporating land use and transport planning, as well as regulatory measures and pricing mechanisms that discourage car use, especially in urban areas;
- improve data collection and reporting on heavy metals and other toxic substances.

Comparison of the SEP objectives with the OECD recommendations shows that the latter have been fully subsumed in the former. The issue of target setting (first recommendation) now is mainly addressed at the EU level. This chapter will demonstrate that, while *substantial advances* were made on several of the above recommendations, *progress stagnated* in other areas (e.g. emissions of particulate matter and NO_x). Progress on transport policies is reviewed later (Chapter 4).

1.2 Water pollution and flooding

The SEP sets the following objectives for water pollution and flooding:

- comply with the Council Directive 91/271/EEC concerning *urban waste water treatment* by 2010;
- permanently monitor *organic pollutants and toxic metals* in surface and ground waters;
- continue to implement the *flood prevention programme*, which calls for: renewal and construction of small water reservoirs, dry polders and dykes; preparation of studies of run-off conditions; and delimiting of inundation areas for all important water courses and territories endangered by extreme floods;

- introduce stricter conditions for *permitting construction and activities* in inundation areas to prevent unnecessary damage.

Czech performance in water management can also be evaluated against the *recommendations of the 1998 OECD EPR*:

- prepare and enact new water legislation with revised effluent limits;
- set quantified water management objectives based on EU Directives and on the agreements reached with respect to the protection of the Labe (Elbe), Morava, and Odra (Oder);
- connect more households to water supply networks and seek to reduce the large differences in connection rates across the country in the most cost-effective way; extend drinking water monitoring and reporting to all public systems;
- increase the number of people connected to sewerage systems and invest in waste water treatment plants;
- continue measures to establish a water pricing structure which encourages water conservation and takes account of social factors;
- continue to strengthen the ecosystem approach;
- reduce vulnerability to flood hazards by strengthening the integration of water management considerations in land-use planning; further pursue physical measures to prevent flooding and reduce flood damage.

This chapter will show that substantial progress was made during the review period towards achieving all the above SEP objectives, as well as on following up to the OECD recommendations. However, the *job is far from complete* and this chapter will suggest some *further issues* that require attention.

1.3 Waste management

Some of the SEP's *strategic goals for waste management* include:

- prepare concepts for regional and national waste management plans;
- prepare *hazardous waste* management plans at company and regional levels by 2005;
- prevent waste generation (particularly by implementing cleaner production) and reduce the hazardous properties of waste;
- implement *economic instruments*;
- recover at least 35% of packaging waste (by weight) and recycle at least 15% of all materials contained in packaging waste (by weight) by 2005.

The *packaging targets* were subsequently strengthened by the Packaging Act (as part of a transitional measure agreed with the EU) to: recovery of 52% and recycling of 45% of total packaging waste (by weight); recovery of 55% and recycling of 45% of paper; recovery of 25% and recycling of 15% of plastics; recovery and recycling of 80% of glass; and recovery and recycling of 25% of metal.

Czech performance in waste management can also be evaluated against the *recommendations of the 1998 OECD EPR*:

- elaborate, as soon as possible, action programmes for implementing the Waste Management Act, including the creation of a reliable information base and the definition of quantitative targets;
- gradually eliminate the differences which still exist between the Waste Management Act and relevant OECD and EU rules, in particular by reducing the number of exceptions to the “green list” of wastes destined for recovery;
- develop separate collection and recycling of municipal waste, introducing appropriate economic instruments to serve as incentives;
- further the use of low-waste and cleaner technologies in industry;
- develop the necessary facilities for proper disposal of hazardous waste and take the necessary regulatory and economic measures to ensure that these facilities are used;
- gradually raise the level of fees and charges to ensure full application of the polluter pays and user pays principles, for municipal as well as industrial and hazardous waste.

This chapter will show that the Czech Republic has made progress in following up to *all of the OECD recommendations*. Progress was notably strong in strengthening the institutional, legal and policy framework for waste management, but there is still *a distance to go* in setting up the necessary facilities and systems and in instilling a waste prevention ethic among citizens and business.

2. Air Pollution

Air quality policy in the Czech Republic during the review period was predominantly *driven by international imperatives* in the form of the CLRTAP and the EU Air Quality Framework and associated daughter Directives, as well as by the EU National Emissions Ceiling Directive. In 2002, these international commitments (including those under the CLRTAP Gothenburg Protocol, which is yet to enter into force) were transposed to Czech law in a new Act on Protection of the Air No. 86/2002 and implementing regulation No. 350/2002, which are now the main legal

instruments for improving air quality. The Czech Republic is also bound to reduce its greenhouse gas (GHG) emissions by 8% below the 1990 level by 2008-12 under the Kyoto Protocol (Chapter 6).

Czech *ambient air quality standards* have become somewhat more stringent since the adoption of EU limits. Regulation No. 350/2002 already incorporates the limits for arsenic, cadmium, mercury, nickel and PAHs that are likely to be stipulated in the forthcoming fourth daughter Directive. The Integrated National Programme of Emission Reduction, under which the central government provides funds to help municipalities draw up air management plans, will contribute to compliance with international commitments.

In line with OECD recommendations, the Czech Republic further *improved its air quality monitoring and reporting* during the review period. New legislation (2003) requires regular monitoring of selected harmful substances. Data on emissions of several heavy metals (Hg, Pb and Cd) and POPs (PCB, PCDD/F and PAHs) were reported for the first time in 2000. Emissions of other monitored heavy metals (As, Cr, Cu, Ni, Se and Zn) were added in 2003, and emissions of HCB were included in 2004. The Czech Hydrometeorological Institute has published a comprehensive annual air quality report since 1993.

2.1 Meeting ambient air quality standards in all parts of the country

In general, the three areas of the Czech Republic with the worst air quality problems are: i) the triangle extending northwest from Prague towards the German border, ii) Moravia and Silesia, and iii) the Prague region (Box 2.2). For instance, pollution limits for benzo(a)pyrene are exceeded in Ústí nad Labem and Plzeň in the northwest, Ostrava in North Moravia, and the city of Prague. In addition, localised sites in these areas show occasional breaches of pollution limits for cadmium (Liberec) and arsenic (Ostrava). Some other parts of the country also have problems with air pollution. *Ozone* is the most widespread and troublesome pollutant: in 2002, 7 of the 13 regions had more than 90% of their territory out of compliance with the 8-hour health standard and two-thirds of the entire country did not meet the ecosystem standard. Small *particulate matter* is of local concern in almost every region of the country.

A marked decrease in *SO₂ concentrations* across the country occurred after 1997 as a result of the more stringent emission limits imposed and enforced from that year under the then Clean Air Act 309/1991 (Figure 2.1). The widespread breaches of the 24h-limit (125 µg/m³) that occurred in the past were halted. The hourly limit value (350 µg/m³) was respected in all but two districts. Concerning the protection of

Box 2.2 Public health and air quality in Ústecký kraj

The *Ústí region* (Ústecký kraj) in the northwest of the Czech Republic covers about 5 335 km² and has 820 000 inhabitants. The region is located in an area formerly called the Black Triangle, a natural basin straddling Czechoslovakia, Germany and Poland where past industrial activity and lignite mining posed an extremely heavy pollution burden on the basin's inhabitants and environment. Polluted air was frequently trapped over the basin when temperature inversion would lock tonnes of ash and gas under a roof of warm air, causing numerous human health problems, including respiratory diseases and cancer.

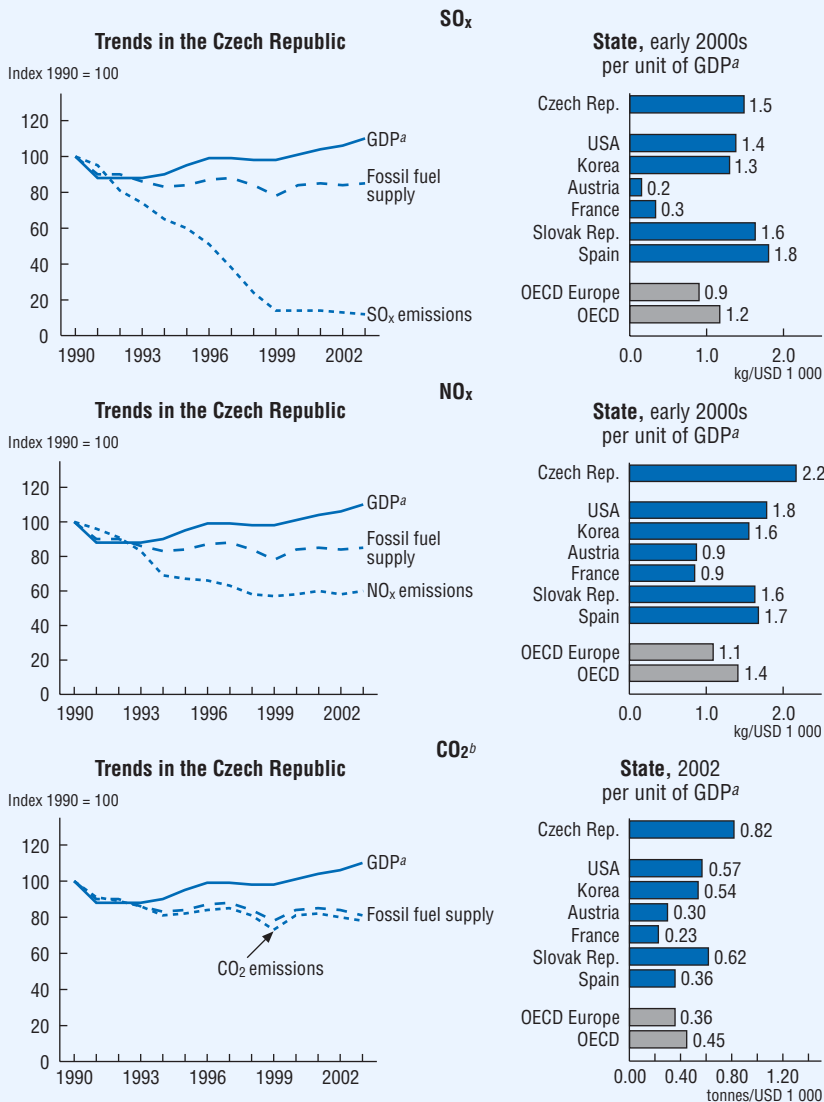
The three affected countries, with the support of the European Commission and the World Bank, launched the *Black Triangle Project* to improve environmental conditions in the area. The project ran from 1991 to 2001. Changes carried out at the *Ledvice coal-fired power plant* by the CEZ Power Company are a good example of the large efforts and investments that were made to cut back emissions. Improvements to the plant included the installation of 28 desulphurisation plants and seven fluidised-bed boilers, as well as closure of the most obsolete plants and modernisation of remaining facilities to meet 1999 emission limits. Air emissions in the Ústí region (with the exception of NO_x) dropped significantly during the review period, after already having fallen greatly in the first part of the 1990s. Over 1997-2002, emissions from both large and smaller sources in the Ústí region decreased (-68%, -63%, -12% and -15% respectively for PM, SO₂, CO and C_xH_y).

Today, the *Ústí region* is still industrial (e.g. chemical industry) and produces about 90% of the country's coal-generated electricity, but *the quality of life of its population has significantly improved*. Annual mean and 24-hour average concentrations of SO₂, NO₂, CO and PM do not exceed their limits and recommended values at most monitoring sites. Whereas in the past the incidence of respiratory illness in the Ústí region was twice the national average, it is now on a par with the rest of the country.

ecosystems, just 6 of 127 rural measuring stations exceeded the limit for average winter concentration (20 µg/m³) in 2002. In 2003, however, a slight increase in SO₂ pollution occurred in several areas, probably due to increased use of solid fuels following higher gas prices.

Concerning *concentrations of NO₂* during the review period, peak (hourly) values did not exceed the limit value of 200 µg/m³ beyond the permitted frequency (i.e. 18 times) anywhere in the country. The annual average was exceeded at a few stations only, mainly in Prague. However, after generally decreasing until 2001, NO₂ concentrations began to edge upward in many localities. Expected growth in traffic is

Figure 2.1 Air pollutant emissions



a) GDP at 2000 prices and purchasing power parities.

b) Emissions from energy use only; excludes international marine and aviation bunkers.

Source: UNFCCC; OECD; IEA.

likely to increase the frequency of episodes of high ozone and NO₂ levels, especially in and near large cities.

Suspended particulate matter is of major concern. Annual means of *both total suspended matter and PM₁₀* rose during much of the review period. Both the annual average limit (40 µg/m³) and the 24 h-limit (50 µg/m³) were exceeded at about one-fourth of measuring stations. Households returning to cheaper but dirtier heating fuels may explain part of the increase. Twenty-three per cent of the population were exposed to excessive levels of PM₁₀ in 2002.

Ground-level ozone is an extensive problem throughout the country, for both human health and vegetation. In 2002, more than 64% of the population were exposed to concentrations above the health limits, and vegetation protection standards were exceeded at 20 out of 32 stations and in more than two-thirds of protected areas. As elsewhere in Europe, the trend has been for maximum 8 h-concentrations to decrease at rural measuring stations but to increase at urban stations. The Czech Republic will find it challenging to meet the 2010 deadline for fully complying with the EU Ozone Directive 2002/3/EC.

PAHs originating from the imperfect combustion of fossil fuels in both stationary and mobile sources are also of widespread concern. In 2003, the limit for concentrations of benzo(a)pyrene was exceeded at 8 out of 12 monitoring stations (affecting about 20% of the population). Limits for benzene concentration were also exceeded in Ostrava, mainly as a result of emissions from coking plants.

2.2 *Furthering air emission reductions*

Good progress

Emissions of SO₂ decreased by 48% during 1998-2003, reaching 226 kilotonnes (kt) and hence already well below the 2010 emission ceilings stipulated by the CLRTAP Oslo Protocol (632 kt) and even the Gothenburg Protocol (283 kt) and the EU National Emissions Ceiling (265 kt). However, the SO₂ intensity of the Czech economy remains almost double that of the OECD Europe average as well as the EU-15 average (Figure 2.1). In 2003, about 81% of total sulphur emissions came from large sources (predominantly the energy sector), while 14% came from small stationary sources.

VOC emissions decreased from an estimated 242 kt in 1998 to 198 kt in 2003, and the Czech Republic surpassed the CLRTAP Geneva Protocol objective of reducing VOC emissions by 30% during 1990-99. This achievement was due to several factors, including: a shift towards the use of environmentally sound coating

materials and degreasing agents; installation and regular checking of vapour withdrawal facilities at most fuel storage terminals and gas stations; and a decline in VOC emissions from traffic due to the increasing penetration of catalytic converters in the vehicle fleet, which has outweighed the effect of traffic growth. Although current VOC emissions are below the 220 kt ceiling set for 2010 by the Gothenburg Protocol and the EU National Emissions Ceiling Directive, likely increases in traffic will make this target difficult to achieve.

Unfavourable trends

Emissions of NO_x dropped steadily from 551 to 313 kt over 1990-99, but have more or less hovered around the same level since; they amounted to 330 kt in 2003. The NO_x -emission intensity of the economy is double that of OECD Europe and the EU-15 average (Figure 2.1). The total NO_x emissions from mobile sources increased by 9% during 1998-2003 with the scale effect of traffic growth beginning to outstrip improvements in vehicle technology in the latter part of the review period (Chapter 4). The further reductions required under the Gothenburg Protocol and the EU National Emissions Ceiling Directive (which both have a ceiling of 286 kt by 2010) will be difficult to achieve.

Particulate matter emissions reached a low of 57 kt in 2000, but then rose again to 76.4 kt, resulting in an overall reduction of 9% over 1998-2003. No emission limits have so far been specified for particulate matter under CLRTAP, but the issue will be addressed in the EU's "Clean Air for Europe" programme.

Ammonia emissions reached a low point of 72 kt in 2002 but then rose. Nevertheless, the Czech Republic should have little difficulty in meeting the 2010 target of 101 kt under the Gothenburg Protocol as long as good agricultural practices are implemented. Meeting the EU emission ceiling of 80 kt for the same year will be much more challenging.

The downward trend in emissions of *heavy metals* (Cd, Hg, Pb) that began in 1990 continued during the early part of the review period, but appears to have been halted in the latter part. The reduction in Pb emissions was due mainly to the gradual phase-out of leaded petrol (completed end 2000). Emissions of POPs (e.g. PAHs, PCBs) also appear to have levelled off in the latter part of the review period. Much of the decline in emissions can be attributed to a shift from solid to gaseous fuels, the installation of new pollution separation equipment (e.g. desulphurisation at power plants) and dust removal from production and processing of metals and mineral raw materials. These measures may by now have exhausted their potential and further reductions will have to come from cleaner technologies.

GHG emissions stayed broadly constant during most of the review period at a level of around 140 million tonnes CO₂-equivalent, or about three-quarters of the 1990 level (Figure 2.1). Net CO₂ emissions amounted to 118.6 million tonnes in 2002, or 86% of the *GHG* total. Given that GDP grew by 12% during 1998-2003, CO₂ emissions stayed decoupled from economic growth. Nevertheless, the carbon intensity of the Czech economy remains *the highest among OECD countries* (Chapter 6). Methane and nitrous oxide contributed 10.4 and 8.2 million tonnes, respectively.

2.3 Integrating air management objectives into energy policy

The Czech Republic did a great deal during the review period to reform the *institutional framework for the energy sector* and make it more consistent with that of other EU countries. New laws (Energy Act No. 458/2000; Energy Management Act No. 406/2000; Act on Promotion of the use of Renewable Sources of Energy No. 180/2005) and institutions (State Energy Inspection Board, Energy Regulatory Office) were put in place, and formal energy policies and programmes were adopted. An overarching energy policy document, the State Energy Policy, was approved in 2000 and reviewed in 2004. The EU was an important driver with its Directives on Renewable Energy (2001/77/EC), Large Combustion Plants (2001/80/EC), Energy Performance of Buildings (2002/91/EC), Use of Biological and Alternative Fuels in Transport (2003/30/EC), Common Rules Regarding the Internal Electricity Market (2003/54/EC), Taxation of Energy and Electricity (2003/96/EC), and Cogeneration (2004/8/EC). In addition, the energy sector was largely restructured and partially privatised, and energy markets were partially opened up (Box 2.3).

After falling by some 17% during the 1990s, the *energy intensity* of the Czech economy has stayed *broadly constant since 1999* and remains well above the OECD Europe average (Figure 2.2). It ranks 28th among OECD countries. This high intensity is partly explained by the country's continued reliance on solid fuels and its large share of energy-intensive production processes (metallurgy, production of building materials). But lower building and appliance standards and some comparatively low energy prices for industry also contributed (Table 2.1). The measures taken during the review period clearly were not able to outpace the scale effects of economic growth, possibly due to insufficient funding.

Improving *energy efficiency* is therefore rightly the number one goal of the State Energy Policy. The policy targets an annual reduction of energy intensity by 3-3.5%, to be achieved through energy transformation, distribution and end-use. The Ministry of Industry and Trade and the Ministry of the Environment have jointly formulated a

Box 2.3 The Czech energy sector at a glance

In 2003, *total primary energy supply* (TPES) was 43.7 Mtoe or 7.8% below the 1990 level. Over the period, energy production, mainly coal, fell by 15%, while energy imports increased by 26%. The structure of the TPES still shows a clear *dominance of coal* (48%), followed by oil (20%), natural gas (18%), nuclear (15%), hydropower (0.3%) and other renewables (2%). Domestic energy production is mainly coal (79%) and nuclear (16%).

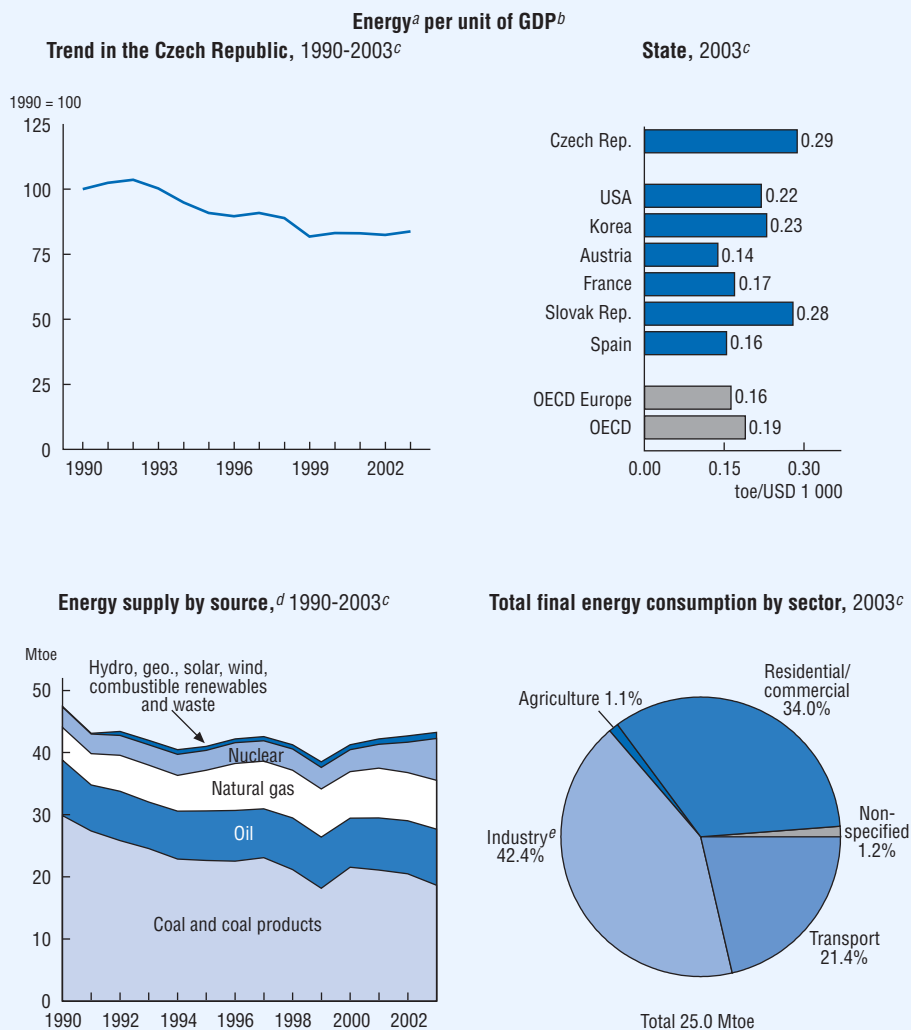
Total final consumption of energy (TFC) decreased by 26% during 1990-2003 to 25 Mtoe (in 2003). During the same period, consumption of coal fell by a factor of five but remains 13% of TFC. Petroleum products and natural gas now have a market share of 32% and 25%, respectively, followed by electricity with 18% and heat with 11%.

Forecasts for 2010 suggest a slight increase of TPES (+1.5%) and an increase of TFC (+14%). The *share of coal* in TPES and TFC is expected to decrease by one-third, but would still account for one-third of TPES. On a time horizon to 2030, the State Energy Policy (approved March 2004) aims to modify the structure of its TPES by further increasing the share of nuclear (20-22%) and renewables (15-16%).

national programme to promote energy savings and the use of renewable resources during the period 2006-09. The programme contains strengthened measures (e.g. promotion of cogeneration, investment incentives, renewing and replacing of outdated power plants, research) to meet its goals.

At the time of the first OECD EPR, the *GHG intensity of the Czech economy* was one of the highest among OECD countries. Six years later this ranking had not significantly changed, in spite of a switch to natural gas in industry and in domestic and district heating, and to nuclear power. The State Energy Policy aims at a further shift away from the carbon-rich domestic lignite and coal and brown coal, and towards greater diversification of the primary energy supply. As for the other pillar of climate change policy, it is clear that ample opportunities for improving energy efficiency should be vigorously pursued. The Czech Republic is expected to easily meet its obligation to reduce GHG emissions by 8% under the Kyoto Protocol, even in a “worst case” scenario of fast economic growth with business-as-usual policies. But this should not be a reason to relent on efforts to reduce GHG emissions. Rather, the Czech Republic should seize the opportunity to reduce energy intensity where it can be achieved at low cost and trade the excess of allowances for profit or keep them to achieve further commitments when the prices might be higher.

Figure 2.2 Energy structure and intensity



- a) Total primary energy supply.
 b) GDP at 2000 prices and purchasing power parities.
 c) 2003: estimates.
 d) Breakdown excludes electricity trade.
 e) Includes non-energy use.
 Source: OECD; IEA.

Table 2.1 **Energy prices**, selected OECD countries, 2003

	Electricity		Oil		Natural gas	
	Industry (USD ^c /kWh)	Households (USD ^d /kWh)	Industry ^a (USD ^e /tonne)	Households ^b (USD ^e /1 000 litres)	Industry (USD ^f /10 ⁷ kcal)	Households (USD ^f /10 ⁷ kcal)
Czech Republic	0.056	0.160	146.8	768.5	203.4	610.5
United States ^g	0.049	0.087	195.8	369.8	222.7	365.0
Korea	0.051	0.120	301.6	870.9	..	..
Austria	..	0.143	..	418.6	..	410.8
France	0.045	0.123	209.3	427.2	229.1	506.4
Slovak Republic	0.070	0.222	..	755.8	220.6	488.5
Spain	0.048 ^f	0.158 ^f	230.9	494.8	204.0	672.4
OECD Europe	0.059 ^f	0.140 ^f	..	458.9	..	..
OECD	0.062 ^g	0.110 ^g	205.7 ^f	442.2	162.0 ^f	380.0 ^f
Czech R./OECD Europe (%)	83 ^f	121 ^f	..	167	..	..
Czech R./OECD (%)	69 ^g	144 ^g	68 ^f	174	107 ^f	160 ^f

a) High-sulphur oil.

b) Light fuel oil.

c) At current exchange rates.

d) At current PPPs.

e) Electricity for industry: price excluding taxes.

f) 2002 data.

g) 2001 data.

Source: OECD; IEA.

The Czech Republic has *surplus electricity* generating capacity (based mainly on coal and nuclear power), and this capacity was further increased in April 2003 when the Temelin nuclear power station came on line. In 2001, transmission and distribution losses of 8.7% of total electricity supplied were higher than the OECD average of 6.6%. Net exports (principally to Germany) represented more than 20% of gross generation in 2002, but these exports are constrained by a lack of high-voltage transmission capacity, among other factors.

The State Energy Policy includes some key *environmental goals* related to complying with the 2010 emission ceilings for SO₂, NO_x and VOCs, such as achieving an 8% share of renewable resources in electricity production, and reducing emissions of POPs and GHGs. Emissions of SO₂ and particulate matter from fuel combustion for the production of energy and heat fell by 49% and 42% respectively during 1998-2003, thanks to desulphurisation and fuel-switching to natural gas in households, industry and district heating. On the other hand, NO_x emissions from the

same sources fell by barely 3%. Nevertheless, the energy sector increased its share of SO₂, NO_x and dust among industrial sources, responsible for 85%, 80% and 82% of emissions, respectively.

Price distortions among different types of energy (including direct subsidies to producers) were generally reduced during the review period and prices paid by end-users are now much closer to the cost of supply. Direct subsidies and cross-subsidies to suppliers and consumers are being phased out or have been significantly reduced. Prices paid by the Czech industry for electricity and oil are considerably lower than the OECD average, but not those for natural gas; on the other hand, households pay significantly more for all three types (Table 2.1). Further price rises may result from ecotaxes arising from a tax reform, the announced shift from the lower to the higher VAT category for heat and biofuels, and the promotion for using renewable energy resources for the generation of electricity and heat. Increases in the price of natural gas relative to coal may lead to a return to heating based on solid fuels, as has already been observed in recent times. This phenomenon could be exacerbated by co-combustion of solid municipal waste.

3. Water Pollution and Flooding

3.1 Water quality trends

The improvement in the water quality of the Czech Republic's *rivers and streams* that began in the early 1990s continued during the review period, even though the disruption in waste water treatment caused by the catastrophic 2002 flood led to a temporary worsening in that year. The abundance of fish and the number of species to be found in Czech rivers has increased: for example, the Elbe, once labelled the European sewer, now counts 80 fish species (including the reintroduced salmon), more than double the number present in the early 1980s. The improvement was due mainly to the fact that many river reaches in the lowest water quality class – Class V, “very highly polluted” – have moved up to Class IV, “highly polluted”. A few river reaches are now in the two highest classes (Classes I and II). Nevertheless, the great majority of river reaches remain in Classes III, “polluted”, and IV. Microbial pollution remains widespread, coming mainly from municipal waste water, and most rivers are not suitable for swimming. The 130 Czech bathing sites designated under the EU Bathing Water Directive are mostly located at artificial reservoirs and recreational fishponds and are generally of higher quality; nevertheless, about 5-6% do not meet microbiological standards. Many reservoirs and fishponds also suffer from serious nutrient enrichment due to agricultural runoff, erosion and deposition from the air (Box 2.4).

Box 2.4 Fishponds of the Czech lands

Fishponds are a *thousand-year-old tradition* and an integral part of the Czech and Moravian culture. The total area of fishponds in the Czech Republic is estimated at more than 50 000 hectares, of which about 33 000 hectares are located in South Bohemia, close to the Austrian border. The largest fishpond in the Czech lands, created by the historic Rozmberk family in the 15th century, measures 489 hectares. In addition to producing fish, fishponds also have an important role in water management and nature protection. Some Czech fishponds are included in UNESCO Biosphere Reserves and World Heritage sites (e.g. the Třeboň area).

Czech fishponds are rich in dissolved nutrients and contain a wealth of micro-organisms. The fish *farming* tends to be semi-intensive, using natural food as a source of animal protein with a supplement of cereals for energy. Little or no use is made of intensive feeding with pelleted feed. Production is stable at just below 20 000 tonnes per year. The dominant species is the common carp with about 18 000 tonnes harvested annually, mostly in the form of live fish produced for the Christmas and Easter holidays and sold on both domestic and export markets. Other cyprinid fish, such as Chinese carp and tench, as well as some carnivorous fish and whitefish species, are produced mostly in polyculture with common carp.

As fishponds are formed by damming smaller streams, they help to *retain flood waters* and attenuate flood peaks downstream. The 2002 flood, however, was so great that it overwhelmed many fishponds, notably in southern and western Bohemia, damaging dams and outfall structures and filling reservoirs with sediment and debris. In 2003, the Czech government contributed more than CZK 620 million for damage repairs and dredging activities. Fishponds are also used for *water supply* (industry, domestic, irrigation and fire fighting), although eutrophication is frequently a problem.

Fishponds can be valuable *aquatic habitat*, too. For example, the Novozámecký and Brehynsky fishponds were declared a National Nature Reserve (923 hectares) and included in the Ramsar List in 1990. Habitat includes extensive reed beds, wet meadows, peat bogs and wet, coniferous woodland. The ponds also are an important breeding and staging area for birds, including the White-tailed Sea Eagle and Osprey. In some ponds in the Czech-Moravian Highlands, otters have reoccupied territories from which they had disappeared due to severe persecution and poor water quality.

However, the *multiple functions of fishponds* are not always compatible. For instance, well-stocked fishponds attract fish-eating predators like cormorants and herons, making these protected species unpopular with fishpond operators. In 2000, the government created a compensation scheme to reimburse fish producers for the fish taken by otters. But as is often the case with such compensation schemes, it can be difficult to establish the facts about the number of predators, their behaviour and the true amount of damage. Determining the amount of compensation requires the involvement of an expert, which makes the procedure cumbersome, especially for owners of small ponds. Another issue raised by a recent study is that some fishpond

Box 2.4 Fishponds of the Czech lands (cont.)

owners, notably owners of small ponds, often breed fish as pets, as a pastime or to share a good meal with friends, rather than for financial gain. Such cases do not lend themselves well to monetary compensation. A solution already informally carried out in parts of neighbouring Saxony, providing replacement fish rather than financial compensation, may also be applicable in the Czech Republic.

Concentrations of many different hazardous substances (which are not taken into account in the above water classification) have been much reduced since the early 1990s. In 2003, receiving water standards for the contaminants covered by the six EU Directives on dangerous substances (1976/464/EEC and its daughter Directives) were met, but this was not the case for all substances during the whole of the review period, particularly in water courses close to discharge points of municipal and industrial waste water treatment plants. Major pollution sources include the chemical industries (e.g. mercury, AOX and chlorinated organic compounds in the Bílina river near its confluence with the Elbe), coal mines (e.g. PAHs such as fluoranthene and benzo(a)pyrene), coke industries (PAHs) and timber treatment facilities (also PAHs). In addition, past pollution accumulated in river bottom sediments (e.g. PCBs in the Morava river, DDT in the Bílina) continues to affect benthic flora and fauna.

Groundwater monitoring at the country's 463 boreholes shows that many groundwater aquifers, particularly shallow ones, remain contaminated with a variety of substances (e.g. chlorides, aluminium and ammonium ions, PAHs, pesticides). Nationwide, about two-fifths of shallow monitoring wells and one-fifth of deep ones (including springs) do not meet standards for at least one substance, though these figures vary by region. Drinking water, at least the almost 50% that is not withdrawn from surface waters, is usually abstracted from deeper aquifers, so that source water quality only occasionally poses problems. Nevertheless, in 2003, testing of groundwater samples against drinking water criteria showed fairly frequent breaches of the limits for nitrates (13.6% of samples), COD (12.2%) and ammonium (11.7%), as well as less frequent breaches for nickel (3.9%), fluorides (2.4%) and atrazine (1.5%). The contamination is largely a legacy of past industrial practices, as substances released many years ago are just now appearing in the groundwater. But current sources also contribute. A monitoring programme (comprising 640 sites) to evaluate nitrate pollution from agriculture is being developed by the Agricultural Water Management Administration.

3.2 *The challenge of implementing EU water pollution Directives*

Compliance with EU environmental Directives is requiring a considerable financial effort from the Czech Republic. The *cost of implementing the Directives* on Drinking Water, Urban Waste Water Treatment, and Nitrates was estimated (in 1999) at approximately CZK 150 billion (or about 8% of GDP). Of this, CZK 75.4 billion was for urban waste water treatment and CZK 5.4 billion was for nitrates.

Urban Waste Water Directive

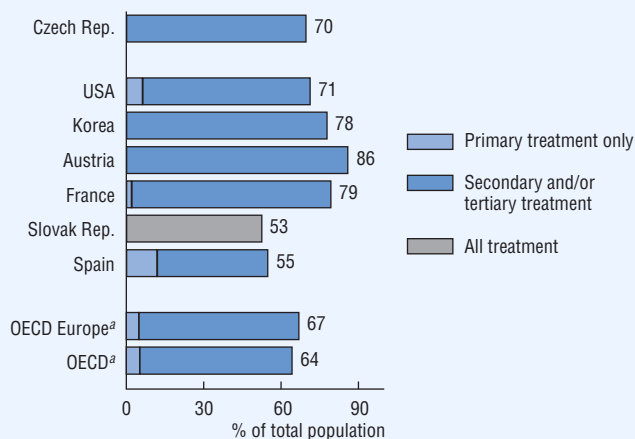
The proportion of people living in houses *connected to a piped sewerage system* increased from 74.4 to 77.7% between 1998 and 2003, amounting to an absolute increase of about 271 000 people (Table 2.2). The number of connections to public water supply systems grew by a comparable number, so that the gap between the number of people supplied from public water mains and those connected to public sewers (12.1% of the population in 2003) stayed broadly constant. Czech water policy aims to close this gap, though that need not mean relying solely on conventional, centralised systems. Modern, decentralised and less costly methods of sewage disposal can also be effective. Municipalities, particularly smaller ones, are not always aware of their potential, however, so central government should play a role in carrying out and disseminating the results of research in this field.

During the review period, the Czech Republic further *decoupled the share of the population not connected to a municipal waste water treatment plant* from population growth. The connection rate climbed to about 70% in 2003 (of which about 55% to the tertiary level), which is greater than the OECD and OECD Europe averages (Figure 2.3). The number of *treatment plants* grew from 870 to 1 410 during the review period. All municipalities with a population equivalent (p.e.) greater than 10 000 are now served by basic mechanical/biological treatment plants. Of the 620 million m³ of waste water discharged into public sewers in 1998, 91.3% was treated in some manner; in 2003, the corresponding figures were 558 million m³ and 94.5% (these figures also reflect the reduction in water use during the review period).

Discharges of biochemical oxygen demand (BOD), chemical oxygen demand (COD) and suspended solids all showed a steady decline between 1990 and 2003, except that in 2002 there was a temporary blip due to the fact that many sewage treatment plants were out of operation for several months after the disastrous flooding in August of that year (Table 2.3). Overall discharges from this source decreased by 92% for BOD, by 85% for COD, and by 89% for suspended solids, between 1990 and 2003.

Figure 2.3 Population connected to public waste water treatment plant

State, early 2000s



a) Secretariat estimates.

Source: OECD, Environment Directorate.

Table 2.2 Waste water treatment

	Unit	1989	1998	2003
Inhabitants	(000)	10 364	10 295	10 201
of which:				
Living in homes connected to a public water supply	(000)	8 537	8 879	9 179
<i>as a share of the population</i>	(%)	82.4	86.2	89.8
Living in homes connected to public sewerage network	(000)	7 501	7 657	7 928
<i>as a share of the population</i>	(%)	72.4	74.4	77.7
Volume of waste water discharged in sewerage networks ^a	10 ⁶ m ³	877.8	620.0	558.1
Volume of waste water treated	10 ⁶ m ³	627.6	566.1	527.4
<i>as a share of volume entering sewerage networks</i>	(%)	71.5	91.3	94.5

a) Excludes storm water from combined systems.

Source: Report on the State of Water Management in the Czech Republic, 2003.

Table 2.3 Discharges from selected industry branches, 1998-2003

	Year	Metallurgical	Chemical	Machinery	Paper	Foodstuffs	Total industry ^a
Total volume (10 ⁶ m ³)	1998	63.6	95.2	22.4	82.3	18.7	311.4
	2003	37.0	93.9	13.1	69.1	14.8	240.9
BOD (tonnes)	1998	245.2	2 833.2	245.7	1 499.1	576.5	6 034.5
	2003	146.8	1 322.9	76.3	1 289.0	227.4	3 213.2
COD (tonnes)	1998	1 002.7	13 410.5	786.3	15 328.6	1 603.8	34 542.1
	2003	553.0	4 265.7	417.6	9 843.6	898.7	16 622.6
SS (tonnes)	1998	781.7	3 943.0	693.7	2 395.0	357.7	8 780.7
	2003	394.1	1 790.3	158.9	1 436.7	259.5	4 262.1
Ammonia (NH ₄) (tonnes)	1998	139.0	1 720.6	58.6	48.3	59.3	2 224.6
	2003	94.0	815.8	41.0	75.5	61.8	1 140.6

a) Total of nine industry branches, i.e. those listed in the table plus electro-technical, wood working, glass and textile.

Source: Ministry of the Environment. Reports on the Environment in the Czech Republic, 2002 and 2003.

As for the *operation of sewage treatment stations*, all facilities are required to monitor their performance and must report to the Ministry of Agriculture. It is said that larger plants operate efficiently, while a proportion of the many smaller plants does not. The government should encourage the sector, e.g. through the association of water utilities, to put in place a practical and transparent benchmarking system to compare and to have confidence in utilities' efficiency. The government should also ensure that municipalities and the municipal enterprises put in place formal maintenance and asset management programmes to protect their large investment.

Concerning the future, in spite of the progress made in building new and upgrading existing sewerage infrastructure, *much remains to be done*. The main tasks ahead are: adding nitrogen and phosphorus removal capability to sewage treatment stations that have a capacity greater than 10 000 p.e. and that are not already so equipped; building waste water treatment plants and upgrading sewer systems for municipalities with 2 000-10 000 p.e.; rebuilding and modernising existing waste water treatment plants with a capacity greater than 5 000 p.e.; and building waste water treatment plants in municipalities that have sewer systems and less than 2 000 p.e.

The Czech Republic has been granted *transitional arrangements* that extend its deadlines for complying with various targets of the EU Urban Waste Water Treatment

Directive (to 2006 for larger areas with higher population equivalent; to 2010 for smaller ones) (Table 2.4). The task imposed by the Directive will be quite large due to the fact that the entire territory of the Czech Republic has been designated as sensitive to nutrient enrichment, making phosphorus and nitrogen removal mandatory for all installations with a capacity greater than 10 000 p.e. In December 2003, the government approved an updated strategy for financing implementation of the Directive. Although the Czech Republic by no means started from zero in 1990, meeting the deadlines would still mean that it had fully upgraded its sewerage infrastructure in just 20 years, which would count as a solid performance, indeed. Given the effort required to implement the Waste Water Directive, it is understandable that so far scant attention appears to have been given to pollution from storm water discharges. This issue will probably need to be tackled in the coming years if the water quality objectives of the EU Water Framework Directive are to be met (Box 2.5).

EU rules prohibit the landfilling of *sewage sludge* after 2008. A new Czech sewage sludge management programme (part of the national Waste Management Plan) should help with compliance. Originally due to be completed by the end of 2003, the programme will be presented to the government in 2005. The programme will likely require the removal of toxic substances from waste water, and may include a 2001 voluntary agreement with the dentistry profession for mercury recovery. It is expected that higher-quality sludge will increasingly be composted and used in agriculture, while lower-quality sludge will be used for soil improvement or as an alternative fuel.

Table 2.4 **Transitional measures^a under the EU Urban Waste Water Directive**

Area/Agglomeration	Number of agglomeration	Million p.e. ^b (% total ^c)	Implementation by
> 10 000 p.e.	18	1.2 (11%)	31.12.2002
> 10 000 p.e.	36	4.07 (37%)	31.12.2006
> 10 000 p.e.	127	3.85 (35%)	31.12.2010
2 000-10 000 p.e.	552	1.87 (17%)	31.12.2010

a) Exceptions negotiated by the Czech Republic.

b) p.e. = population equivalent.

c) Percentage covered by the Directive (agglomerations over 2 000 p.e.).

Source: Report on the State of Water Management in the Czech Republic, 2003.

Box 2.5 International river conventions and the EU Water Framework Directive

The Czech Republic straddles the hydrological divide *between three seas*. The Labe (Elbe) flows into the North Sea near Hamburg, the Odra (Oder) discharges into the Baltic Sea near Stettin, and the Morava is a tributary of the Danube, which debouches into the Black Sea. All the country's rivers are thus located in transboundary watersheds. Watercourses also make up nearly *one-third of the country's borders*.

During the 1990s, international *conventions for the protection of these three rivers* were concluded: for the Elbe in 1990, the Danube in 1994 and the Oder in 1996. International commissions were established to formulate and co-ordinate various action plans. The three conventions have similar objectives, such as: preventing pollution of the river and of the sea into which it flows; protecting aquatic ecosystems and species diversity; protecting the river as a source of drinking water; and improving flood control, flood warning systems and the prevention of flood damage; and accident prevention and warning.

All three international conventions are based on the *river basin approach*, which is also an organising principle in the EU Water Framework Directive 2000/60/EC. As the Directive explains, this means that within a river basin where water use may have transboundary effects, the requirements for meeting environmental objectives should be co-ordinated for the entire river basin district. The Directive also notes that, for river basins extending beyond the boundaries of the EU, Member States should endeavour to co-ordinate measures with the relevant non-member States, as is also required under the UN Convention on the Protection and Use of Transboundary Watercourses and International Lakes. Another purpose of the Directive is to help the Community and Member States to meet their obligations under various international agreements to protect marine waters from pollution.

Because the objectives of the river conventions and the Water Framework Directive are so similar, the three international commissions have been entrusted with the *international co-ordination* of the implementation of the Directive for the three basins concerned. The commissions have been restructured to facilitate this task, and have begun publishing the reports required under articles 3 (i.e. lists of competent authorities) and 5 (characterisation of river basins) of the Directive.

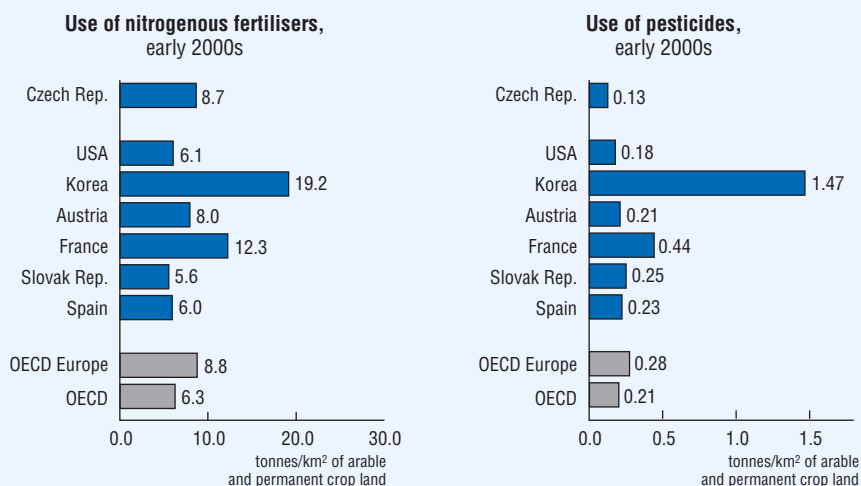
Nitrates Directive

Agricultural land covers 42 730 km² or 54% of the country's territory and more than 70% is used for arable farming. The *nitrogen surplus of the agricultural soils* is close to the European average and stayed broadly constant during the review period at

just below 60 kg N/ha. The application of mineral fertilisers fluctuated during the review period and appears to be increasing again after its sudden drop during the early 1990s; use is similar to the OECD Europe average (Figure 2.4). In part this may be a catch-up after a period of depletion, but several other countries have succeeded in reducing the use of fertilisers and other agricultural inputs, so room for improvement should exist.

The Czech government has *already undertaken various actions* required under the EU Nitrates Directive. Under Government Regulation 103/2003, it designated about 36% of the Czech territory (representing 43% of agricultural land) as vulnerable to nitrate pollution and set rules for manure storage, buffer strips, erosion control, etc. In 2002, the Ministry of Agriculture published principles of good agricultural practice, and farmers will have to comply with these principles in order to receive EU agricultural support payments starting in 2007. In 2004, the government adopted an updated strategy for financing the investment (CZK 5.4 billion) and non-investment (CZK 25.7 million annually) cost of implementing the Nitrates Directive. Now that the main instruments and financing plans are in place, efforts should focus on a vigorous implementation of various programmes, notably the construction of manure storage facilities.

Figure 2.4 **Agricultural inputs**



Source: FAO; OECD.

Directives on the discharge of dangerous substances to water

Water quality monitoring as well as the widespread presence of dangerous substances in sewage sludge shows that *pollution of surface waters by organic substances and heavy metals* is an issue. The government has formulated an action plan (the Programme for the Reduction of the Pollution of Surface Water with Dangerous Substances and Highly Dangerous Substances) to keep these substances out of waste waters as part of its implementation of the EU Directives on this issue (76/464/EEC and 86/280/EEC), including mercury (82/176/EEC and 84/156/EEC), cadmium (83/513/EEC) and HCH (84/491/EEC). A 2001 voluntary agreement between the Ministry of the Environment and the Chamber of Dentistry aims to install amalgam traps at all dental care facilities by 2005; this should eliminate the discharge of mercury into sewer systems from this source and hence reduce the contamination of sewage sludge. Further progress in this area will depend heavily on the success of efforts to promote cleaner technologies in industry.

3.3 Preventing damage from floods and inundation

Preventing flood damage became a major preoccupation of Czech water policy when two catastrophic floods, as well as some smaller ones, hit the country within the space of six years. The floods in the summers of 1997 and 2002 were the two largest events of the past 100 years, causing the deaths of 60 and 19 people, respectively. In 2002, 15 000 people had to be evacuated and hundreds of thousands were affected. On both occasions, the material damage was enormous relative to the size of the economy: CZK 62.6 billion (about EUR 2.1 billion) in 1997 and CZK 70 billion (EUR 3 billion) in 2002, *equivalent to 3.5% of GDP in 1997 and 3.2% in 2002*, of which less than one-third was insured. To put these figures into context, the damage of the 2002 flood was of the same order as the total cost of implementing the Urban Waste Water Directive in the Czech Republic. In the aftermath of the floods, the first priority was to restore damaged or construct new river control and flood protection works. More than 2 000 separate structures (involving 2 200 km of water course, 116 km of protective dikes, 49 water reservoirs and 175 dams) were either restored or newly built. Financial assistance from various European Union funding mechanisms (e.g. EUR 129 million from the EU Emergency Fund, EUR 48 million from unallocated ISPA funding, EUR 9.75 million from the PHARE 2003 reserve) contributed substantially to the restoration work.

In addition to showing the inadequacy of the country's structural flood defences (i.e. engineering works), the 1997 flood revealed serious weaknesses in flood forecasting and warning systems and in emergency response capacity. It also

revealed the lack of an integrated approach to preventing flood damage. These issues were comprehensively addressed during 1999-2004 in *seven new pieces of legislation*, including the new Water Act No. 254/2001, which assigned responsibility for flood prevention to various levels of government and established dedicated commissions responsible for drawing up flood control plans. The government also adopted a Flood Protection Strategy in 2000, which provides for hydrological modelling and the designation of flood-prone areas. The Czech Republic is also actively involved in the flood protection activities of the international river conventions for the Elbe, Oder and Danube (Box 2.5). So far, much of the attention has rightly focused on improving flood preparedness and emergency management. The measures already in place at the time of the 2002 flood resulted in better preparedness and fewer casualties, in spite of the flood's being substantially larger than the 1997 event.

If the Czech Republic is to succeed in its aspiration to be a leader in rational floodplain management, it must go beyond putting all the necessary instruments in place. In the long run, the challenge is to *implement an efficient mix of structural solutions and planning measures that reduce the exposure to flood risks*. Local government must ensure that development in floodplains is appropriate to the level of flood risk by strictly enforcing the hazard zones now being delineated and reporting on any exemptions granted. Urban storm water practices should encourage infiltration and retention rather than rapid evacuation of rainwater. Rural communities should be mindful that land use in the wider catchments does not increase peak flows further downstream. Water authorities should ensure that existing programmes to "renaturalise" stream channels allow rivers to spread out when they are in spate. All this requires that flood prevention become a prominent consideration in the implementation of the river basin approach of the EU Water Framework Directive, as is already foreshadowed in the decision of the Czech authorities to adopt the districts delineated under the Directive as the basis for managing flood prevention. Also, damage compensation policies should not reward uninsured building owners who have knowingly built on flood-prone land. Such a complex web of actions and interactions cannot be maintained through top-down approaches alone, but stakeholders at all levels should be given the right incentives, including appropriate sanctions, to adopt "flood hazard responsible" behaviour.

4. Waste Management

4.1 Consolidation of the waste management framework

The Czech Republic consolidated its waste management framework during the review period, through legislative, institutional, and planning and programming advances. The enactment of the Waste Act and the Packaging Act in 2001 brought *Czech legislation* in line with EU legislation, with *two transition periods* negotiated under the Directives for packaging waste (with respect to the minimum quotas for recycling of plastics and overall recovery of packaging waste) and electric/electronic equipment waste. Concerning institutions, the Ministry of the Environment retains the lead for waste management; the *Centre for Waste Management*, established in 2001, administers the national waste management information system (thus implementing an OECD recommendation); the Czech Environmental Inspectorate enforces compliance with legal provisions and administers fines; and the Customs Service carries out border control for waste imports and exports. The new regional authorities are responsible for granting permits for hazardous waste management. Municipalities set charges for the collection, sorting and disposal of municipal waste and must also establish secure sites where citizens can discard hazardous household waste and bulky waste. A statutory not-for-profit company owned by the packaging industry, EKO-KOM, was created to manage the recovery and recycling of packaging waste.

Planning and programming are guided by the 2003 *Waste Management Plan (WMP) of the Czech Republic*, a comprehensive document that evaluates the state of waste management and prescribes binding measures and quantitative targets (laid down in Government Regulation No. 197/2003), including the requirements of EU waste Directives (Table 2.5). Twenty-two *implementation programmes* under the WMP will regulate the management of specific groups of waste (e.g. hazardous waste, packaging and packaging waste, biologically degradable wastes, electrical and electronic equipment, municipal waste, wastes from health care, waste from mining activities, contaminated soils and sediments). The implementation programmes should all be in place by the end of 2006. At the territorial level, *regional waste management plans* are the vehicle for implementing the WMP, and all 14 regions have one. Management of hazardous waste has until recent years been hampered by a lack of information, but the Waste Act has required operators of all facilities to provide data to the authorities.

The radical restructuring of the Czech industry after 1989 offered an opportunity to speed up the transition from end-of-pipe technologies to *cleaner production*. The Czech government took several steps during the review period to encourage this

Table 2.5 Quantitative targets of waste management policy

Object	Quantitative target	Target year
All waste	Increase recycling to 55% (base year 2000)	2012
Municipal waste	Increase material recovery to 50% (base year 2000)	2010
Fraction of wastes deposited in landfills	Decrease by 20% (base year 2000)	2010
Hazardous wastes	Decrease by 20% (base year 2000)	2010
Industrial Ni-Cd batteries	Recover 100% of metal substances	end 2005
Used portable batteries	Collect 100g per inhabitant annually of which material recovery > 50%	2006
Lead storage batteries	Collection and material recovery of 85%/95%	2005-12
Waste oils	38%/50% of oil placed on the market	2006-12
Wastes containing PCB	Terminate combustion in SME stationary sources	01-06-2004
	Elimination/decontamination	2010
	Complete and evaluate inventories of installations containing PCBs in amounts greater than 5 dm ³ ; establish conditions for decontamination of installations containing PCBs greater than 50 mg/kg	—
End-of-life vehicles		
Manufactured before 1/1/1980	Reuse and recover at least 75%; reuse and materially recover at least 70%	01-01-2006
Manufactured after 1/1/1980	Reuse and recover at least 85%; reuse and materially recover at least 80%	01-01-2006
All discarded vehicles	Reuse and recover at least 95%; reuse and materially recover at least 85%	01-01-2015
Construction and demolition wastes	Analyse the manner of managing for creating conditions for recovering 50%/75% of produced construction and demolition waste (by weight)	end 2005/end 2012
Separated discarded electrical and electronic equipment from households	Increase the level of collection to 4 kg per person annually	end 2006
Used large domestic appliances and automatic sales machines	Recover at least 80% of materials, substances and components and reuse or recycle at least 75% (by average weight)	end 2006
Used equipment in information technology and communications	Recover at least 75% of materials, substances and components and reuse or recycle at least 65% (by average weight)	end 2006
Used small domestic appliances, lighting equipment, electrical and electronic tools, toys and instruments for monitoring and regulation	Recover at least 70% of materials, substances and components and reuse or recycle at least 50% (by average weight)	end 2006
Discharge tubes	Reuse or recycle at least 80% of materials, substances and components (by weight)	end 2006

Source: Waste Management Plan of the Czech Republic, 2003.

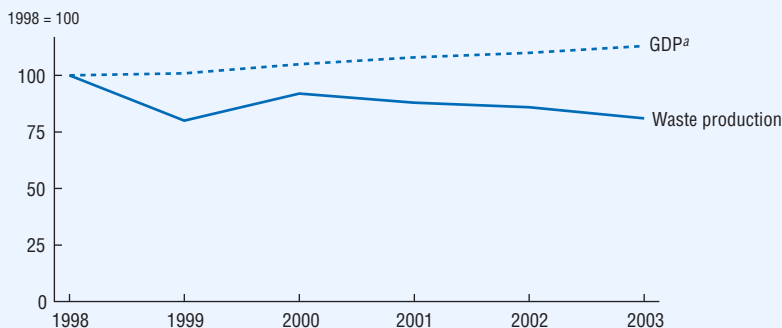
transition. In 1999, it signed up to the UNEP International Declaration on Cleaner Production, and since then, the State Environmental Fund (SEF) has provided financial assistance to regions, municipalities and enterprises for projects to promote and implement cleaner production and Best Available Technology. In 2000, Government Resolution No. 165/2000 stipulated that all ministries (notably that of Industry and Trade) must implement the principles of cleaner production in their domain. In 2002, the government set waste minimisation as an objective under the Act on Integrated Prevention (No. 76/2002), which transposes the EU Directive on Integrated Pollution Prevention and Control. The 2003 WMP reiterates the strategic goal of progressing with low-waste or no-waste technologies in industrial production, replacing harmful materials and components, introducing environmental management systems, and changing the behaviour of industry and commerce. Nevertheless, notwithstanding all these measures, it has so far proven difficult to get industry and commerce to act on accepted waste-prevention principles.

4.2 Waste generation trends

Total waste generation and GDP growth were *strongly decoupled* over the review period: total waste generation fell by 18% between 1998 and 2003, whereas GDP rose by 12% (Figure 2.5). Total waste amounted to 35.9 million tonnes in 2003 (Table 2.6). Waste from the energy and agriculture sectors was reduced by 38% and 35% respectively during this period. The volume of *municipal waste* fell to its lowest point in 2001, but then rose. Packaging waste (including single-use PET and glass bottles) increased strongly.

The total *industrial waste* (i.e. manufacturing, energy, construction and mining) generated in 2003 was 21.4 million tonnes (Table 2.6). Waste from the manufacturing industry (approximately 7.5 million tonnes) represents the largest fraction of the total waste stream, followed by waste from construction (mostly excavated soil).

Hazardous waste production (as classified by the EU waste catalogue) was steadily reduced from 3.0 to 1.9 million tonnes during 1999-2003, i.e. a decrease of 37%. When expressed per unit of GDP, this figure is still about three times as high as in most EU countries, a fact explained partly by the structure of the Czech economy. Half of all hazardous waste originates from industry (Box 2.6). Radioactive waste does not fall under the Waste Act but is subject to specific legislation, and hence is not counted in the above figures.

Figure 2.5 **Decoupling of total waste generation from economic growth, 1998-2003**

a) GDP at 2000 prices.

Source: CWM.

Table 2.6 **Waste production, origin according to OECD classes, 1998-2003**

(1 000 tonnes)

	1998	2000	2001	2002	2003 ^a
Manufacturing waste	8 900	7 778	9 040	9 510	7 525
Waste from energy production	10 409	9 704	8 891	6 425	6 501
Waste from the construction industry	—	—	—	5 924	6 714
Waste from mining activities	600	2 566	2 285	597	689
Waste from agriculture and forestry	8 124	7 499	5 935	5 817	5 281
Municipal waste	4 535	4 258	4 243	4 615	4 639
Waste from water production and distribution	—	—	—	819	755
Waste from cleaning cities	—	—	—	1 474	1 632
Other waste	11 550	8 805	8 300	2 787	2 203
Total	44 118	40 610	38 694	37 968	35 939

a) Preliminary results.

Source: Report on the Environment in the Czech Republic, 2003.

Box 2.6 Wastes from health care

Hazardous wastes from health and veterinary care constitute only 0.66% of the total amount of hazardous waste, but they represent a substantial danger to human health and the environment. Medical waste is *on the increase* due to the growing consumption of single-use medical instruments and protective clothing for health-care personnel.

The management of medical waste requires not only safe disposal, but also prevention and separate collection of individual types of waste. An implementation programme for health-care waste was completed in 2004. Currently, most health-care waste (73%) is *incinerated* in 21 small hospital facilities with a capacity of less than 500 tonnes per year (except for one unit with double that capacity). The total capacity of the 21 facilities is 13 100 tonnes per year. Some medical waste is incinerated in other hazardous waste facilities.

4.3 Recovery and recycling

Some rates of recycling and reuse of waste in the Czech Republic *are relatively low, compared to rates in some other OECD countries*. For example, the amount of hazardous waste recovered from municipal waste equals less than 1% of the overall production. In 2003, 54.8% (19.7 million tonnes) of the total waste stream was reused. Metal wastes (ferrous and non-ferrous) are predominantly recovered and reused, while certain metal-bearing wastes are used to a lesser degree. Much construction waste (e.g. excavated soil) is recovered, and ash from power plants is increasingly reused in the construction industry. The *recycling industry* has been held back by the lack of an economy-wide approach. The WMP implementation programme for increasing material recovery of wastes, which includes a strategy to support the development of markets for recycled products (expected by the end of 2004), is needed.

Concerning *packaging waste*, however, much progress has been made in *separate collection and recycling*, thanks to the EKO-KOM system established during the review period (Box 2.7). An estimated 30 to 40 collection facilities have been established to sort the incoming waste. The share of the population with potential access to separate collection grew from 20% in 1999 to 93% in 2003, and polls suggest that 57% of citizens actually participate in domestic waste separation. The amount of packaging material collected (separately) per capita almost quadrupled between 1999 and 2003, to reach 28.3 kg per year. The Czech Republic met its 2001 targets under the SEP and the EU Packaging Directive for recycling of at least 15% of

Box 2.7 Economic aspects of separate collection and recycling

Separate collection of municipal waste involves *various costs* (e.g. for containers, logistics, final sorting) that are greater than the cost of collecting and transporting mixed municipal waste (CZK 200 per tonne), and then land filling (CZK 720/tonne) or incinerating it (CZK 1 140/tonne). Separate collection costs about CZK 2 100 to 2 600/tonne for paper, CZK 6 000 to 9 000/tonne for plastics, and CZK 700 to 1 500/tonne for glass. However, the revenue obtained from the sale of separated wastes as secondary raw materials can offset some of the cost. In 2001, producers and importers of packaging and packaged goods established a not-for-profit company called EKO-KOM to distribute funds (collected from producers and fillers of packaging) to municipalities to help cover the cost of separate collection. Overall in 2003, 20 754 companies and 4 358 municipalities with a total population of more than 9.5 million participated in the EKO-KOM programme. By 2002, separate collection was economically effective for municipalities.

Producers and importers of products that must be returned at the end of their useful life are liable for the *cost of recycling* these products. The full cost for recycling TV sets, including transport to the treatment plant, separation of components, treatment, and overall management of the process is about CZK 12/kg. The cost of recycling batteries and accumulators is in the range of CZK 0.30 to 3.30/kg for prism and cylindrical batteries, and between CZK 0.03 and CZK 0.12 each for button batteries. For incandescent and fluorescent lamps, the cost of recycling is CZK 4.40 to 5.90 per piece, depending on the amount taken. The cost of processing used tyres for material reuse (e.g. granulated reclaimed rubber) varies from CZK 0.80 to 6.00/kg, depending on tyre size and type. Currently, the Czech Republic does not have any capacity for regenerating waste oils, but it sends a certain percentage of its waste oil for treatment abroad.

individual materials and 25% of all packaging wastes. In 2003, the country recycled 66% of its paper waste, 37% of plastics, 37% of metals, 56% of glass and 49% of packaging wastes. With the exception of glass, these figures already surpass the 2005 targets of the Packaging Act, and the remaining targets should be met without major problems.

The 2001 Waste Act includes the *principle of producer responsibility* and obliges manufacturers and importers of designated products to take back these products at the end of their useful life. So far, the designated products include mineral oils, galvanic cells and batteries, electric accumulators, discharge and fluorescent tubes, tyres and refrigerators used in households. The take-back obligation has been extended to electrical and electronic equipment. Various targets and deadlines for collection and recovery of these products have been set, but no information is available on progress

achieved (Table 2.5). Take-back systems for the various products are managed either by individual producers/importers, or by associations set up for the purpose, under agreements with the Ministry of the Environment (e.g. the 2001 agreement with the Czech Portable Battery Association).

4.4 Disposal

Landfilling remains, at 60%, by far the predominant type of municipal waste disposal, and the total capacity of 12 million m³ for municipal and other waste landfilling is sufficient for the foreseeable future. ISOH data show that, of the 298 landfills currently in operation, 104 are for inert waste, 159 for other waste, 30 for hazardous waste and 5 in more than one group. Regional government issues approvals and sets conditions for the operation of landfills, and the Czech Environmental Inspectorate carries out compliance monitoring. Landfills for non-hazardous wastes are mostly situated suitably close to towns, but hazardous waste landfills are concentrated near a few major industries, requiring other generators to transport their hazardous waste over relatively long distances.

Progress has been made in reducing the number of below-standard landfills. Many unsuitable sites have been closed and replaced. Nevertheless, further efforts will be needed, as a 2002 survey of 352 landfills showed that 229 of them did not yet comply with the standards that will apply starting in 2009 (under the EU Landfill Directive). Illegal dumping has been greatly reduced, although some municipalities still experience problems in remoter areas. Some 227 closed landfills were rehabilitated during the review period, but the task of remediating the remaining hundreds of old landfills is far from completed. One of the WMP implementation programmes already proposes to deal with PCB-contaminated disposal facilities, and the assessment and remediation of closed landfills containing inappropriately deposited hazardous waste other than PCBs should be covered by the proposed WMP implementation programme on contaminated soils.

As for *other treatment methods*, only about 1% of overall waste is incinerated and there is little energy recovery; three municipal waste incinerators at the large urban centres of Brno, Liberec and Prague (combined capacity of 646 000 tonnes per year) processed 442 700 tonnes of waste in 2003. Composting of the biodegradable fraction of municipal waste (the subject of two WMP implementation programmes) has yet to begin.

About 90 of the initial 150 small *hazardous waste incinerators* have been closed down, partly because they would not meet the air emission standards applicable from 2005. The trend towards fewer and larger installations should be encouraged,

because most of the incinerators currently in operation are too small and too little-used to be cost-effective. The 60 operating incinerators have a total capacity of about 113 kt per year (i.e. 5% of hazardous waste generation) and they processed 76 kt of hazardous waste in 2003 (Table 2.7). Larger incinerators (typical installed capacity of 5 to 15 kt per year) are mainly found in the chemical and petrochemical sector, while small and medium-sized incinerators (capacity of 1 to 1.5 kt per year) are mostly operated by industrial waste producers themselves (e.g. small industrial plants or hospitals).

Hazardous waste is subject to the Czech Environmental Inspectorate inspections. Practically all *landfills for hazardous waste* were examined during 2002-03. Particular concern was devoted to the disposal of end-of-life vehicles, PCBs and hospital waste. Results show an improving situation in all mentioned areas.

4.5 Imports and exports of waste

Czech waste legislation had since 1998 incorporated the country's international commitments under the Basel Convention and the OECD Council Decision C(92)39 with regard to the transboundary movement of waste. The 2001 Waste Act, in anticipation of EU membership, also transposed EU Regulation No. 259/93. Among the Czech waste rules that were abolished upon entry into the EU was the prohibition on the import of hazardous waste for disposal, and of waste for energy recovery. However, the Czech Republic has retained its prohibition on the import of wastes destined for disposal in accordance with EU Regulation No. 259/93.

Both the *import and the export of hazardous waste fluctuated greatly* over the review period (Table 2.8). For example, exports amounted to 2 000 tonnes in 2003, about half the amount in 2002; the most significant export (in weight) was of waste from aluminium thermal metallurgy (skimmings). Until the end of 2001, a number of wastes from the green list was considered hazardous (e.g. coal fired power plant fly ash, aluminium skimmings, etc.) No wastes for disposal were imported. The export of hazardous waste for disposal, limited to wastes containing PCBs, decreased during the review period.

Initially, the Czech system of *green, amber and red lists* was somewhat stricter than the OECD classification (58 wastes from the OECD amber list and 43 from the green list were included in the Czech red and amber lists, respectively), but the differences have been gradually reduced. All such exceptions were abolished.

Table 2.7 Recovery or disposal of hazardous waste, 2000-03
(1 000 tonnes)

Manner of management	2000	2001	2002 ^a	2003
Physical and chemical treatment	559	608	184	243
Biological treatment	245	276	115	185
Incineration ^b	43	53	61	76
Landfilling	299	394	135	200
Other management	–	–	6	85
Reuse as secondary raw material	924	897	286 ^e	354 ^e
Warehouse	80	148	213	211
Export	1	5	4	7
Not specified ^c	658	437	510	69
Total ^d	2 809	2 818	1 514	1 430
According to new Waste Catalogue	2 091	2 138	1 514	1 430

a) Pursuant to new Act No. 185/2001, where fewer kinds of wastes are assigned to category H (hazardous) compared to the earlier legislation.

b) Includes incineration and use for energy.

c) Includes waste not used or disposed of within the facilities where it was produced, but transferred elsewhere.

d) The data includes all waste that was managed in the year of interest.

e) Includes means of use pursuant to Annex 3 to the Waste Act No. 185/2001, except combustion with energy use.

Source: Report on the Environment in the Czech Republic, 2003.

Table 2.8 Import and export of hazardous waste
(tonnes)

	1999	2000	2001	2002	2003
Import	4 798	20 126	44 854	1 831	3 284
Export	1 784	3 939	4 088	4 288	2 226

Source: WMIS.

4.6 Remediating contaminated sites

Further progress was made during the review period in remediating the Czech Republic's *contaminated sites*. Responsibilities are shared among several ministries,

regional authorities, and local administration as well as private entities. A permanent database accessible to the public was created. This database contains records on more than 7 000 sites, of which about 2 600 are closed landfills. There is no comprehensive system or list of priority sites dealing with all contaminated sites, but remediation is carried out depending on the origin and history of the problem.

Privatised industrial sites

To deal with environmental liabilities incurred prior to privatisation, remediation is carried out through “*environmental agreements*” between new owners and the National Property Fund. Between 1991 and 2004, 275 agreements were concluded (of which 66 have been completed) at a cost of CZK 21.3 billion to the Fund.

Former Soviet army bases

Significant environmental damage (mostly groundwater contamination caused by petroleum, chlorinated hydrocarbons, PCBs, heavy metals and other toxic substances) was found at about 60 of 73 former Soviet army bases. By 2004, 54 sites had been *decontaminated* at a total cost of more than CZK 1.2 billion (financed from the State budget). A further CZK 270 million will be required to complete the task by 2012.

Old environmental burdens remedied pursuant to the Water Act

According to the Water Act, regional authorities hold a *special account*, which is annually complemented up to the sum of CZK 10 million, for remediation of accidentally endangered surface water and groundwater and remedial measures in case of high-risk historical contamination.

Old environmental burdens remedied on the basis of a Government Resolution

The government uses this approach only in exceptional cases, with respect to especially *serious accidents* that substantially endanger sources of drinking water in the long-term or cause spreading of especially dangerous substances.

Areas affected by coal mining

Areas affected by *coal mining* are concentrated in the Ústecký, Karlovarský and Moravskoslezský regions and the district of Kladno. The government has agreed to gradually allocate CZK 36.18 billion from the National Property Fund since 2002 to remediate the area.

5. Expenditure and Financing, Charges and Economic Instruments

5.1 Expenditure on air, water and waste management

Overall public expenditure on *pollution abatement and control (PAC)* for air, water and waste management, which had reached a high of 0.8% of GDP in the mid-1990s, fell to 0.6% in 1998 and to 0.5% in 2000, then rose again to almost 0.9% in 2003 (Table 4.7). In 2003, sewerage and waste water treatment accounted for 62% of public PAC expenditure, waste management accounted for 31% and air pollution management for 7%. *Business PAC expenditure*, which had been around 1.5% of GDP during much of the 1990s, dropped to 1.2% in 1998 and to 0.5% in 2000, the latest year for which figures are available. Whereas in the 1990s the major investments had been in air pollution control, the review period saw a gradual shift towards sewerage and waste water treatment and, more recently, towards waste management.

Public PAC expenditure on *air management* fell by about one-quarter during the review period, to CZK 1.4 billion or 0.06% of GDP (Table 4.7). Nevertheless, SEF investment in this area remained stable. Business expenditure on air pollution control, which had constituted a major share of the high overall business PAC expenditure during the 1990s, declined massively.

Public PAC expenditure on *sewerage and waste water treatment* in 2003 amounted to CZK 13.4 billion (approximately EUR 430 million) or 0.55% of GDP, of which current spending amounted to CZK 1.9 billion and investment came to CZK 11.4 billion (0.47% of GDP). This rate of investment appears to be about the right order of magnitude to meet the 2010 deadline of the EU Waste Water Directive.

Public PAC expenditure on *waste management* roughly doubled during the review period to reach CZK 6.6 billion, or 0.27% of GDP, in 2003 (Table 4.7). Operating expenditure represented 82% of the total in that year, leaving less than CZK 1.2 billion for investment, down from an all-time high of CZK 4.7 billion in 1998 (current prices). Investment in waste management will need to grow considerably during the next decade, in view of the CZK 36 billion (2001 prices) estimated to be required, mainly for the implementation of EU Directives (CZK 27 billion). Order-of-magnitude estimates of business operating and investment PAC expenditure on waste management suggest that it may have fallen from about CZK 6 billion at the start of the review period to about CZK 4 billion around 2000 (latest data available).

5.2 Financing

The *financing of public environmental expenditure* is achieved through a mix of sources including the State budget, the SEF, and regional and municipal budgets. The relative share contributed by each of these sources is quite different for air, water and waste. Public investment in air management is primarily financed by the SEF; investment in water comes mostly from local sources; and investment in waste management is about equally derived from the SEF and local sources. Operating expenditure for waste management is predominantly financed at a local level by municipalities, except in the case of hazardous waste management, which is largely financed through the State budget. The SEF has also in recent years taken a more prominent role in financing investment in waste facilities, reflecting the availability of EU funding for this purpose.

The *SEF receives part of its revenue from funds collected through the use of economic instruments*. This part represented 60% of the SEF's total income in 2003 and included just over CZK 1.5 billion from economic instruments related to the management of air (36.5%), water (52.9%) and waste (10.6%). In the same year, the Fund allocated more than CZK 4.3 billion to these three areas (including renewable energy sources), of which CZK 0.7 billion as refundable loans. The SEF also administers the EU environmental subsidies allocated to the Czech Republic. EU subsidies generally ranged between 65 and 75% of eligible project costs: total funds approved from the ISPA pre-accession fund, for projects whose scope was somewhat wider than pollution abatement and control (e.g. including drinking water supply, monitoring of water quality), amounted to CZK 0.98 billion in 2001, CZK 2.25 billion in 2002, and CZK 2.55 billion in 2003 (Chapter 4).

5.3 Pricing of municipal services

Prices for municipal *water and waste water services* are set by individual utilities, but are subject to price control exercised by the Ministry of Finance. The combined price of both services increased on average by 40% (current prices) during 1999-2003 and is still rising slowly. In 2003, the average water supply charge amounted to CZK 21.56/m³ (with a range of CZK 10.26-28.24) and the average sewerage charge equalled CZK 18.22/m³ (with a range of CZK 8.88-28.26). Combined prices for the sum of water supply, sewer and treatment charges varied between CZK 18.96/m³ and 56.13/m³, with an average price of CZK 39.77/m³ (all prices include VAT). Prices include operating as well as capital costs, in a cost-recovery logic; capital costs are calculated on the basis of asset value, so that subsidies from the national government or the EU do not distort prices.

Concerning municipal *waste services*, households pay an explicit waste charge dependent on the number of people living in the house. The charge was previously capped at CZK 500 per person, but a 2002 amendment to the Waste Act now allows municipalities to charge more and to structure waste charges so as to encourage waste separation. Where warranted, municipalities may also enter into individual contracts for waste collection. However, revenue from these charges has so far covered not more than one-third of the actual cost of municipal waste collection and disposal.

Selected sources

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3

NATURE AND BIODIVERSITY MANAGEMENT*

Features

- Diversity of fauna and flora
- Nature conservation in protected areas
- Biodiversity in the Czech forests
- Integration of nature and biodiversity concerns in agriculture and forestry

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1998. It also reviews progress with respect to the objectives of the 2001 OECD Environmental Strategy.

Recommendations

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

- finalise, adopt and implement the *national biodiversity strategy* and related action plans;
- establish the *Natura 2000 network* and related management, with appropriate co-ordination and consultation among national, regional and local authorities, and participation of civil society;
- further integrate *biodiversity concerns in agriculture, forestry and tourism*; evaluate the impact of agricultural chemicals (fertilisers, pesticides) on ecosystems; take measures against soil erosion; promote natural processes in the forest restoration activity; develop the strategy for sustainable tourism for protected areas;
- consistently apply nature and biodiversity criteria in the *environmental impact assessment* and *strategic environmental assessment* of development projects and programmes, especially for land use and transport infrastructure projects;
- enhance the *service functions* provided by nature and biodiversity, and the *economic assessment* of these functions (e.g. protection against the impacts of flooding and climate change, support of recreational and tourism services);
- improve funding for nature conservation and biodiversity; ensure consistency in *financial assistance* (e.g. in the agricultural sector).

Conclusions

During the review period, good progress was made with legislation and institutions. The EU accession process was the driving force behind a revision of the legislative framework for biodiversity protection and nature conservation. Improvements in administrative capacity, including inspection and enforcement, were also made. A *network of protected areas* was established, within the national ecological network of protected areas (including landscape sites and monuments, elements of the *Territorial System of Ecological Stability*). The list of *Natura 2000 sites* under the Habitat and Bird directive (SCI and SPA) was adopted by the government. The *return of some fish species* was observed. The *natural renewal* of the forests increased. *Land-use* planning and land-use mapping helped bridge the gap between the management of landscape and protected areas and the use of natural resources. *Environmentally sound agriculture* developed. *Ecological restoration of landscape* was supported at all administrative levels.

However, direct destruction or gradual disappearance of *valuable ecosystems* continues. On-site *monitoring of target species and habitats is inadequate*. While several rescue programmes for selected protected species have been launched, there are no action plans at the scale of the challenge. Implementation of the *CITES agenda* needs to be greatly improved, with co-operation among inspectors, police investigators and courts. The landscape *outside protected areas* has been dramatically affected by extraction of mineral resources, urbanisation, industrial facilities and related pollution damages. The *fragmentation, isolation and destruction* of dominant habitats are important issues. Consumption of fertiliser and pesticides is slowly increasing, though the intensity of their use is relatively low. The *integration of biodiversity and nature protection* concerns into sectoral policies is to be improved, including by use of EU Cohesion and Structural Funds and other financial resources (State or non-State) for specific projects. In particular, the service functions provided by nature (e.g. protection against flooding and climate change, recreational and tourism services) and the economic and health benefits of recreational activities (e.g. reduced obesity) should be recognised. A *strategy for sustainable tourism* should be prepared. *Scientific and technical capacities* for protecting biodiversity and nature conservation are not commensurate to the pressures from development.



1. Objectives

1.1 National policy and strategy

The *State Environmental Policy 2004 (SEP)*, the principal document that will guide Czech environmental policy in the coming years, includes protecting nature and biodiversity among its top priorities. “Halting loss of biodiversity”, “care for aquatic and wetland ecosystems” and “renewal of aquatic biotopes” are among the SEP’s targets. A *National Biodiversity Strategy* has been prepared and is to be submitted to the government for approval in May 2005. This strategy will be essential for implementing the Convention on Biological Diversity and the EU Birds and Habitats Directives, as well as for developing a system for monitoring the state of biodiversity, indicators, new tools for safeguarding unprotected areas and extensive biodiversity policies for forestry.

The 1998 *State Nature Conservation and Landscape Protection Programme* is the Czech Republic’s main programme for protecting biodiversity. It defines 41 priority tasks, for which action plans and operational tasks were developed (e.g. management plans for protected areas, fauna and flora rescue programmes). A

new State Nature Conservation and Landscape Protection Programme is under preparation and is expected to be submitted to the government in 2005.

Performance during the review period can also be evaluated against the recommendations of the *1998 OECD Environmental Performance Review*:

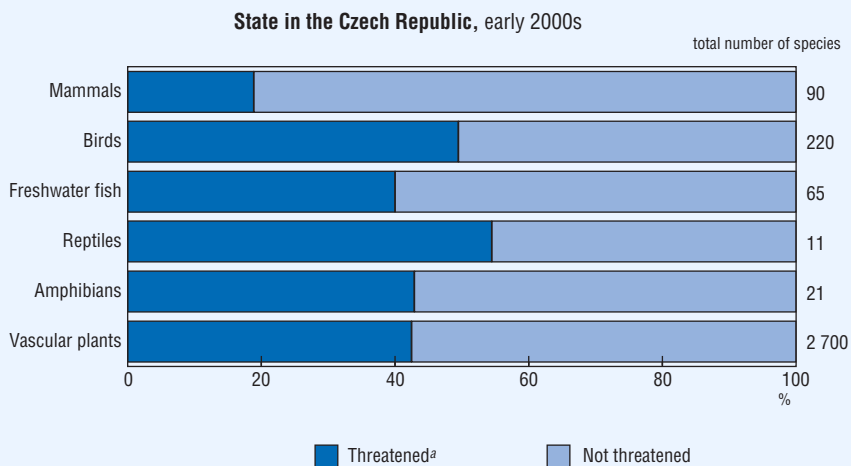
- urgently complete, adopt and implement the National Biodiversity Strategy and related action plans now under preparation;
- develop a sustainable tourism strategy for protected areas and consider ways in which visitor charges could contribute to financing maintenance and environmental costs;
- improve the application of land-use planning, integrating nature conservation and landscape protection concerns and strengthening public participation;
- create synergies among the policies of relevant ministries (Regional Development, Agriculture, Environment, Finance) to encourage rural land owners to take nature and landscape into account in land-use decisions;
- ensure that planning of road infrastructure takes account of the Territorial System of Ecological Stability (TSES); examine legislation in other domains to find ways that nature conservation considerations could be more effectively taken into account, and strengthen the enforcement capacity for the TSES;
- continue and extend the nature-friendly forestry practices indicated in the 1995 Forest Act;
- look for ways to enhance the environmental effectiveness of agri-environmental support measures and to integrate nature and biodiversity concerns in agricultural practices;
- strengthen expertise in nature conservation and biodiversity at district level.

2. State of Nature and Biodiversity

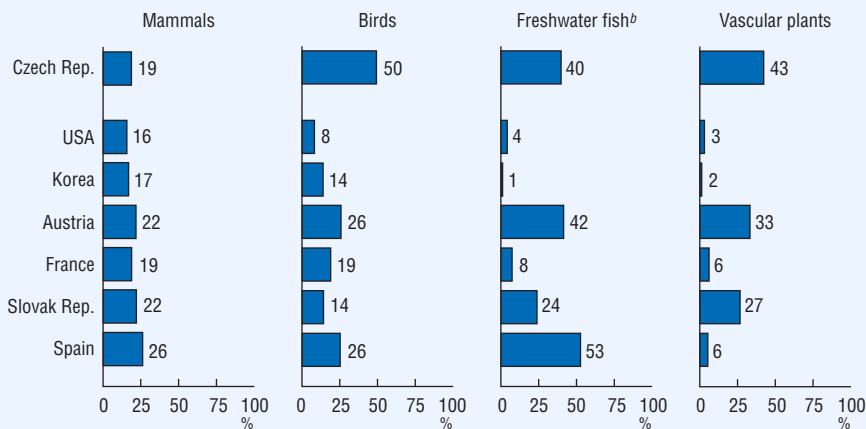
2.1 Diversity of fauna and flora

The Czech Republic presents a *high level of diversity* of species and habitats. This is partly due to its position in a region where the geographical ranges of numerous animal species and vegetation communities overlap. The country has more than 2 700 vascular plants, 2 400 lower plants and 50 000 invertebrates, and about 390 vertebrates. According to the IUCN category, 19% of mammals, 50% of birds, 55% of reptiles, 43% of amphibians, 40% of fresh water fish and 43% of vascular plants are threatened (Figure 3.1).

Figure 3.1 Fauna and flora



Threatened species^a



a) IUCN categories “critically endangered”, “endangered” and “vulnerable” in % of known species.

b) Freshwater fish only except Korea and France.

Source: OECD, Environment Directorate.

Among mammals, bats, carnivores and mammals that *depend on wetlands* are particularly vulnerable. Bird populations in the agricultural landscape are continuing to decrease and some species may disappear. Birds in wetland habitats are especially at risk. The numbers of amphibians and reptiles are continually decreasing. The gradual improvement of water quality has permitted the return and spread of some fish species (Box 3.1). The number of ungulates such as Red Deer (*Cervus elaphus*) has grown throughout the country to such a degree that they cause significant damage to the forest ecosystem.

Box 3.1 Favourable trends for wildlife

Favourable trends for *fish* include the gradual improvement of water quality, which has allowed the return of a number of fish species in some areas. For example, the Euroasian minnow (*Phoxinus phoxinus*), the bullhead (*Cottus gobio*), the Siberian bullhead (*Cottus poecilopus*), the burbot (*Lota lota*) and the golden spined loach (*Sabanajewia aurata*) are returning.

Favourable conditions for *birds* helped to increase the numbers of some rare species, including the common crane (*Grus grus*), the peregrine falcon (*Falco peregrinus*) and the white-tailed sea eagle (*Haliaeetus albicilla*).

For *flora*, success has been achieved with the reappearance of the rare leathery grape fern (*Botrychium multifidum*), which was considered to be extinct, in Šumava.

A favourable trend can also be seen in the slightly growing or stabilised populations of most species of domestic bats (*Chiroptera*), of which 23 species are found in the Czech Republic.

2.2 Diversity of habitats and ecosystems

Currently, 33% of the country is covered by semi-natural and production forest, about 50% by intensively managed agricultural land, 5% by semi-natural meadows and extensive pastures and 12% by other land uses. Important habitat types include natural forest, peat-lands, major river basins, lakes and fish ponds, wetlands, and several types of meadows and grasslands. The country is one of the most important *crossroads on the migration* routes for several floristic elements, which has created a high diversity of species. The country has three phytogeographical regions: thermophyticum (an extrazonal thermophilous vegetation and flora) in the lowland and hill country belt; mesophyticum (a vegetation and flora of the temperate zone with deciduous forest) in the major part of the country; and oreophyticum (mountain

flora and vegetation with conifers dominating in natural forests) in the mountains. The country has 11 Ramsar sites (covering a total of 39 000 hectares).

Overall *forest renewal* has steadily decreased since the early the 1990s, in spite of an increase in natural renewal, as a result of the decrease in artificial reforestation (Table 3.1). The artificial reforestation includes introduction of improved and strengthened tree species, such as beech, mountain ash and fir, into forest ecosystems.

Table 3.1 **Forest renewal, 1990-2003**

(hectares)

	1990	1995	2000	2001	2002	2003
Artificial	33 615 (97.4) ^a	30 128	21 867	19 109	18 120	17 164 (80.2) ^a
Natural	908 (2.6) ^a	1 163	3 422	2 956	3 940	4 230 (19.8) ^a
Total	34 523 (100) ^a	31 291	25 289	22 065	22 060	21 394 (100) ^a

a) Figures in parenthesis are in per cent.

Source: CSO.

3. Policy Measures for Nature Conservation

3.1 Institutional and legal framework

The Czech Constitution stipulates that the State should care about nature conservation and the considerate use of natural resources. The *Act on Protection of Nature and the Landscape* provides the main legislative framework for appropriate nature and landscape management. Other important laws covering nature conservation and biodiversity protection include the act on conditions for the import and export of endangered species of wild fauna and flora and other measures to protect these species, the act on the compensation of damages made by selected species of animals, and the Forest Act. All of these acts are implemented well.

The *EU accession* process has been the driving force to *revise the legislative framework*. The latest amendment to the Act on Protection of Nature and the Landscape transposes the EU Birds and Habitats Directives. It also requires improving the planning and conceptual process in line with European legislation

(e.g. Natura 2000, plans for river basin areas, land-use plans and regional conceptions). The protection of nature, landscape and biological diversity became the first of the four pillars in the 2004 *SEP*. The country has a *variety of programmes* for nature conservation and landscape protection, supported in part by EU funds (Table 3.2).

Administrative capacity has improved, including for *inspection and enforcement*. Involvement of landowners and other stakeholders in the management of protected areas is included in the legislation as well as financial compensation for economic losses due to protection restrictions. Biodiversity *monitoring* (e.g. in forests) provides solid baseline information. However, evaluation of the impacts of development programmes and projects on nature, landscape and biodiversity, particularly strategic ex-ante assessment, is still in its infancy. Monitoring of protected areas and biodiversity still needs to improve. *Scientific and technical capacities* for protecting nature and biodiversity are not commensurate with pressures for development.

Overall, *good progress* has been achieved in improving the institutional and legal framework during the review period and meeting concrete goals like establishing a protected areas network and strengthening the protection management capacity. However, lessons learned from using EU funds and increasing public awareness of nature and biodiversity will help strengthen further policy response and enforcement.

Table 3.2 **Summary of programmes to create and protect landscape**

	1999		2003	
	No. of sites	(CZK million)	No. of sites	(CZK million)
Programme of Care for the Landscape	2 050	224	2 859	205
River System Restoration Programme	315	399	285	546
Programme of Minor Water Management Environmental Projects	55	43	70 ^a	187 ^a
Programme of Renewal of Rural Areas	..	484	3 547 ^a	759 ^a
Programme of Care for the Natural Environment	..	158	113 ^a	221 ^a

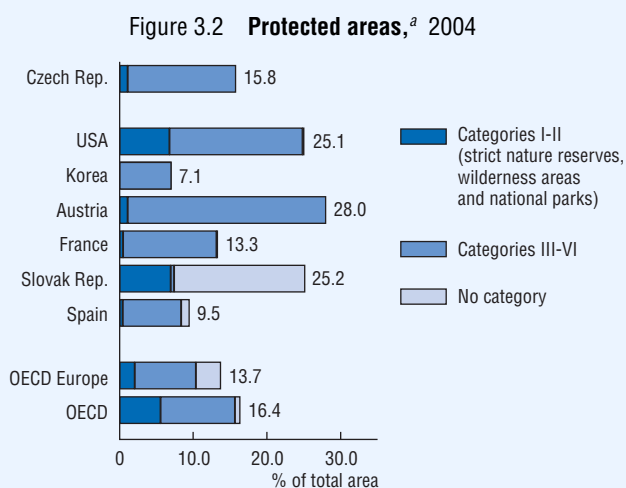
a) In 2002.

Source: Report on the Environment in the Czech Republic, 2003.

3.2 Protected areas

During the review period, the total protected area in the Czech Republic remained almost unchanged, except for the designation of a fourth national park (covering 70 km²). In total, 16% of the country is designated as protected (Figure 3.2). All “specially protected areas” have developed or are developing *management plans* that cover nature conservation in a very broad sense, including agriculture, tourism and industry. A *network* of protected areas has been established (including landscape sites and monuments), although it does not cover the entire range of biotopes. The government has also adopted its list for Natura 2000 sites (SCI and SPA) of 864 sites in 2004.

Due to the rapid expansion of personal and freight *transportation*, road construction might conflict with nature conservation. The *fragmentation, isolation and destruction* of dominant habitats is a serious issue. The ecosystems of the Elbe and Morava Rivers are threatened by the plans for canalising or intensifying the use of waterways.



a) Terrestrial and marine areas. IUCN management categories I-VI and protected areas without IUCN category assignment. National classifications may differ.

Source: WDPA Consortium. “World Database on Protected Areas” 2005. Copyright World Conservation Union (IUCN) and UNEP-World Conservation Monitoring Centre (UNEP-WCMC), 2005 (www.unep-wcmc.org/parks/index.html).

National parks and protected landscape areas

National parks and protected landscape areas are categorised as “large specially protected territories”. The national parks comprise mostly mountain forest ecosystems and close-to-nature deciduous forests with river systems. The fourth national park, České Švýcarsko, was established in 2000. *The Programme of Care of the Landscape* is targeted at increasing its ecological stability through protection against erosion, maintenance of the cultural state, protection of species diversity and care of specially protected areas. In 2003 this programme provided CZK 205 million (Table 3.2).

The 25 *protected landscape areas* present the cultural landscape as influenced and managed by man for a long time. In contrast with the national parks, protected landscape areas aim not only at active management of fragments of nature but also at development of environmentally friendly and economically varied uses of the landscape. Most of the protected landscape areas are located in economically marginal areas, and maintenance of their nature and landscape is one of the few conditions for long-term local economic prosperity.

The Act on Protection of Nature and the Landscape prohibits the *mining* of mineral materials, with limited exceptions, in the national parks, in Zone I of the protected landscape areas, in the national nature reserves and in the national nature monuments. In other areas, the mining of mineral materials is not prohibited, but it is not easy to

Table 3.3 Mining in protected landscape areas, selected minerals
(1 000 tonnes)

	1990	1998	2000	2001	2002	2003
Black coal	915	386	386	280	25	0
Natural gas	0	1	1	1	2.6	3
Clays	205	0	75	72	0	3
Natural sands	13	2	0.2	0	0.1	0.4
Feldspar	86	174	231	256	247	269
Limestone	6 632	3 906	3 637	3 585	3 363	3 382
Decorative stone	187	52	102	28	28	39
Construction stone	7 744	3 125	3 169	2 601	2 470	2 865
Gravel-sands	6 271	1 983	1 532	1 343	1 676	1 663
Brick-making materials	293	56	0	0	70	63
Total	23 346	9 685	9 133.2	8 166	7 881.6	8 284.4

Source: CGS – Geofond.

obtain a permit. During the review period, mining in protected landscape areas generally decreased, except for mining of feldspar, brick-making materials and natural gas (Table 3.3). The total amount of mining increased by 5% between 2002 and 2003. It is necessary to increase the fraction of recycled construction materials in total consumption.

Small specially protected areas

Another type of protected area is the “*small specially protected areas*”, which consist of national nature reserves, national nature monuments, nature reserves and national monuments (Table 3.4). In contrast to the large specially protected territories, the small specially protected areas change more frequently, as special protection is established for additional territories based on new scientific knowledge. Protective zones are created when it is necessary to protect an area against detrimental impacts from the surroundings. These protective zones have special regimes that permit certain activities only with the consent of nature protection authorities. Together with Zone I of the national parks, the small specially protected areas represent the most ecologically valuable area in the Czech Republic.

Table 3.4 **Protected areas, end of 2003**

	Number	Area (1 000 ha)	Forest cover (%)	Area of the country (%)
Large specially protected areas				
National parks	4	119	87	1.51
Protected landscape areas	24	1 043	54	13.19
Sub-total	28	1 162		14.7
Small specially protected territories				
National nature reserves ^a	110	28	82	0.35
National nature monuments ^b	102	3	59	0.03
Nature reserves ^c	750	35	44	0.42
National monuments ^d	1 180	27	70	0.33
Sub-total	2 142	93		1.13
Total ^e	2 170	..	..	..

a) To protect natural and almost natural ecosystems that are important and unique on a national or international scale.

b) To protect unique geological and geo-morphological formations and phenomena, findings of rare natural features, habitats of rare or endangered species.

c) Territories with natural or little-disturbed ecosystems which are typical of a certain geographical area.

d) Areas similar to national nature monuments but with lesser importance.

e) Some small specially protected territories are established in the large specially protected area.

Source: ANCLP, Czech Republic.

Nature parks

Nature parks, promulgated by a generally binding regulation of regional authorities, are established to protect the natural and aesthetic value of smaller landscape units that are not subject to special landscape protection. In 2003, the country had 135 nature parks. Trees that are important because of their species, age, size or shape, as well as groups of trees connected with historical events, may be declared *monumental trees*. As of the end of 2003, there were a total of 4 960 monumental trees. The Act on Protection of Nature and the Landscape provides for protection of forests, peat bogs, lakes, water courses, fishponds and flood plains as *important landscape features*.

3.3 Species protection

The Act on Protection of Nature and the Landscape identifies specially protected species of flora and fauna (Table 3.5). The complete lists of protected species, provided in an executive directive, have been criticised, as they are only partially consistent with the “red lists” drafted by scientists. The act requires the establishment of *action plans* for listed species, including the proposal and implementation of special conservation measures. However, in contrast to the successful development of management plans for specially protected areas, no action plans have been drafted for protected species. Instead, five rescue programmes for specially protected species have been officially launched and a “*strategy of rescue programmes*” is in preparation (Table 3.5). Notable success has been achieved in restoring populations of Lynx (*Lynx*

Table 3.5 **Rescue programmes for protected species**

	Protected species ^a	Rescue programmes
Mammals	30	Lynx
Birds	123	Wood grouse
Reptiles/amphibians	28	None
Fish and cyclostomata	19	None
Invertebrates	92	Pearl mussel
Vascular plants	482	Marsh angelica, long-stalked pond weed
Fungi	46	None

a) As stipulated in Decree No. 395/1992.

Source: Ministry of the Environment.

lynx) in the Šumava/Bohemian Forest Mountains and the White-tailed Eagle (*Haliaeetus albicilla*) in the Třeboň Basin Protected Area and Biosphere Reserve. However, no rescue programme has been initiated for reptiles, amphibians, fish or fungi, although some favourable trends have been observed recently, such as the return of certain fish species due to the improved water quality (Box 3.1).

Illegal hunting is a serious problem. It has reduced the number of lynx (*Lynx lynx*) from 100-150 individuals in 1997/98 to only 80-100 in 2002. Illegal hunting has also affected some species of raptor (*Falconiformes*) and the river otter (*Lutra lutra*). There has also been a decrease in the already low number of elk (*Alces alces*).

3.4 Nature conservation outside protected areas

While nature conservation in the Czech Republic focuses primarily on designated protected areas, the *main threats* to biodiversity are likely to occur outside these areas. A great concern is growing regarding the reconstruction of landscape that has been destroyed or dramatically affected by over-exploitation (e.g. by mining, urbanisation). There appears to be a lack of confidence that local plans are strong enough to prevent development decisions that threaten nature. There is therefore a need to strengthen the link between local spatial plans and conservation plans for protected areas, as well as to fully translate national policies into local plans.

There is a *serious risk* that biodiversity will be lost rapidly through the structural changes and intensification of agriculture associated with EU accession. For many Natura 2000 sites, protection schemes tailored to the individual site will be essential. More broadly, nature conservation and biodiversity objectives will be best served by a Common Agricultural Policy that offers increased broad-based rural development initiatives, including targeted agri-environmental schemes and a decrease in traditional commodity support measures.

3.5 Integration of nature and biodiversity concerns in sectoral policies

The integration of nature and biodiversity concerns into sectoral policies should be pursued. Sectoral policies, strategies and legislation often need to be reconciled with biodiversity goals and international requirements. The ecosystem approach is missing from the main development project.

Land use and land-use planning

The “*territorial system of ecological stability*”, a network of biologically valuable areas connected by “bio-corridors”, is a binding and integral part of land-use planning in the Czech Republic. The Ministry of Regional Development is responsible for spatial

planning, whereas regional or municipal offices have executive authority, a situation that can produce conflicts between development and nature protection. Implementation and co-ordination at regional and local levels need to be strengthened.

Nature conservation and landscape protection are gradually being taken into account at all levels of territorial planning (e.g. amendments to the *Construction Code* concerning Natura 2000 territories). Improvements could be made, however, particularly in conflict resolution and public participation.

Agriculture

Environmentally sound agriculture was practised on 810 farms (6% of the total agricultural land) in 2003 with a predominance of permanent grasslands (90%) and arable land (8%). Inspection for compliance with the act on environmentally sound agriculture was carried out on 717 farms in 2002.

The objectives of *agri-environmental subsidies* are usually linked to nature conservation and landscape protection. They are provided for reducing water run-off and soil erosion (e.g. by planting grasslands on arable land, creating buffer strips around fields and grass strips on slopes, and growing interim plants), for supporting biodiversity (e.g. by maintaining meadows and pastures, permanently wet and peat meadows, and bird habitats on grasslands, as well as by planting bio-strips on arable land), for reducing fertiliser use in meadows and pastures, and for supporting extensive management. The effectiveness of existing agri-environmental subsidies is to be evaluated within the horizontal rural development plan. There will be new opportunities under the Common Agriculture Policy (e.g. encouragement of environmentally beneficial farming methods, promotion 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 currently cover 2.6 million hectares, or 33% of the country, a slight increase from 1990. The intensity of forest use (harvest/annual growth) has increased since 1990, but remained within a sustainable range during the review period. Most forest land belongs to the State (60%) and the remainder belongs to municipalities and regions (15%), forest co-operatives (1%) and private owners (23%). This situation has remained almost unchanged over the last ten years. Overall, 76% of total forested areas are recognised as commercial forest and the rest provide environmental services.

The Forest Act 1995, which conforms to the Convention on Biological Diversity, requires the development of *forest management plans* and the full integration of biodiversity in all forms of forestry practice. The Forestry Act sets minimum shares

of so-called “MZD species” (i.e. broad leaved species and fir) during regeneration processes to increase biodiversity. The fraction of broadleaved tree species, especially beech and oak, has gradually increased (Box 3.2). The minimum shares set for offering subsidies and providing compensation for increased costs could be raised. Consistency should be ensured among the Forest Act, which offers a long-term vision of forest management, and the forthcoming National Biodiversity Strategy. *Certification of sustainable forest management* has developed with the overall certified forest area equal to almost two-thirds of the total forest area.

Environmental impact assessments are performed for deforestation of areas larger than 25 hectares. Deforestation of 5 to 25 hectares requires “investigative proceedings”, called “little EIAs”. The 2001 Environmental Impact Assessment Act

Box 3.2 Biodiversity in the Czech forests

Although Czech forests are currently improving, they have an *unfavourable species composition* as a result of long-term, intensive forest management aimed at maximum wood production. Because of a critical lack of timber in the 18th century, many broadleaved and mixed forests were replaced with coniferous monocultures. In the last 50 years, however, the share of broadleaved species has gradually increased, from 12.9% in 1950 to 22.3% in 2000. Broadleaved trees made up 65.3% of the original forest composition.

The Norway spruce (*Picea abies*), which made up 11.2% of the natural composition of Czech forests, currently represents 54.1%; the Scots pine (*Pinus sylvestris*), originally comprising 3.4%, now makes up 16.8%. The share of the European beech (*Fagus sylvatica*), on the other hand, has dropped dramatically, from 40.2% to a mere 6.0%. The result of these long-term changes is a *low biodiversity and ecological stability* of present forest stands, which leads to widespread devastation of forests by factors both biotic (especially bark beetles) and abiotic (especially wind, air pollution and drought). The share of salvage cuttings caused by these factors has ranged from 15% to 60% in recent years.

The large *populations of ungulates*, including introduced species, cause damage through browsing and peeling bark from trees, significantly altering the mix of species and ages in forest stands and the space between trees. This makes natural regeneration difficult and sometimes impossible, and even creates difficulties for artificial renewal.

At present, two independent *certification systems* are being promoted. The worldwide certification system of the Forest Stewardship Council guarantees an increase in the biodiversity of forest ecosystems through its strict environmental criteria. The Pan-European Forest Certification system, implemented in the Czech Republic by the National Certification Centre, conforms to the requirements of the Forest Act 1995.

lists construction projects that significantly affect biodiversity in forests. While a strategic environmental assessment was made of the Forest Policy prior to EU accession, EIA does not apply to the ten-year forest management plans. Neither local nor State nature protection administrations nor non-governmental organisations (NGOs) take part in the preparation and approval of forest management plans and regional forest development plans, as the Forest Act does not require these plans to go through administrative procedure.

Tourism

The idea of sustainable tourism is found in the State Tourism Policy of the Czech Republic 2002-07. The Ministry of the Environment is developing an *action plan for sustainable tourism* in the frame of the National Biodiversity Strategy. The action plan will describe objectives, means and indicators relating to sustainable tourism, and will contain actions for each specially protected area. The Czech Republic is promoting the creation of a national system of certification of environmentally sound tourism services.

3.6 Economic aspects of nature conservation and biodiversity protection

Expenditure and financing

Direct public funding is the main source of financing for *nature conservation and landscape protection*. In 2003, the *State* contributed CZK 2.6 billion to this purpose (out of CZK 6.0 billion of the State budget for environmental protection). The *State Environmental Fund* contributed CZK 345 million in direct funding and CZK 0.5 million in the form of a loan for 171 new projects in nature and landscape conservation. Expenditure from *local authorities* amounted to CZK 5.4 billion.

Government Regulation No. 344/1999 permits *support for non-productive agricultural functions* that have a favourable environmental impact. The Ministry of Agriculture increased the support provided under this regulation to almost CZK 2.9 billion in 2003. Current programmes include subsidies for environmentally sound agriculture (CZK 230 million was provided in 2003), for maintenance of grassland (CZK 749 million) and for establishing the elements for ecological stability (CZK 1.4 million) (Chapter 4).

To avoid contradictory signals or perverse incentives in the use of financial support (e.g. State funds, EU Cohesion or Structural Funds), *co-operation at the project preparation stage* might be improved, with participation of nature conservation authorities in the early definition phase of relevant projects. Valuation methodologies were prepared concerning forest functions and habitats.

3.7 *International co-operation*

The Czech Republic has ratified most of the international and regional conventions on wildlife, habitats, landscape, desertification and biodiversity (e.g. CITES, CBD, the Bonn Convention, UNCCD, the Bern Convention) and actively participated in the negotiations of the development of recent conventions (e.g. the European Convention on Landscape, the Framework Convention on the Protection and Sustainable Development of the Carpathians). The Czech Republic became a member of the international Planta Europa Association in 2002 and co-operates in preparing the national list of the most endangered European species and biotopes. On accession to the EU, the Czech Republic had *no transition period* for the EU Directives on nature and biodiversity conservation.

Implementation of the *CITES* agenda might be improved, following related EC regulations. Co-operation among the CITES inspectorate, police investigators and judges is still not sufficient. The police should deal with violations of CITES and of related nature protection laws (Chapter 6). For the *Cartagena Protocol* (CBD/GMO), the country is ready to comply with all requirements for meeting targets for implementation. The Czech Republic is a party to the *Ramsar Convention* with 11 listed wetlands: the Šumava peat bogs, Třeboň fishponds, Břehyně and Novozámecký fishponds, Lednické fishponds, Litovelské Pomoraví peat bogs, Poodří peat bogs, Krkonoše peat bogs, Třeboň peat bogs, Lower Podyjí wetlands, the Liběchovky and Pšovky wetlands and the Punkva subterranean stream.

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4

ENVIRONMENTAL-ECONOMIC INTERFACE*

Features

- Pollution, energy and resource intensities
- Sustainable development and institutional integration
- Environmentally harmful subsidies
- Environmentally related taxes
- Administrative and legislative instruments
- EU legislation and financial support
- Economic instruments
- Land-use planning
- Efficient and effective environmental expenditure
- Integrating environmental concerns in transport policies and projects
- Improving vehicles and fuels
- Internalising external costs from transport
- Transport management in Prague

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1998. It also reviews progress with respect to the objectives of the 2001 OECD Environmental Strategy.

Recommendations

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

Integration of environmental and economic decisions

- further decouple environmental pressures from economic growth, including by reducing the *energy and material intensities* of the economy, making the maximum possible use of the EU greenhouse gas trading system;
- foster the introduction of an *ecological tax reform* within a context of fiscal neutrality;
- continue to eliminate *environmentally harmful subsidies*;
- ensure *consistency between the State Environmental Policy and other State policies*; strengthen the integration of environmental concerns into energy policies;
- strengthen the use of *environmental impact assessment* and strategic environmental assessment;
- increase the involvement of relevant ministries and agencies in implementing the *Strategy for Sustainable Development* of the Czech Republic and monitoring its implementation.

Implementation of environmental policies

- take steps to adjust existing *pollution charges* for inflation and to increase their rate of collection; consider adopting *product charges* and work toward more internalisation of external costs;
- increase *environmental expenditure* to levels needed to implement the EU environmental *acquis*, including by use of revenues from economic instruments and EU financing;
- develop the use of *economic analysis* of environmental projects and policies (e.g. cost-benefit analysis);
- develop public-private *partnerships* (e.g. among national authorities, local authorities, industry, NGOs) and strengthen environmental capacities at regional and municipal levels to ensure environmental progress; *monitor this progress* through appropriate targets and indicators;
- strengthen *enforcement of laws and regulations* at national, regional and local levels; further ensure that polluters are effectively sanctioned.

Integration of environmental and transport decisions

- increase the consistency between *transport infrastructure investment programmes* and environmentally sustainable transport objectives, giving higher priority to road network quality, railways and combined transport, as well as to efficient use of EU funds; increase the use of *cost-benefit analysis* and the effectiveness of *environmental impact assessment*;

Recommendations (cont.)

- further develop *traffic management in urban areas*, (e.g. traffic restrictions in city centres, parking and road pricing, incentives to commute by public transport, establishing mobility managers in major companies and government departments);
- improve *institutional co-ordination of transport and land use plans* among the State, regions and municipalities, especially in developing and managing the road network; develop the infrastructure for cycling;
- enforce *vehicle inspection and maintenance* obligations, to better control emissions from older vehicles and to stimulate renewal of cars, lorries and bus fleets;
- review *transport prices and taxes* to better internalise external costs; create incentives to influence transport decisions by firms and individuals (e.g. gradually extend the road tax to passenger vehicles and link it to distance travelled, introduce highway electronic tolls, implement measures to compensate for rail VAT and price increases).

Conclusions

Integration of environmental and economic decisions

Over the review period, some progress was made in decoupling environmental pressures from economic growth with respect to SO_x and VOC emissions, water withdrawals, and waste generation from the energy, manufacturing and agriculture sectors, although often at a slower rate than in the early and mid-1990s. Integration of environmental concerns into *sectoral policies* (e.g. transport, industry, mining) also progressed, with the least success in the energy sector. The restructuring process initiated in the 1990s to rationalise coal production and reduce subsidies is still underway and cross-subsidies to households from industrial consumers in the energy sectors are ended. A *National Strategy for Sustainable Development* was approved at the end of 2004 and monitoring of its implementation has been proposed. An *ecological tax reform* is currently under consideration.

Although economic growth was relatively modest during the review period, decoupling was not achieved for several important indicators. *Pollution intensities* are well above the OECD average (e.g. SO_x, NO_x and CO₂ emissions per unit of GDP). The use of fertilisers and pesticides has increased over the review period, although,

per hectare of agriculture land, it remains lower than the EU-15 average. *Energy intensity* is the second highest among OECD countries. Further efforts are needed to *decouple environmental pressures* from economic growth to capture consequent *health, economic and environmental benefits*. High priority should be given to improving the *energy efficiency* and *resource efficiency* of the Czech economy. *Environmental impact assessment* as well as strategic environmental assessment should be made more influential. More focus is needed at the planning level; the confusion between targets and instruments should be eliminated. Contradictions between governmental targets (e.g. between the State Environmental Policy and the State Energy Policy) should be addressed. At the strategic level, Czech authorities may wish to consider whether EU targets are sufficient in scope and level, and whether additional benefits could be captured beyond the EU targets, given the country-specific conditions (e.g. floods).

Strengthening the implementation of environmental policies

After a first wave of changes to environmental legislation in the early 1990s, the EU accession process led, during the review period, to *intensive work to transpose EU environmental legislation* into Czech environmental legislation (e.g. the Act on Integrated Pollution Prevention and Control, the Act on Environmental Impact Assessment, the Act on the Protection of the Air, the Water Act, the Act on Waste and many others). In May 2004, the Czech Republic joined the EU, with *transition exceptions for only three European Directives*: the Directive on Packaging and Packaging Waste, the Directive on Urban Waste Water Treatment, and the Directive on the Limitation of Emissions of Certain Pollutants into the Air from Large Combustion Plants. A new *State Environmental Policy* was adopted for the period 2004-10. As recommended in the first OECD review, the Ministry of the Environment has strengthened both *its monitoring capacity and its economic analysis*; a wide range of *economic instruments* (e.g. pollution charges and fines, water charges) is in use and *broadly in line with the polluter pays principle*. Environmental management systems are being promoted (ISO 14001 and EMAS) as well as eco-labelling and green purchasing.

While economic changes and environmental legislation and investments rapidly reduced emissions of pollutants in the 1990s, *environmental investment dropped sharply over the review period*, falling from 2.5% of GDP in 1997 to 0.7% in 2002. This partially explains the *lack of progress in reducing the high levels of pollution and energy intensity*. Expenditure for pollution abatement and control (estimated at 1.3% of GDP in 2003) will need to be increased to implement new legislation and EU-related commitments. Overall, EU accession requirements related to the environment are

expected to necessitate EUR 9 billion between 2004 and 2010, with a large part for water issues. This is despite important support expected from the EU through the European Cohesion Fund and Structural Funds. It is therefore essential for the Czech Republic to improve the *cost-effectiveness* of its environmental policies. The rates of *economic instruments*, which have in many cases been eroded by inflation, will need to be strengthened to help finance environmental investment, continue to remediate past damage and dissuade potential polluters. Further use of technologies that prevent pollution, rather than end-of-pipe technologies, should be considered. *Land-use planning* needs to integrate environmental concerns. *Regional and municipal* administrations should strengthen their environmental capacities.

Integration of environmental and transport decisions

The transport sector plays an increasingly important role in the Czech economy. Institutional integration of *environmental concerns in transport policies* has progressed at strategic, project, regulation and local transport planning levels. Environmental sustainability is part of the proposed State Transport Policy. *Strategic environmental assessment* of transport policies and *environmental impact assessment* of transport projects have been extensively used. Concerning vehicle and fuel quality standards, the process of *harmonisation with EU regulations* is completed. The ban on importing cars more than eight years old, the import duties on used cars and the vehicle emission inspection programme have contributed to the renewal of the car fleet. Lead gasoline was phased out in 2001 and limits on fuel sulphur content were introduced in 2003. Financial and fiscal incentives are provided for LPG, CNG and biofuel. *Public transport networks in urban areas* are well developed, integrated transport systems are in place in major cities, and sustainable mobility plans are being introduced in some municipalities. Overall, the review period has witnessed a steady decline in *transport emissions* of carbon monoxide, volatile organic compounds and lead, a slight decrease in emissions of nitrogen oxides, and a recent decrease in sulphur dioxide emissions. Some progress has also been made in *preventing noise* from air transport.

Despite this progress, the transport sector is an important and growing source of environmental concerns. Freight and passenger transport volumes have been steadily rising and are likely to continue to rise. The share of *road transport* in the modal split is increasing and is a major and growing source of *air pollution* (e.g. emissions of CO₂, PM, NO_x and other precursors of ozone) and noise pollution. Ambient particulate matter and ozone concentrations are high in cities (e.g. due to the relative old age of freight vehicles and passenger buses) and threaten *the health of inhabitants*. A large population is exposed to high noise levels. With heavy

investments in new road infrastructure, the quality of the rest of the road network remains poor, and the railway system has not progressed significantly. The renewal of the vehicle fleet has been mainly driven by restrictive measures rather than by market-based incentives. Fuel price adjustments have not managed to moderate road transport demand. Road taxes and fees are not differentiated on the basis of distance travelled. In large urban areas, the use of public transport has fallen and demand management is still not adequate to influence car use.



1. Progress Towards Sustainable Development

1.1 Decoupling environmental pressures from economic growth

Overall, the *economy* of the Czech Republic grew by 9.5% during 1990-2003 (well below the OECD Europe average of 30%), while its population decreased by 2% (Figure 4.1, Box 4.1). After a significant decline between 1990 and 1998, GDP increased by 12% during 1998-2003. Industrial production increased by 26%, road freight traffic by 37%, total primary energy supply by 6% and total final consumption of energy by 2%, between 1998 and 2003 (Table 4.1).

Pollution intensities

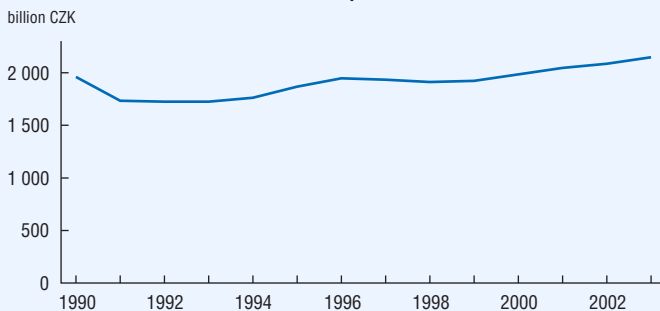
Over the review period, SO_x and VOC emissions were strongly decoupled from economic growth: between 1998 and 2003 they decreased by 48% and 16%, respectively, while GDP grew by 12%. NO_x emissions increased by 3% and CO₂ emissions by 1% during the same period, despite the relatively modest rate of economic growth (Table 4.1, Chapter 2). However, the intensities of SO_x, NO_x and CO₂ emissions per unit of GDP remain *much higher than the OECD Europe averages*: the CO₂ figure is the highest among OECD countries (Figure 2.1). This is partly due to the continued reliance on solid fuels for energy.

Energy intensity and energy efficiencies

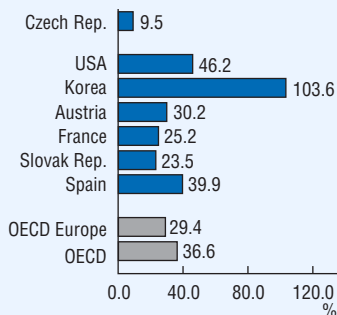
Energy intensity decreased by 5% over the review period, reaching 0.29 toe per USD 1 000 of GDP, a figure 1.7 times as high as the OECD Europe average and the *second highest among OECD countries* (Figure 2.2). This high intensity is partly explained by the country's large share of energy-intensive production processes (metallurgy, production of building materials). But other reasons include the lower building and appliance standards and relatively low energy prices for industry (Table 2.1). The environmental measures introduced during the review period were

Figure 4.1 Economic structure and trends

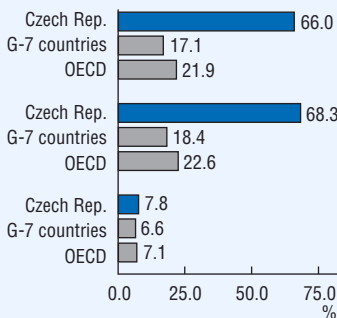
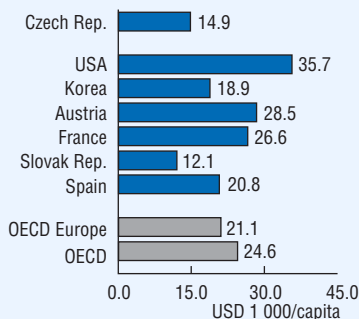
GDP^a in the Czech Republic, 1990-2003



GDP^b growth, 1990-2003



GDP^b per capita, 2003



a) GDP at 2000 prices.
 b) GDP at 2000 prices and purchasing power parities.
 c) % of total labour force.
 Source: OECD Economic Outlook.

Box 4.1 Economic context

The average growth of GDP in the Czech Republic was *modest* between 1990 and 2003; it increased by only 9.5% over the whole period while the GDP of neighbouring Austria and Slovakia increased by 30.2% and 23.5%, respectively (Figure 4.1). However, Czech GDP growth in recent years has been relatively strong. In 2003 it was 2.9%, and it is expected to be somewhat higher than that in 2004 and 2005, driven by investment and exports. Czech GDP per capita is about 60% of the EU average.

The *economic transition* has been fairly rapid and smooth compared to the transition in other former communist countries, although some unresolved issues are now hampering economic performance. As a result of a determined policy of *privatisation*, more than 75% of the economy has been privatised. However, the State retains a controlling share of some enterprises and, to a large extent, ownership of privatised firms is in the hands of the Investment Privatisation Fund managed by State-owned banks. Further reforms are being contemplated to resolve particular problems of corporate governance. The structural changes occurring in the economy are characterised by a reduction of the mining, metallurgy and heavy chemistry sectors, a restructuring of heavy engineering, a decrease in agricultural output and the development of tourism. *Agriculture and industry* now represent 3.4% and 38.4% of GDP, respectively, and the *service sector*, 58.3%.

The Czech Republic has a *very open economy*: Imports and exports of goods and services represented 68.3% and 66% of GDP, respectively, in 2003 (Figure 4.1). Exports to former CMEA trading bloc countries had previously dropped from 60 to 16% between 1989 and 1994, and had only returned to the 1989 level in real terms in 1996. The Czech Republic still imports almost all of its oil and gas from Russia, but in recent years, the largest share of Czech trade has been with countries of the EU-15, especially neighbouring Austria and Germany. Corporate tax advantages and special support schemes have attracted significant foreign capital. Total annual *FDI inflows* have reached between 9 and 12% of GDP during the past few years (with the exception of 2003, when privatisation receipts were very low). In the manufacturing sector, FDI represented between 1.5 and 4% of GDP.

The Czech Republic has had relatively stable and *low inflation* during economic transition. Price increases after the initial liberalisation steps were large, but inflation was kept below 10% thereafter (in contrast with Poland and Hungary). Inflation has remained below 5% in recent years. Over the 1990s, the unemployment rate was low compared with Hungary, Slovakia and Poland. After the macroeconomic crisis of the late 1990s, the *unemployment rate* roughly doubled to reach 7.8% by 2003. While during the 1990s the reduction of State involvement in the economy brought a decline in general government spending relative to GDP, *general government spending* increased from 40% of GDP in 1998 to 45% in 2003. The *State budget* had a *deficit* of 4.5% of GDP in 2003.

not able to outpace the scale effects of economic growth. *Improving energy intensity is therefore a major goal* of the Czech government (e.g. in the State Energy Policy), which aims to reduce the rate by 3 to 3.5% annually through measures to improve energy efficiency in the energy transformation, distribution and end-use sectors.

Table 4.1 Economic trends and environmental pressures

(% change)

	1990-2003	1998-2003
Selected economic trends		
GDP ^a	10	12
Population	-2	-1
GDP ^a /capita	11	13
Agricultural production ^b	-28	-11
Industrial production ^c	3	26
Road freight traffic ^d	177	37
Passenger traffic ^d	50	14
Selected environmental pressures		
Pollution intensities		
CO ₂ emissions from energy use ^e	-18	1
SO _x emissions	-88	-48
NO _x emissions	-40	3
Energy intensities		
Total primary energy supply	-8	6
Energy intensity (per GDP)	-16	-5
Total final consumption of energy	-26	2
Resource intensities		
Water abstraction	-47	-16 ^f
Nitrogenous fertiliser use	-22	32 ^f
Pesticide use	-52	4
Municipal waste	-	2

a) At 2000 prices and purchasing power parities.

b) 1990-2003: 1993-2003.

c) Includes mining, quarrying and manufacturing, electricity, gas and water industries.

d) Based on values expressed in tonne-kilometres and passenger-kilometres.

e) Excluding marine and aviation bunkers.

f) To 2002.

Source: EMEP; FAO; IEA; OECD.

Resource and material intensities

Water withdrawals were further decoupled from GDP growth during the review period, with a decline of 16%. This was due to the reduced use of water for industrial

and energy production as well as for household consumption, reflecting water price increases. Intensity of water use is now 17% below the OECD Europe average.

The use of *pesticides and nitrogenous fertiliser* decreased sharply overall between 1990 and 2002 as a result of the land privatisation process and the subsequent increases in the prices of both inputs. During the review period, however, the declining trend was reversed, with nitrogenous fertiliser use rising by 32% and pesticide use by 4%. The consumption of nitrogenous fertiliser reached 8.7 tonnes/km² of arable land, a rate similar to the OECD Europe average. The consumption of pesticides reached 0.13 tonnes/km² of arable land, below the OECD Europe average of 0.28 tonnes/km² (Figure 2.4).

The quantities of waste generated annually by the agriculture, energy and manufacturing sectors declined respectively by 35%, 38% and 15% over the review period. On the contrary, *municipal waste generation* increased and that trend is expected to continue as packaging materials are increasingly used and private consumption grows. Currently, *industrial waste* generation is relatively high compared to most EU countries.

During the review period, a first phase of economic recession (-0.4 to -1.2% GDP growth from 1997-99) witnessed a standstill and/or a 10 to 15% decline in *material flow* indicators. Then a second phase (2000-04) was marked by GDP growth and a moderate growth in material flow indicators. Over the review period, domestic material consumption per unit of GDP decreased by some 25%. Since 1990, decreases in output indicators can be attributed to the introduction of end-of-pipe technologies, restructuring of the Czech industry and the contraction of its economy.

Overall assessment

During the review period, *little progress was made in decoupling environmental pressures from GDP growth*, except for SO_x emissions, VOC emissions and water abstractions. The formerly declining trends for CO₂ and NO_x emissions reversed and rose slightly. SO_x, NO_x and CO₂ emissions per unit of GDP are the highest or close to the highest among OECD countries. Energy intensity is the third highest among OECD countries. The generation of municipal waste is on the rise. Nitrogenous fertiliser and pesticide use are increasing. *Among sectors, industry and road transport* are growing faster than GDP, and energy supply is growing almost as fast. Whereas the first part of the 1990s was characterised by significant improvements following economic contraction, economic restructuring and strong environmental efforts, the review period (1998-2005) often showed no significant improvements. High priority should therefore be given to *further reducing the pollution intensity, energy intensity and material intensity of the Czech economy*, to capture consequent health, economic and environmental benefits.

1.2 Sustainable development and institutional integration

Institutional arrangements for sustainable development

The Czech Republic formally introduced *sustainable development* in its early environmental legislation. But in most of the 1990s, integration of environmental considerations in economic and sectoral policies was very limited and the words “sustainable development” were barely used. The 1998 OECD Environmental Performance Review (EPR) therefore recommended discussion of a sustainable development strategy.

A *Government Council for Sustainable Development* was established in August 2003 as a standing advisory, initiative and co-ordinating body of the government of the Czech Republic in the domains of sustainable development and strategic management. The Council has 28 members from the State administration and self-government bodies, as well as representatives of the academic community, social partners and other interest groups. It is chaired by the Deputy Prime Minister for Economic Affairs and is served by two committees and seven working groups. One of the Council’s main challenges is to improve co-ordination amongst the large number of institutions that deal with sustainable development issues, especially with the new three-tier administrative structure requiring allocation of competencies across administrative levels.

The National Strategy for Sustainable Development was adopted by the government in December 2004. The Strategy for Sustainable Development focuses on the economic, environmental and social pillars as well as on research and development and education, European and international issues and good governance (Table 4.2). The economic pillar aims at strengthening the competitiveness of the Czech economy. The environmental pillar aims at protecting nature, the environment and natural resources including the landscape. The social pillar aims at strengthening social cohesion and stability. Progress in implementing the strategy will be monitored through various indicators, such as material intensity and share of environmental taxes in total tax revenues. In total 38, 26 and 17 indicators will be used for, respectively, the economic, environment and social pillars. The strategy confirms two quantitative government goals, for reducing CO₂ emissions (to 8.7 tonnes per person by 2020) and for increasing material use (to reuse of 50% of municipal waste by 2010).

The National Strategy for Sustainable Development has been criticised by NGOs as lacking vision, coherence and priorities. In many ways, NGOs are involved in the process of implementation of the strategy and take part in the activities of the Council on Sustainable Development, its committees and working groups. The first report on

Table 4.2 **Strategic goals of the National Strategy for Sustainable Development**

Component	Goals
Economic	<p>To maintain the stability of the Czech economy and safeguard its resistance to negative external and internal effects.</p> <p>To create conditions for economic growth that, with minimum environmental impact, can ensure an optimum rate of employment, public service financing and a progressive reduction in the public and “internal” debt.</p> <p>To create conditions for a flexible economy based on knowledge and skills and to increase the competitiveness of industry, agriculture and services.</p>
Environment	<p>To ensure that the country benefits from the best possible quality of environment, and subsequently increase its quality, thus creating conditions for the progressive regeneration of the landscape, for the minimisation or elimination of risks to human health, and for the progressive regeneration of wildlife and preservation of natural resources to the highest extent economically and socially acceptable.</p> <p>To minimise conflicts of interests between economic activities and environmental protection, and to decouple environmental pressures from economic growth.</p> <p>To make a contribution towards solving European and global environmental issues (specifically the threat of climate change and depletion of the Earth’s ozone layer, as well as the loss of biodiversity).</p>
Social	<p>To support human resource development and maximise social cohesion.</p> <p>To reduce unemployment to a rate where people are economically and socially motivated.</p> <p>To maintain a stable number of inhabitants, and to increase the population over time and improve its age structure.</p>
Research and development, education	<p>To attain a high level of education in society, and thus to ensure the competitiveness of Czech society and develop ethical values in accordance with European cultural traditions.</p>
European and international contexts	<p>To advocate and promote the principles of sustainable development in international relations, in international global and regional organisations, and in bilateral relations.</p> <p>To be an active member of the EU and contribute to the EU’s becoming a functioning and prosperous community.</p>
Good governance	<p>To ensure the adaptation of the constitutional system to the needs of the society for purposes of transition to the path of sustainable development (to help the society move towards sustainable development).</p> <p>To ensure that regions/municipalities are granted a status corresponding to their prospective functions in ensuring an equilibrium between the pillars of sustainable development.</p> <p>To improve conditions for public participation in decision-making concerning sustainable development, and to create the broadest possible consensus regarding the transition to sustainable development.</p> <p>To set up and develop institutions and forms of work of public administration in accordance with the requirements of sustainable development.</p> <p>To ensure that the measures to be taken in the course of providing external and internal security reflect the requirement of protection from changing forms of crime, including international crime and terrorism in particular.</p>

Source: Czech Government.

the implementation of the Strategy together with the indicators should be presented to the government in November 2005. The Strategy should then be updated and presented to the government in November 2007. The establishment of working groups involving different ministries has already increased the level of communication and co-ordination among the various administrations.

Environmental assessments

In 2001, the Czech Environmental Impact Assessment Act (EIA Act) was revised to reflect the corresponding EU Directives. This act applies not only to projects (as required by EU EIA Directives), but also to a range of technologies and concepts (including policies and physical planning) that can be referred to as “strategic environmental assessments” (SEA). The act also applies to products that require pre-marketing certification. The process mandated by the act includes public consultation (e.g. through public hearings, written comments). The *Czech EIA Act* contributes to sustainable development as a preventive and integrative instrument.

EIA can be used as a *condition for receiving financial support*. Under the Common Regional Operational Programme, applicants are usually required to submit an environmental impact assessment of “structures, activities and technology”, as well as an assessment of their impact on Natura 2000. A further condition for receiving financial support is submission of a construction permit or land use decision (which may also include an EIA of structures, activities and technologies). The Convention on Environmental Impact Assessment in a Transboundary Context (the *Espoo Convention*) came into effect in the Czech Republic in 2001.

The *competent authorities* for environmental assessment under the EIA Act are the Ministry of the Environment and the regional authorities. The Ministry of the Environment is responsible for assessing major projects and activities (e.g. railroads, roads, waste facilities, energy and mining projects and activities). Regional authorities are responsible for the assessment of other projects (e.g. agriculture, food industry, metallurgy, infrastructure).

Regarding *EIA of projects*, in 2004, a total of 97 construction projects were registered at the Ministry of the Environment for the EIA process: 29 were completed that year with a fact-finding procedure and 51 with the issuing of a standpoint. Numerous projects financed with EU funds were also assessed: the Ministry reviewed 272 applications related to PHARE, five projects related to ISPA and 205 related to the Structural Fund. Regional authorities received notification of 751 projects, of which 533 were completed that year with a fact-finding procedure and 68 by issuing a standpoint.

Regarding SEA, in 2004, a total of four *plans and programmes* prepared by central bodies were assessed. The Ministry of the Environment issued four consenting standpoints with conditions, and two statements on draft *land-use planning documents*. Environmental aspects are notably included in the State Policy of Tourism (for 2002-07).

Overall, the Czech EIA Act is a powerful tool for integrating environmental concerns not only in projects (through EIA), but also in a range of programmes and policies (through SEA). Increasing the *effectiveness of the implementation of the act* is an important priority. Both EIA and SEA need to be made more influential.

Other initiatives have also been taken to seek *greater integration of environmental and other policies*, as the 1999 OECD EPR recommended. Success has been uneven, however, with the least progress in the energy sector.

Integration of environmental concerns in energy policies

The Czech Republic's general *energy policy* objectives – as set out in the 2000 State Energy Policy and revised in 2003 with the update of that policy – are to *improve energy efficiency and environmental performance*, to promote the restructuring of the energy sector and to comply with EU and other international commitments. The SEA procedure provided the Ministry of the Environment with an opportunity to express its negative opinion on both documents.

The Czech Energy Agency is responsible for implementing the *National Energy Efficiency Programme*, which aims to reduce energy intensity by at least 2.6% by 2005. The main instruments currently used to improve energy efficiency are energy audits, fiscal subsidies and voluntary agreements. Given the high energy intensity of the Czech economy, the potential for cost-effective energy savings is high and has been estimated at more than 20%. However, it is unlikely that substantial progress in reducing energy intensity can be made without further adjusting prices. The Energy Agency has insufficient financial and human resources to reach its objectives, although funding for energy efficiency projects is also provided by the State Environmental Fund (SEF).

In an effort to conform to EU policies on *renewable energy*, the State programme for the promotion of energy savings and the use of renewable energy sources aims to increase the share of renewable energy sources to at least 6% of total primary energy sources (TPES) and 8% of gross power production by 2010. In 2002, this share was 2.2%, with biomass accounting for 77% of the total amount. Biomass, biogas, small hydropower and solar water-heaters show the greatest potential for development. Substantial fiscal advantages are granted to producers and users of renewable energy, including tax exemptions and direct investment subsidies (the latter amounting on

average to 17% of total investment costs). In 2003, the Energy Regulatory Office enacted a regulation providing higher minimum purchase tariffs for electricity generated from renewable sources.

Concerning *climate change*, the *National Programme to Abate the Climate Change Impacts* (March 2004) includes a commitment, after the end of the first commitment period of the Kyoto Protocol, to reduce CO₂ emissions to 8.78 tonnes per capita (at the level of the EU-15 in 2000) by 2020 (Chapter 6).

The latest update of the *national energy strategy* to 2030 (released in March 2004) foresees the construction of new brown coal power plants and a relaxation of environmental regulation of brown coal mining. This contradicts with the environmental requirements of the energy policy in the SEP.

Integration of environmental concerns in agriculture policies

Agricultural land covers 54% of the territory of the Czech Republic, and the share of *agriculture* in the national economy (about 4% of GDP) did not change significantly during the review period. Employment in this sector had declined to 3.4% (156 000 workers) of overall employment by 2003. The percentage of arable land in the total agricultural area (72%) declined slightly after 1999.

The Czech Republic has recently begun looking at ways to incorporate environmental concerns into agricultural policies, with two main documents prepared by the Ministry of Agriculture. Both were reviewed favourably by the Ministry of the Environment through the SEA procedure. The first document is the *Agricultural Policy Concept 2000* for the period before the Czech Republic's accession to the EU, and then in 2004 for 2005-13. Its thrust is to increase the competitiveness of Czech agriculture (both in the EU and world wide) while maintaining intensive and extensive agriculture on the largest possible area, assuring an adequate income for farmers, and respecting obligations in international agricultural trade. Other objectives outlined in the document are to provide for the environmental functions of agriculture, especially in less favoured areas, to integrate agriculture with rural development and to maintain rural cultural heritage.

The second document, adopted in February 2004, is the *Horizontal Plan for the Development of Rural Areas* for 2004-06. One of its strategic objectives is to maintain and protect the environment and the landscape, including reducing soil degradation and water contamination, renewing and preserving wildlife habitats and high biodiversity, and promoting the development and preservation of environmentally-friendly farming systems. To this end, 25% of agricultural land will benefit from the proposed national measures, and another 8% will be subject to organic farming. In addition, 30% of the area with valuable habitats will benefit from region-specific

schemes. Overall, the estimated cost is about EUR 335 million, with an EU contribution of 80%.

An action plan (of March 2004) focuses on the development of *organic farming* up to 2010, partly as a response to developments in the EU. At the end of 2003, 810 organic farms covered 255 000 hectares (i.e. 6% of the total agricultural land). In 2003, subsidies paid to organic farming amounted to about CZK 230 million (approximately EUR 7.7 million) as compared with CZK 48 million (approximately EUR 1.6 million) in 1998.

1.3 Sustainable development and market based integration

Sectoral subsidies

In the *energy sector*, direct subsidies (including State financial contributions for investments in the desulphurisation of power plants and restoration of closed mines), indirect support and cross-subsidies amounted to an estimated CZK 207 billion during 1994-98. Since then, *subsidies, and particularly cross-subsidies, have fallen considerably* owing to the application of full VAT, efforts at price adjustment and the phasing out of direct subsidies for heat. The restructuring process to rationalise production and *reduce coal subsidies* is still ongoing. From 1999 to 2003 the amount of direct State subsidies to coal mining decreased from CZK 2.7 billion to CZK 2.0 billion. State subsidies for hard coal or brown coal mines have been used to close some mines and mitigate environmental damage and social hardship, but have not been used to support production. In mid-2003, the government initiated the procedure to privatise the two remaining large State-owned brown coal mines, Severočeské doly (in Northern Bohemia) and Sokolovska Uhelna (in Western Bohemia).

The State has gradually raised *energy prices* since the early 1990s. Most notably, *cross-subsidies from industry to households ended* in 2002. As a result, household electricity prices jumped some 15% bringing them closer to cost-recovery levels. Natural gas prices for households also rose significantly between 2000 and 2003 (Table 2.1). Further energy price increases for households might have negative social consequences, which should be addressed.

In the *agricultural sector*, policies have developed in the context of a transition toward a market economy and in preparation for entry into the EU. Agricultural support declined sharply during 1986-97 but has been increasing *since 1998*, reflecting a rise in market price support and budgetary payments. This is due mainly to the introduction of policies similar to the European Common Agricultural Policy (e.g. set-aside payments, milk and sugar production quotas) in the perspective of EU

accession. Support to farmers is based largely on measures that tend to stimulate production, increase the use of inputs, reduce trade and increase pressure on the environment, while doing little to raise farmer income. No specific agri-environmental measures have been introduced, but payments to support extensive forms of farming may reduce environmental pressures in specific areas.

Total support to agriculture represented 1.6% of GDP in recent years, which is above the OECD average. In 2003, the producer support estimate (PSE) reached 27%, just under its level in the early 1990s, at the beginning of the economic reforms. The combined share of market price support (MPS) and output and input payments dropped from 98% (in 1991-93) to 77% (in 2001-03). Prices received by farmers evolved from 54% higher than those on the world market (1991-93) to 19% higher (2001-03). During the same periods, Czech consumers paid prices averaging 49% higher (1991-93) and 17% higher (2001-03) than world prices. Payments based on area planted or animal numbers increased from 1% (1991-93) to 22% (2001-03). Payments based on input constraints and farm incomes remained small. The share of total support provided for general services increased from 3% (1991-93) to 10% (2001-03), due mainly to increased payments to inspection services and infrastructure.

A study was carried out in 2001-02 to review *environmentally harmful subsidies*. The methodology used to identify and quantify such subsidies was developed on the basis of six case studies (two on transportation, two on agriculture, one on the construction industry, one on energy). It is suggested that subsidies should be reduced when they are found to have adverse impacts on the environment.

Environmentally related taxes

Energy taxes include VAT, excise tax and mining charges. All energy end-use is currently subject to VAT (at 19%), except for heat supply and biomass fuel (at 5% until July 2007). Electricity and natural gas have been subject to the 22% (currently 19%) rate since 1998. Bio diesel has been exempt since 1996. An *excise tax* on fossil fuels was introduced in 1993.

In 2003, a total of CZK 57 billion was collected from energy taxes. The State Fund for Transport receives some of the excise tax revenues to pay for public transport infrastructure. Road fuel prices, and the corresponding taxes, have been decreasing in real terms since 1990 and thus have not provided an incentive for energy efficiency. Taxes on unleaded gasoline are higher than those on diesel fuel. EU membership will require the Czech Republic to levy higher taxes on the most polluting fuels, such as high sulphur fuel oil and brown coal. Regarding biofuels, only fossil components are taxed, bio components are exempted from excise tax. In

agriculture, direct support to crop producers replaced the tax exemption for biofuels, which are more expensive than petroleum products. In *mining*, two *taxes* are levied on coal. The first is the annual tax for mining space (at CZK 10 000/km²) paid to the municipality where the coal mine is located. The second is a royalty on “extracted reserve material” (at a maximum of 10% of the market price of extracted minerals), paid to the municipalities (75%) and the State (25%). Its revenues are used for the restoration of sites.

Concerning *transport taxes*, *highway fees* are levied annually and are differentiated according to vehicle weight. A *road tax on commercial vehicles*, levied on a per-vehicle basis, is differentiated according to vehicle age and emission control level (a surcharge of 15% being levied on cars from before end of 1989 and a discount being given to lorries that conform to the EURO2 and EURO3 standard). The differentiation of the vehicle tax helps to speed up the renewal of the fleet with more environmentally friendly vehicles. However, consideration should be given to extending the tax to more than commercial vehicles. In addition, specifying the tax in terms of kilometres driven, rather than on a per vehicle basis, would make it more targeted. The introduction of *road pricing* would also help to reduce diffuse emissions in cities efficiently. The annual mileage tax and road pricing could be implemented for lorries at low cost, since many of them are already fitted with the necessary technical devices in order to use Austrian and German motorways. As previously noted, recent changes in the *VAT* have reduced the automobile tax while significantly increasing rail transport taxes (Chapter 4, Section 3).

The 2001 SEP foresaw the proposal of a *green tax reform* to restructure existing fuel and energy taxes while reducing other taxes, such as on labour (as unemployment reaches 8%), so as to leave the *overall tax burden unchanged*. The 2004 SEP reiterates the need for such an environmental tax reform. Discussions are underway between the Ministry of the Environment and the Ministry of Finance, but the Ministry of Labour and Social Affairs does not appear to be included. A green tax commission should be established to speed up the reform.

2. Implementing Environmental Policy

2.1 Environmental administrative, legislative and policy framework

Environmental administration

The environmental administration of the Czech Republic evolved over the review period. The country continues to have a powerful Ministry of the Environment and to be supported by various scientific institutes. However, further to an administrative

reform which introduced 14 regional authorities, the implementation of environmental policies has partly been *devolved to regional and municipal levels*, which now have the largest number of environmental personnel.

Bodies operating under the aegis of the Ministry of the Environment include: the SEF, which collects environmental charges (e.g. for air, water, waste) and is one of the main sources of financing for environmental protection; the *Czech Environmental Institute* (CENIA, Czech Environmental Information Agency, from April 2005), a policy research and information institute; the Agency of Nature Protection and Landscape Conservation; the Nature Conservation Authority, responsible for public administration; the T.G. Masaryk Water Management Research Institute; the Czech Hydrometeorological Institute; the Czech Geological Survey; the Research Institute of Ornamental Gardening; and the Czech Environmental Inspectorate.

Other ministries concerned with environmental policy include Agriculture (water, forests), Industry and Trade (minerals, energy), Regional Development (physical planning), Health and Transport.

Environmental legislation

In the Czech Republic, citizens have a *constitutional right* to a healthy environment. After a first wave of legislative changes in the early 1990s, the EU accession process led, during the review period, to intensive work to *transpose EU environmental legislation* into Czech environmental legislation (e.g. the Act on Integrated Pollution Prevention and Control, the Act on Air Protection, the Water Act and the Act on Wastes). As a result, most Czech environmental legislation is now consistent with that of the EU. However, when the Czech Republic joined the EU in May 2004, it negotiated *transitional periods* for three European Directives: the Directive on Packaging and Packaging Waste, the Directive on Urban Waste Water Treatment, and the Directive on the Limitation of Emissions of Certain Pollutants into the Air from Large Combustion Plants.

Environmental policy framework

In March 2004, a new SEP for 2004-10 replaced and updated the 2001 SEP (Box 4.2). The 2004 SEP defines a consensual framework for long-term and medium-term environmental policy developments within the context of sustainable development. Independent experts and representatives of civil society were involved in its elaboration, as well as a range of ministries. The SEP (together with other strategic documents such as the National Strategy for Sustainable Development) provides a *strategic framework for environmental policies*.

The challenge will be to *translate the SEP into action*. As it stands, the SEP focuses more on administrative process than on results and outcomes. It gives more emphasis to instruments than to targets, and when targets are quantified, the purpose is to take into account EU targets (Box 4.2).

Box 4.2 State Environmental Policy

The SEP has been updated twice, in 2001 and in 2004. The *2001 SEP*, which covered the period 2001-03, evaluated progress in meeting the short-term objectives of the original (1999) SEP, reviewed changes in environmental conditions, set concrete goals and targets, integrated environmental concerns into sectoral policies more vigorously, and prepared the Czech Republic for EU membership by setting quantitative targets based on the EU targets that would be transposed into Czech law during 2001-05.

The *2004 SEP* covers 2004-10 and takes into account Czech membership in the EU since May 2004. Its general goals are to further improve environmental quality, to implement the principles of sustainable development, to integrate environmental concerns into sectoral policies, and to improve the economic efficiency and social acceptability of environmental programmes, projects and activities. More generally, this SEP provides a framework for environmentally-related decision making on international, regional and local issues.

The priority areas of the 2004 SEP are compatible with those of the 6th Environmental Action Programme of the European Communities: protection of nature, landscape and biological diversity; sustainable use of natural resources; protection of waters, optimisation of material flows and waste management; improvement of environmental standards for the quality of life such as reduction of environmental damage from human activities or protection against detrimental effects of natural disasters (e.g. floods); and protection of the climate system of the earth and prevention of long-range transport of air pollution.

The 2004 SEP offers a *range of instruments* (e.g. regulatory, economic, institutional, organisational, informational and voluntary) for achieving the targets in these priority areas. It also provides recommendations for economic sectors such as energy, mineral extraction, industry, trade, transport, agriculture, forestry, health care, regional development and tourism. *Indicators* are to be used for monitoring progress with respect to the EU and OECD averages.

2.2 Environmental regulation

The *reform of environmental legislation* has thus been extensive (Table 4.3). This reform, together with the transfer of certain administrative responsibilities to the

regional and municipal levels, raises questions about the implementation of environmental laws and regulations. But overall, public opinion is positive: the share of people who believe the government deals well with environmental issues increased from 30% in 1997 to 54% in 2002.

The *Czech Environmental Inspectorate* is responsible for monitoring and controlling compliance with environmental laws and regulations for air, water, waste, nature and forests. It also deals with complaints from individuals and recently has gradually expanded its coverage to protection of the ozone layer, chemicals management, prevention of accidents and genetically modified organisms. The Inspectorate can impose penalties, prescribe remediation measures or even stop production. It had 455 inspectors in 2004, up from 312 in 1999.

The number of inspections also increased over the review period (Table 4.4). In 2003, the Inspectorate carried out 18 359 inspections, issued 3 186 decisions and collected 2 411 fines (amounting to a total of CZK 81.2 million). In 2002, apart from 133 flood-related cases, there were 246 recorded cases of *accidental pollution* of surface and groundwater (including 121 cases relating to oil spills and 49 relating to fish deaths). The level of *fines* for non-compliance with environmental laws is set in legislation and thus does not evolve with inflation. Maximum fines are CZK 1 million for non-compliance with laws related to nature and water protection and CZK 10 million for air and waste problems, but the heaviest fines rarely exceed CZK 1 million. The amount of fines levied by the Inspectorate increased over the review period (Table 4.5). The number of complaints from the public grew from 737 in 1998 to 1 253 in 2003.

In spite of these enforcement trends, environmental legislation and regulations are still not satisfactorily *implemented and enforced*. The penalties imposed by the Inspectorate are estimated to be paid in 80% of cases. But overall, they are not high enough to be dissuasive, and inspectorate action is not sufficiently followed by court action. Inspection and monitoring networks will need to be strengthened, and the role of inspectors will need to evolve to include *education and information* about compliance.

It will also be necessary to strengthen the still-young *regional and municipal environmental administrations*, by strengthening co-operation with the private sector, increasing financial resources, further introducing best available technology (BAT), and improving maintenance and protection of green areas. Finally, greater public participation in decision-making processes is needed at regional and municipal levels (e.g. in administrative procedures, land-use planning, community planning, EIA/SEA and integrated pollution prevention and control [IPPC]).

Table 4.3 Selected environmental legislation

1992:17	Act on the environment
1992:114	Act on protection of nature and the landscape (amended by Act 161/1999)
1995:289	Act on forests (amended by Act 67/2000)
1995:86	Act on the protection of the ozone layer of the earth
1997:16	Act on the CITES Convention
1997:125	Act on waste
1998:123	Act on the right of access to information on the environment
1998:58	Act on charges on the discharge of waste water into surface waters
1998:157	Act on chemical substances and preparations (amended by Act 352/1999)
1999:353	Act on prevention of major accidents caused by selected hazardous chemical substances and chemical preparations
2000:242	Act on environmentally sound agriculture
2000:258	Act on the protection of the public health
2001:100	Act on environmental impact assessment
2001:185	Act on waste
2001:247	Act on water supply and sewerage systems
2001:254	Act on water
2001:477	Act on packaging
2002:76	Act on integrated pollution prevention and control, the integrated pollution register (Act on Integrated Prevention) (amended by Act 521/2002)
2002:86	Act on air protection (amended by Act 521/2002)
2003:149	Act on trade in reproductive material of forest tree species
2003:276	Act on the Antarctica
2003:356	Act on chemical substances and chemical preparations
2004:100	Act. on trading with endangered species
2004:695	Act on conditions of GHG emission allowance trading
2005:180	Act on promotion of the use of renewable sources of energy

Source: Czech Government.

Table 4.4 Activities of the Czech Environmental Inspectorate, 1998-2004

Activity	1998	1999	2000	2001	2002	2003	2004
Inspections and controls	15 182	16 125	18 334	19 454	17 774	18 359	18 032
Decisions in administrative procedures	9 192	7 380	9 291	9 375	7 971	3 186	9 661
Decisions on emission limits ^a	18	–	–	–	–	–	–
Standpoints for other state administrative bodies	7 443	8 259	9 465	9 592	10 264	10 845	12 308
Dealing with accidents	175	112	107	104	252	159	136
Dealing with complaints and notifications	737	712	771	764	864	1 253	1 654

a) From 1999, the Inspectorate was no longer authorised to set emission limits for existing large air pollution sources.

Source: Report on the Environment in the Czech Republic.

Table 4.5 **Fines levied by the Czech Environmental Inspectorate**
(1 000 CZK)

	1999		2000		2001		2002		2003		2004	
	No ^a	CZK	No ^a	CZK	No ^a	CZK	No ^a	CZK	No ^a	CZK	No ^a	CZK
Air	349	20 818	685	28 416	399	15 333	365	15 500	318	23 384	464	18 389
Water	379	8 092	428	13 229	509	15 560	442	18 443	366	14 850	336	25 459
Waste	491	11 688	606	15 367	1 004	22 114	896	19 768	841	29 343	750	37 831
Nature	390	3 443	404	4 909	449	4 695	487	4 997	685	5 846	395	8 676
Forest	128	7 466	95	10 945	105	7 445	143	10 402	200	7 781	166	3 975
Total	1 737	51 507	2 218	72 866	2 466	65 147	2 333	69 109	2 410	81 204	2 111	94 330

a) Number of legally effective decisions.

Source: CSO.

2.3 Environmental expenditure and its financing

Environmental and PAC expenditure

PAC expenditure of the Czech Republic (including public and private investment as well as operating expenditure) is estimated at 1.3% of GDP. *Environmental investment expenditure decreased* significantly over the review period. From 1994 to 1997, environmental investment remained at around 2.4 or 2.5% of GDP, but after 1998 it dropped, reaching 0.9% in 2001 and 0.7% in 2002 (Table 4.6).

The very large decrease in investment expenditure aiming to combat air pollution was accompanied by significant decreases in investment expenditure for waste water and waste management. This evolution may partly follow from the considerable efforts and progress accomplished during 1990-98 (e.g. for combating air pollution). It may also reflect anticipations of future investment and financing associated with EU accession. Emphasis will need to be placed on *water protection* and particularly on implementing *the EU Directive on Urban Waste Water Treatment*, which requires the construction and reconstruction of waste water treatments plants and sewer systems by the end of 2010. In 2002, 45% of the environmental investments were for water protection, as compared to 36% for the protection of air and climate.

Table 4.6 Environmental investment expenditure,^a 1997-2002 by sector

(million CZK)

	1997	1998	1999	2000	2001	2002
Total	40 503	35 160	28 956	21 399	19 892	14 918
Of which:						
Air and climate	22 323	20 141	15 762	8 407	7 057	4 149
Waste water management	11 275	8 291	8 839	8 567	8 815	7 034
Waste management	4 765	4 698	2 597	2 270	1 463	1 236
Protection of soil, surface waters and groundwater	604	555	426	329	488	1 027
Noise and vibrations ^b	455	313	241	277	632	365
Biodiversity and landscape	1 081	1 162	1 091	1 549	1 437	511
Total as % GDP	2.5	2.0	1.5	1.1	0.9	0.7

a) Does not include current expenditure. Environmental investment expenditure includes several "integrated environmental projects" (e.g. technology changes, new and more environmentally benign facilities), but excludes investment related to drinking water.

b) Excluding workplaces.

Source: Ministry of Finance, Ministry of the Environment.

Financing of public expenditure

The *State budget*, which was the largest source of public financing for environmental projects during the 1990s, provided only 17% of public expenditure for environmental protection in 2003 (Table 4.7). Financing by the State budget has been greatly reduced as a result of the government effort to reduce the budget deficit and to achieve the Maastricht criteria. In 2003, financing for water protection amounted to CZK 1.1 billion (EUR 34.4 million). In 2003, 67% of the State budget contribution to environmental protection was for *operating expenditure*, mainly for the protection of biodiversity and landscape (e.g. for the protection of species, habitat, important ecosystems and localities, public green areas).

The *territorial (i.e. regional and municipal) budgets* provided 69% of public environmental protection expenditure in 2003. These funds were used mainly for water protection (CZK 9.5 billion) and waste management (CZK 5.8 billion). In 2003, 55% of the environmental protection expenditure of the regional budgets was allocated to operational expenditure, mostly in the area of waste management (collection and accumulation of hazardous and municipal wastes, use and disposal of hazardous and municipal wastes, prevention of waste generation and monitoring of waste management).

Box 4.3 State Environmental Fund

Between 1992 and 2003, the cumulative income of the SEF reached a total of CZK 46.13 billion, while expenditure came to CZK 41.51 billion (e.g. CZK 4.76 billion in 2003). The expenditure covered construction of 1 236 waste water treatment plants and sewerage projects, implementation of 225 actions to repair the flood damages of August 2002, installation of 3 799 full-scale gas mains in municipalities and gas boilers, and 1 600 measures for reducing pollution of nature and landscape, including waste handling and disposal.

Since 2001, the SEF has become the implementation agency and payment unit for the EU pre-accession programme ISPA, and since 2004, it has served these functions for the EU *Cohesion Funds* in the environmental area. The SEF is also the mediating and payment unit for Priority 3 (improvement of the environment infrastructure) and part of Priority 4 (technical assistance) of the *Structural Funds*.

Table 4.7 **Financing of public expenditure for air, water and waste, 1998 and 2003**
(1 000 CZK current prices)

		Total public PAC expenditure	State budget		State funds		Local	
			Current	Investment	Current	Investment	Current	Investment
Air	1998	1 957 484	53 023	372 611	12 297	884 600	94 928	533 025
	2003	1 441 949	55 139	82 965	23 206	994 162	71 912	214 565
Water	1998	7 302 974	294 307	608 037	0	1 081 193	648 097	4 671 340
	2003	13 354 577	501 217	683 459	270 341	2 381 710	1 157 906	8 359 944
Waste	1998	3 007 960	137 594	38 255	-1 155	75 398	2 381 115	376 753
	2003	6 612 437	207 920	36 000	9 047	567 265	5 223 697	568 508
Total	1998	12 268 418 (0.67% of GDP)						
	2003	21 408 963 (0.89% of GDP)						

Source: Statistical Environmental Year Book of the Czech Republic, 2003.

The *SEF* accounted for 14% of public environmental protection expenditure in 2003. The *SEF* receives about 60% of its revenue from environmental charges and fines (CZK 3.2 billion); the other 40% comes from loan repayments, interest on the Fund's deposits and bank accounts, and interest on loans. The *SEF*'s expenditure consists mainly of direct support and loans (which account for 75% and 19%, respectively, of its total expenditure). The primary recipients are municipalities and non-profit organisations (97% of the total); business receives just 3% (Box 4.3).

Financing of private expenditure

Industry has played and is still playing a large role in financing environmental improvements. In 2002, companies operating in the Czech Republic financed about 40% of the investments for environmental protection (CZK 6 billion) including 52% of those related to air pollution control and climate, 40% of those related to water management and 38% of those related to waste management.

The *National Property Fund*, which was established under the Privatisation Act to collect payments from the sale of State properties, is supporting environmental expenditure from owners of privatised facilities to remedy the pollution burden of the past. This fund provided 11% of the environmental protection expenditure in 2003.

EU financing

The Czech Republic has been actively using EU *pre-accession assistance instruments*, including PHARE and ISPA pre-accession funds, together with loans from international financial institutions (e.g. European Investment Bank). The *PHARE* programme supported the adoption of the environmental *acquis* before accession to the EU, through institutional twinning and technical assistance and investment projects in the field of water quality, waste management, air quality and IPPC: overall, EUR 28.74 million of PHARE funding were allocated to the environmental objective during 1996-2004. The *ISPA* fund (an instrument for promoting transport and environmental infrastructure) has been used for financing waste water treatment plants and sewerage networks: during 2000-03, the European Commission approved 15 ISPA environmental projects totalling EUR 340 million.

During 2004-06, the Czech Republic expects to use the Cohesion Fund (EUR 415 million) and Structural Funds (EUR 142 million) for environmental improvements. However, the total amount needed to implement the European environmental *acquis* during 2004-10 is estimated at CZK 285 billion (EUR 9 billion). Hence *priorities will have to be set* and additional national and international funding mobilised.

This effort is expected to be financed by the private sector (58%), the regional budget (40%) and the State budget (2%). Investments will initially be concentrated in the areas where the Czech Republic asked for transitional periods, but will also be needed to comply with other EU legislation. It is therefore essential for the Czech Republic to improve the efficiency of its environmental instruments and expenditure. *Cost-effectiveness and cost-benefit analysis* should be applied systematically to environmental expenditure. So far, such tools seem to have been systematically used only by the SEF and for projects funded by the EU. The authorities have not used cost-benefit analysis as a regular policy tool, because it is not required for programmes or projects.

2.4 Economic instruments

The Czech Republic has established a *comprehensive set of economic instruments* for environmental management. These broadly respect the *user polluter pays principle* (Table 4.8).

Charges

The Czech Republic has established a *wide-ranging system of charges* relating to the environment. They are mostly used in association with regulatory instruments. They include emission and user charges for water and air pollution, noise, waste, packaging, use of natural resources such as water and minerals, and change in use of agricultural land (Table 4.8).

Charges for emitting *air pollutants* vary depending on the toxicity of the pollutant: CZK 20 000 per tonne for Class I (e.g. asbestos, Cd, Hg) and CZK 10 000/tonne for Class II (e.g. As, Mn, Cu, Pb). Whereas the rates for organic substances were increased during the review period, the rates for the other substances were held constant. Since the passing of the 2002 Act on Air Protection, the regional authorities have set charges for large and very large air emission sources. For medium-sized sources, decision-making is in the hands of municipalities with extended competence. For small sources, municipalities are the designated authority. Municipalities must use revenue received from small sources for environmental protection, and transfer revenue from medium-sized and larger sources to the SEF.

Economic instruments for water management were further extended in the new Water Act No. 254/2001. For *groundwater*, the exemption from abstraction charges for drinking water was abolished, and supply utilities now face a charge of CZK 2 per m³. In addition, the rate charged for other uses of groundwater was raised from CZK 2 to CZK 3/m³. Half of the revenue is paid to the SEF, the other half to the regional budget. For *surface water abstractions*, State river board enterprises levy a

Table 4.8 Economic instruments

Instrument	Rate	Remarks
Water		
Waste water effluent charge		Total income: CZK 410 million in 2003.
BOD, COD, etc.	CZK 3-16/kg	Revenue goes to SEF for financing water protection projects.
Amount of waste water	CZK 0.1/ m ³	
Phosphorous	CZK 70/kg	
Absorbed organically bound halogens	CZK 300/kg	
Mercury	CZK 20 000/kg	
Cadmium	CZK 4 000/kg	
Dissolved inorganic salts	CZK 0.5/kg	
Un-dissolved substances	CZK 2/kg	
Emissions into underground water	CZK 3 500/year	
User charge for water supply and for sewerage and sewage treatment	Average price: CZK 40/m ³	Payment for the service of municipal plants. Prices are different according to regions.
Surface water withdrawal charge	Each river basin corporation has a different rate	Total income: CZK 1 929 million in 2001. Payment for the services of river basin corporations, which must cover their costs including environmental expenditures.
Groundwater withdrawal charge	CZK 2-3/m ³	No charge for agriculture and pisciculture. Total income: CZK 313 million in 2003. 50% goes to SEF and 50% to relevant region. No charge for drinking water. Payment for withdrawing groundwater in volumes exceeding the standard limits – more than 6 000 m ³ /year or 500 m ³ /month.
Air and noise		
Air pollution charge		Total income: CZK 368 million in 2003. (large pollution sources)
SO _x	CZK 1 000/t	Revenue goes to SEF for financing programmes related to air protection.
NO _x	CZK 800/t	
CO	CZK 600/t	
Particulates	CZK 3 000/t	
Hydrocarbons	CZK 20 000/t	
Volatile organic compounds	CZK 2 000/t	
Heavy metals	CZK 20 000/t	
Ammonia	CZK 1 000/t	
Methane	CZK 1 000/t	
Selected heavy metals and organic pollutants:		
class I (asbestos, Cd, Hg, etc.)	CZK 20 000/t	
class II (As, Mn, Cu, Pb, etc.)	CZK 10 000/t	
Charge on hard freons (ozone depleting substance: CFCs)	CZK 400/kg	Total income: CZK 43 million in 2002. Revenue goes to SEF. It is used to finance the creation of a system for recycling and eliminating ozone depleting substances and introducing harmless substitutes.

Table 4.8 Economic instruments (cont.)

Instrument	Rate	Remarks
Noise pollution charge	Approx. CZK 12-127/tonne of starting weight of the plane	Total income: up to CZK 100 million per year. From 1996 the charge is levied on airplanes based on weight and corresponds to four noise categories.
Waste		
Waste disposal charge		Imposed on landfill operators.
Hazardous waste		Total income: CZK 1 755 million in 2001.
Basic charge	CZK 1 100/t	CZK 1 700/t in 2009
Risk charge	CZK 2 000/t	CZK 4 500/t in 2009
Solid municipal waste and other wastes	CZK 200/t	CZK 500/t in 2009
Municipal waste charge	..	Revenue goes to waste collection and treatment plant operators.
Financial reserve for landfilling		Revenue goes to special purpose-tied bank account.
Hazardous waste	CZK 100/t	
Other waste	CZK 35/t	
Radioactive waste fee	CZK 50/MWh	Total income: CZK 1 331 million in 2004.
Deposit-refund system for glass	CZK 3/glass bottle	
Packaging	Registration and record fees (more than 300 kg/year)	Person who places packaging or packaged products on the market or into circulation.
Non-compliance charges and fines		
Exceeding standards	Up to 50% of standard charge	Revenue goes to SEF.
Fine for infringement of specific environmental laws		Revenue goes to SEF and municipalities.
Land and minerals		
Charge for removal of land from agricultural production	Lump-sum for permanent withdrawal Annual fee for temporary withdrawal	Total income: CZK 590 million in 2002. 60% goes to SEF, 40% to the municipality, to support actions for rural revitalisation and environmental protection.
Charge for removal of land from forestry use	Lump-sum for permanent withdrawal Annual fee for temporary withdrawal	Total income: CZK 60 million in 2002. 60% goes to SEF, 40% to the municipality.
Fee for use of mining area	CZK 10 000/km ² /year up to 2 hectares: CZK 2 000/year	Total income: CZK 21.7 million in 2003. Revenue goes to the municipality concerned.
Fee for exploitation of mineral resources	Up to 10% of market value of extracted raw material	Total income: CZK 495.3 million in 2003. 75% to the municipality, 25% to the State budget, to be used for remediating environmental damage caused by mining.

Source: Ministry of the Environment; OECD.

charge of about CZK 2 to 3/m³ or, in the case of withdrawals for cooling purposes, CZK 0.4 to 0.9/m³. These charges are levied under Law 526/1990 to pay water authorities for the cost of administering watercourses and river basins; they are regarded as a charge for service and do not reflect the value of the water. For *discharging waste water into natural waters*, charges are based on both the volume and the pollution content of the effluent, and rates for untreated effluent are double those for treated waste waters. The revenue is paid to the SEF. *Individual dwellings that discharge* untreated waste water into *groundwater must pay* an annual fee of CZK 3 500 to the municipality concerned. Discharges from single-home treatment units are exempt.

The rates of the country's most significant economic instrument related to *waste management*, landfill charges, were gradually raised over the review period, as recommended in the latest OECD EPR. The charges, which apply to anyone who deposits waste in a public or private landfill (including producers depositing on their own property), were raised every two years during the review period and, under the Waste Act, will continue to be raised every two years until 2009. The basic landfilling charges for municipal and other non-hazardous waste amounted to CZK 20/tonne in 1998 and CZK 200/tonne in 2002-04. This charge will be raised every two years until it reaches CZK 500/tonne in 2009. The landfill charge for hazardous waste has both a basic (volumetric) and a risk component. The basic component, CZK 200/tonne in 1998 and CZK 1 100/tonne in 2002-04, will rise to CZK 1 700/tonne in 2009. The risk component, CZK 300/tonne in 1998 and CZK 2 000/tonne in 2002-04, will be raised to CZK 4 500/tonne. Revenue from the basic component is transferred to the relevant municipality and that from the risk component goes to the SEF. Given that the real cost of landfilling municipal waste was estimated at CZK 840/tonne in 2003, it is clear that the current charge level is still too low to encourage the use of more environmentally sound waste management techniques. Landfilling remains by far the least expensive method of waste disposal and the most commonly used.

Most pollution charges are paid into the *SEF*. These consist mainly of waste water charges, air pollution charges, waste charges and charges for changing the use of agricultural land. The charge system has helped to raise money for investments in projects undertaken by municipalities and industry. Since 1999, the total revenue from air and water charges has decreased while that from waste charges has increased pursuant to the waste law. *Municipalities* receive revenue from a charge imposed for discharging waste water into groundwater as well as from a waste charge and an air pollution charge for small stationary sources. They also receive a share of mining fees and of the charges imposed for removing agricultural and forest land from its original use.

These charges have primarily a *financing function* because they are generally too low to affect polluters' behaviour. Some rates have not been updated since 1996.

Polluters have therefore not been motivated to invest in cleaner processes and have generated insufficient funding for investment. As already recommended in the previous OECD review, the *rates of charges* on polluting activities should be increased. Accession to the EU has brought a renewed emphasis on regulatory measures to reduce pollution, but further cuts in emissions should be achieved mainly by using more efficient economic instruments. Raising emission charges would be a cost-effective way to concentrate abatement where it can be achieved at the lowest cost. In addition, to compensate for the decrease in the revenue generated by some of the emission charges (e.g. due to reduced emissions of air pollutants), consideration should be given to introducing a system of *product charges*.

Other economic instruments

Czech law requires landfill operators to create a *financial reserve* for recovery and maintenance after the landfills are closed down; the reserve is equal to CZK 100/tonne for hazardous waste and CZK 35/tonne for other waste. The financial reserve is kept in a trust account and landfill operators must obtain the consent of the competent regional authority to withdraw funds. However, the reserve is insufficient to cover costs during the more than 30-year recovery period required by the EU Landfill Directive; it therefore amounts to a subsidy for landfilling and a disincentive for waste reduction or energy recovery. Producers and importers who bring more than 300 kg of *packaging material* per year on the market must pay (under the Packaging Act) a once-off registration fee of CZK 2 000 and annual record-keeping fees of the same amount (715 such packaging items were registered as of 2004). Defaulters are liable for penalty payments of up to 0.1% of the outstanding sum per day of default. Revenue is paid to the SEF.

Other waste-related economic instruments include: a *deposit system* introduced in 2002 for seven types of returnable glass bottles at a rate of CZK 3 per bottle; until 2004, a *reduced VAT* of 5% (as compared to the normal rate of 22%) on biogas and products made of a minimum of 70% recycled paper; until 2004, *exemption from real-estate taxes* on properties used exclusively for recycling activities; *stricter fines* of up to CZK 10 million for serious legal infringements, depending on the threat to health and the environment; and the requirement of *financial guarantees or insurance* for the back export into the country of origin, as a condition for approvals under the Waste Act for import, export and transit of waste.

Legislation on liability for pollution has been developed. An Act on prevention of major accidents caused by selected hazardous chemical substances and chemical preparations and amending Act on District Authorities came into effect in 1999. This act obliges operators to have *liability insurance* for damage that results in case of a major accident. The amount of the insurance must correspond to the extent of potential damage.

Environmental damage from past activities has been managed within the privatisation process, with support from the State budget and the National Property Fund.

2.5 Role of industry and R&D

At present, about 1 400 companies have *ISO 14001* certification in the Czech Republic. The national EMAS register includes 18 organisations (e.g. the CHEMAS project introduced in the chemical and plastics industry), and two new registrations are currently being processed. The *EMAS programme* has been harmonised with European regulation. Financial support from the SEF for the introduction of EMAS has increased from 50% to 60% of eligible costs.

Voluntary instruments have been developed to promote clean technologies and the use of environmental management systems. Some voluntary agreements between industry and the Ministry of the Environment aim at alleviating certain environmental impacts (e.g. from detergents, portable batteries, mercury from dental care facilities) while others provide action plans and a general framework for co-operation (e.g. between the Ministry and the Union of Industry and Transport, the Czech Business Council, the construction industry associations or the Chamber of Commerce).

A national *eco-labelling* programme has been implemented since 1994. More than 310 environmentally friendly products from 70 Czech and foreign companies have been labelled in 40 product categories. The new guidelines for product categories are consistent with European Directives.

In 2003, *total R&D expenditure* in the Czech Republic represented 1.3% of GDP, and one-third of the OECD per capita average. The share of public sector R&D expenditure is higher than that of most of OECD countries. A Commission for Environment within the Academy of Science promotes and supports scientific progress in the area of the environment. The Ministry of the Environment supports *environmental institutes* and funds *research projects* on priority environmental issues: in 2003, this included CZK 219 million for institutional support and CZK 345 million for R&D in the areas of the atmosphere, biosphere, environmental risks, environmental economics, information on the environment, renewable resources and energy savings. The Ministry of the Environment's funding for R&D increased considerably over the review period. In addition, other ministries provided over CZK 250 million for research related to the environment. Overall, however, R&D on environmental issues is insufficient, and this is well recognised in the National Strategy for Sustainable Development. Emphasis on low material and energy intensity, reduced pollution and reduced imports of raw material is desirable.

3. Towards Sustainable Transport

The transport sector is playing an increasingly *important role in the Czech economy*. In particular, road freight and car traffic are growing faster than GDP. It is estimated that following the country's accession to the EU, road haulage increased by 30% in just a few months; and it is expected to continue to grow. Motorisation of households has also increased and will likely continue to increase, generating higher car traffic (Box 4.4). Transport infrastructure is generally insufficient to cope with

Box 4.4 The transport sector: state and trends

The transport sector accounts for 3.5% of GDP in the Czech Republic. *Rail and air transport infrastructures* are managed by public bodies (Railway Infrastructure Administration, Czech Airports Authority). Whereas the rail service operator, Czech Railways, is a joint stock company controlled by the central government, the air carrier, Czech Airlines, is a State-owned company.

The *road network* (55 000 kilometres of roads, 838 kilometres of national motorways) has a density of motorways that is less than the average of OECD Europe. Overall, road quality is low. Many roads go through urban centres and road access is a barrier to economic investment in some regions. The *railway system* has the highest density in OECD Europe (12.15 km/100 km²). However, only 6% of its length can accommodate speeds between 120 and 160 kilometres per hour. *Combined transport* infrastructure includes 13 transshipment points. Both the rail and the motorway networks are concentrated in the Prague area and in the surrounding region (Central Bohemia). The country has 664 kilometres of *permanently navigable waterways*, including 303 kilometres of continuous Elbe-Vltava waterway.

Freight traffic has been growing by 177% since 1990. In 2003, modal share (in tonnes per kilometre) was 74% road, 25% rail (including 1% combined transport) and 1% air and inland waterway. Since 1998, road freight transport (in tonne-kilometres) has increased by 37% at the expense of freight shipped by rail, which has dropped by 15.5%. Combined and waterway transport are used almost exclusively for long-distance transport to large Northern European seaports. The truck fleet has grown by more than 30% since 1998, but 67% of lorries are over five years old, and 36% are over ten.

The *volume of passenger traffic* (in passenger-kilometres) has increased by about 50% since 1990 and 14% since 1998. Road transport increased by more than 11% over the review period, while air travel doubled and rail transport decreased by more than 7%. The modal split for passenger transport in 2003 (in passenger-kilometres) was 84.8% road, 7.3% rail and 7.9% air. The number of *passenger cars* per 100 inhabitants (36 in 2003) has been steadily growing since 1998 and is slightly below the OECD Europe average. Over half of the car fleet is more than ten years old and 15% uses diesel fuel. The motorcycle fleet is older still; the average age is nearly 30.

these increases. Thus, responses concerning both transport supply and demand are needed. The Czech legislation relating to the environmental impacts of the transport sector went through a process of *harmonisation with the EU requirements*. In 2002, some major acts on air pollution were approved.

3.1 Policy objectives

Transport policy objectives related to the environment are defined in two major documents: the 1998 State Transport Policy (STP, presently under revision) and the 2004 SEP. The basic aim of the transport policy is to extend the transport system in order to support economic and social development. Concerning the environment, the overall aim is the “stabilisation and gradual reduction of the impacts of transport on the environment”, which translates into the following *main policy goals*:

- a *gradual shift of freight transport* from roads to environmentally sound transport modes, through financial and regulatory support to rail, combined and waterways transport;
- *renewal of the vehicle fleet* toward more environmentally efficient vehicles;
- *internalisation of the external costs* of transport through taxes and charges;
- improvement of the efficiency of *public transport* and the integration of transport systems in urban and suburban areas;
- reduction of *air pollution and noise* from transport.

The STP is supplemented by *mode-specific policy documents*. For instance, the 2004 National Strategy for the Development of Bicycle Transport aims primarily at developing a network of cycling routes to provide a sustainable alternative to other passenger transport modes and to support tourism.

The revision of the STP in 2004 aimed at *adjusting it to EU membership* and is expected to propose measures to integrate environmental concerns in transport objectives.

3.2 Developing a balanced transport infrastructure

The Ministry of Transport is in charge of *transport infrastructure development planning* and shares management responsibilities with regions, municipalities, the Railway Infrastructure Administration and the Czech Airports Authority (Box 4.4). Some co-ordination problems have occurred, especially in setting priorities for resource allocation and for investments in the inter-regional roads.

Since 1999, investments in transport infrastructure have fluctuated around 2% of GDP, with *emphasis on the development of new infrastructures* (e.g. motorways,

Trans-European Network corridors) rather than on upgrading and maintenance of existing ones (Box 4.5). Overall, the quality of roads remains poor. Road maintenance is insufficient and traffic intensity is increasing, and maintenance of railways has been unsatisfactory. The Czech transport sector has received and continues to receive substantial EU support. The use of the Cohesion Fund and Structural Funds during 2004-06 will offer an important opportunity to reduce the gap between road transport and other modes. But the focus still seems to be on road building.

The only service of *combined transport* – the “rolling road” from Lovosice in the Czech Republic to Dresden in Germany – was discontinued after EU accession. The economics of the rolling road were modified with the opening of the border, as trucks using the road had previously been exempt from the border-crossing permit. In place of former rolling road Lovosice-Dresden (accompanied intermodal line), the opening of alternative lines on the basis of unaccompanied combined transport systems would prevent traffic increases in the environmentally sensitive area at the Czech-German border.

Waterway transport is limited, despite the total exemption from fuel excise. Improving navigation conditions on the Elbe River near the German border has been

Box 4.5 Investment in transport infrastructures

Since 1999, *investment in transport infrastructure* has fluctuated around 2% of GDP. In 2003, 70% was devoted to new infrastructure and 30% to maintenance and upgrading of existing, including remediation of *damage caused by the 2002 floods*. Funds have mainly been allocated to the road network, at the expense of the railway system. In 2003, investments in railways were also slowed by the establishment of the Railway Infrastructure Administration, which encountered financial difficulties in its first year of operation. Investments in waterway and air infrastructures remain modest.

About half of the investments are financed by the central government, almost completely through the extra-budgetary State Fund for Transport Infrastructure, which collects privatisation proceeds as well as 20% of fuel excise duties and 100% of highway fees and road taxes. The infrastructure projects also benefit from *EU funding* through EIB loans (about EUR 1.9 billion in 1998-2004) and ISPA (about EUR 245 million in 2000-03). In 2004-06, the Czech transport sector will receive EUR 500 million from the Cohesion Fund and EUR 246 million from the Structural Funds for Objective 1 regions. The Structural Funds are specifically allocated to modernising and developing national transport infrastructures, mainly rail and road networks (34%), and to reducing the negative environmental impacts of transport, for example by supporting environment-friendly transport modes (6%).

discussed as a necessary condition for the development of waterway transport, but has been questioned on economic and environmental grounds. Similarly, a project to connect the Elbe, Oder and Danube waterways has been debated for years.

3.3 *Integrating environmental concerns in transport projects and policies*

The integration of environmental concerns in transport projects and policies improved over the review period, through institutional integration. *Inter-ministerial co-operation* improved; for example, an inter-ministerial working group on transport, health and environment, which acts as an advisor to the ministries, was established in 2001. The Czech Republic has also participated actively in the WHO and UNECE Pan-European Programme for Transport, Health and the Environment.

Further to the EIA Act (Act No. 100/2001), *EIA* is required for all transport infrastructure projects having potential environmental impacts. Since the second EIA Act entered into force, 81 transport projects have been assessed (7% of the total). Despite the fact that EIA statements are not legally binding, no infrastructure projects subject to a negative statement have been undertaken. However, infrastructure development has continued without adequate *cost-benefit analysis*. In addition, in some cases, project alternatives or recommendations from the public have not received full consideration in the EIA procedure.

The Building Code and the legislation on nature conservation and landscape protection require transport infrastructure development to take into account *land-use plans* and the territorial system of ecological stability (TSES), to consider *alternative routes*, and to include compensatory or mitigation measures (Chapter 3). However, the current legislation is operational only for new infrastructures, while the existing transport infrastructure network contributes to the *fragmentation of natural habitats* and the prevention of wildlife migration. The improvement of transport networks will require a more effective integration of land-use plans, nature protection networks (Natura 2000) and transport plans. The proposed Building Code is expected to contribute to progress in this direction.

Further to the EIA Act, *SEA* has also been extensively used for evaluating the most recent national transport policy documents. For example, SEA was used to evaluate the National Strategy for the Development of Bicycle Transport and led to active public participation. Unlike the 1998 State Transport Policy, the proposed revision of this policy was subjected to SEA.

3.4 Improving vehicles and fuels

Concerning *vehicles*, Euro 3 emission standards for new vehicles were introduced in 2000 and an inspection programme has been implemented, requiring inspections every two years for vehicles four years and older. Since 2004, imported used vehicles that do not meet the Euro 3 standard have been subject to a fee of CZK 5 000. The import of cars more than eight years old has been banned.

Concerning *fuels*, quality standards were introduced in 2001 in accordance with EU regulations. In 2003, the sulphur content of both gasoline and diesel fuels was reduced from 500 mg/kg to 150 mg/kg for gasoline and 350 mg/kg for diesel. Leaded gasoline was phased out in 2001.

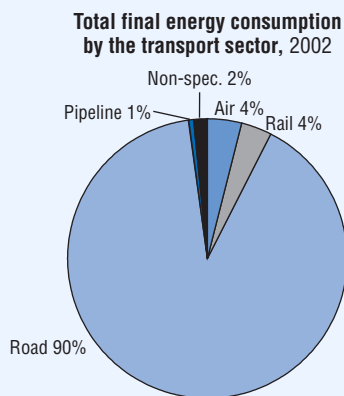
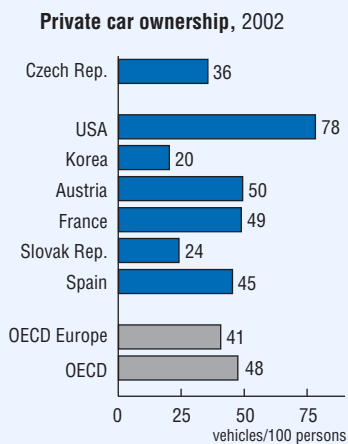
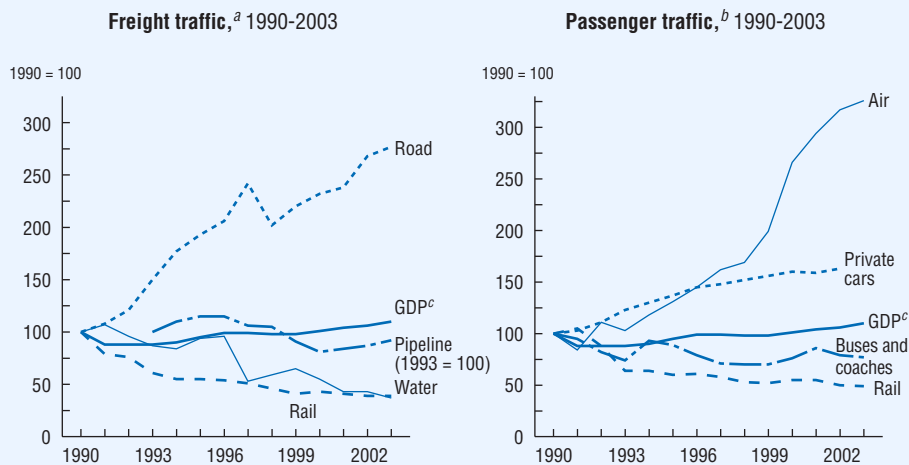
The introduction of barriers to the import of used cars has stimulated the *renewal of the car fleet*. The number of vehicles equipped with catalytic converters has more than doubled since 1998; in 2003, 47.5% of motor vehicles had them. However, 56% of passenger cars are still more than ten years old. Despite the availability of an LPG refuelling infrastructure, the number of cars using LPG is negligible.

Despite the increasing number of vehicles with lower fuel consumption, the share of *energy use by the transport sector increased* from 14% to 22% of TFC between 1996 and 2003. Compared to other new EU countries, the Czech Republic shows the highest growth in energy consumption, partly as a result of the replacement of some rail freight by road transport, and of the increased motorisation of households. Road transport now accounts for 90% of energy use by the transport sector (Figure 4.2). Consumption of all types of fuel has increased, including LPG, CNG and biodiesel, but diesel oil still prevails. Biofuel in the form of rape seed is already added to diesel and represents about 4.5% of the automotive fuel market.

No voluntary agreements have been made between government and operators to improve fuel *quality* and vehicle *efficiency*. Nonetheless, in 2001, the transport sector (including storage, communication and manufacture of transport equipment) invested CZK 1.2 billion in environmental protection. In addition, in 2005, a State *programme to achieve energy savings* in the transport sector will, funds permitting, provide financial support for projects on alternative fuels and energy savings associated with transport infrastructure and mobility management.

Disposal of transport wastes (e.g. vehicles, tyres, batteries, used oil) is an emerging issue, associated to the growth and renewal of the vehicle fleet. The Waste Management Plan for 2003-12 addresses this issue, introducing quantified targets for reuse and recovery of these wastes (Chapter 2). The general aim is to develop dedicated recycling markets.

Figure 4.2 Trends in the transport sector



- 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 2000 prices and purchasing power parities.
 Source: ECMT; AAMA; IRF; OECD.

3.5 Internalising external costs from transport

Concerning *fuel taxation*, all fuels for automotive use are subject to the *standard VAT rate*. An *excise tax* on fossil fuel for transport was introduced in 1993 and is approaching OECD Europe rates; it is currently close to the minimum value allowed by EU Directives and represents around 40% of the price of gasoline. VAT and excise duties together represent 63% of the gasoline price and 50% of the diesel price (Figure 4.3). LPG benefits from a lower tax rate. Regarding biofuels, only fossil components are taxed. Bio components are exempted from excise tax. Bio-diesel has been exempt from VAT since 1996.

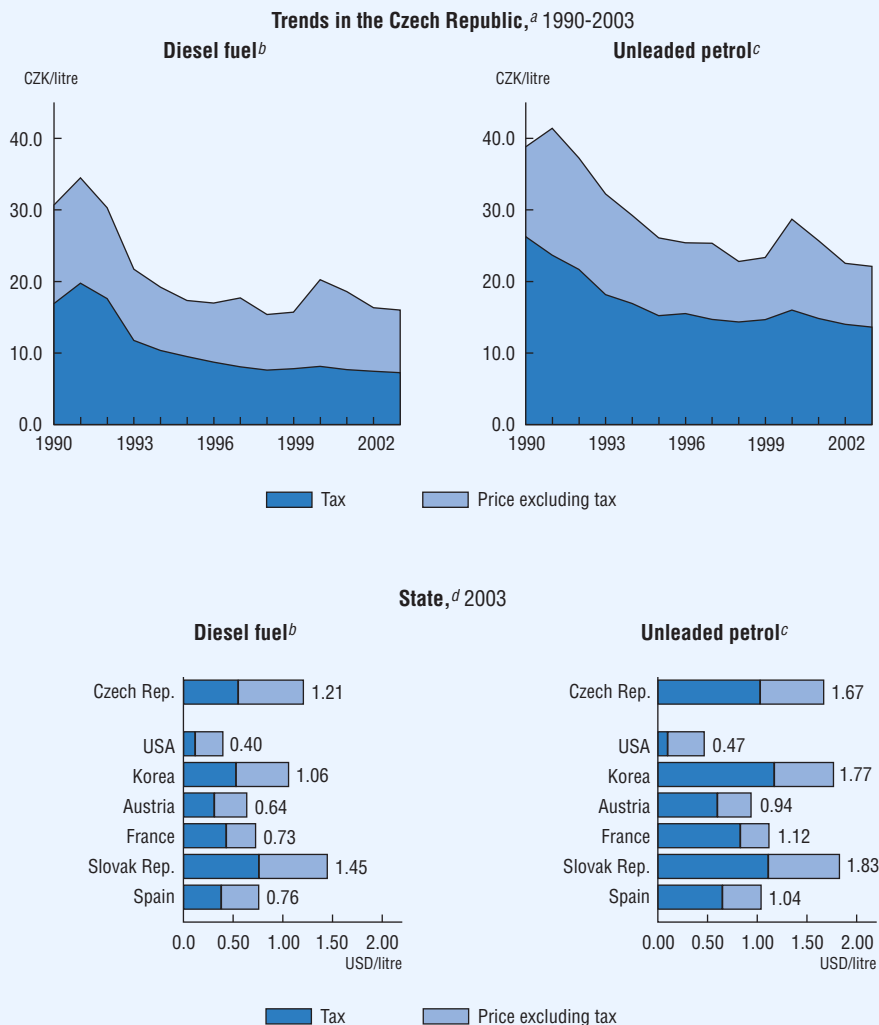
A *road tax has been imposed on commercial lorries*, at a rate that depends on the technical features and maximum load of the lorries. A tax reduction of 60% until 2005 and 66% until 2006 apply to Euro 2 and Euro 3 lorries respectively. The tax rate is 15% higher for old vehicles (registered before 1990). A *highway usage fee* is imposed on a travel-time basis (sticker or vignette for 10 days, a month or a year). This fee is differentiated between passenger cars (CZK 800 per year) and heavy goods vehicles (CZK 6 000-12 000 per year). However, its low level compared to the fees in neighbouring countries has contributed to the boost in transit traffic since May 2004.

Since 2003, after the split-up of Czech Railways between the line owner and the service operators, service operators have had to pay a *rail line usage fee* in addition to the standard VAT. This has translated into an increase in rail service prices. In addition, the *rail sector* has been further penalised from the VAT change decided in the context of harmonising EU taxation. While the standard VAT rate was reduced from 22% to 19% for both road fuel and vehicle prices, the VAT rate was increased from 5% to 19% for both the rail infrastructure usage fee and the rail freight service price. The VAT rate on the passenger rail price has not changed.

As for *air transport*, the Czech Republic considers CO₂ emission taxes within the context of the International Civil Aviation Organisation. Since 1995, a noise charge has been imposed on aircraft over nine tonnes landing at the Prague airport. This charge has helped to reduce the number of landings and take-offs during the noisiest time categories without compromising traffic volume.

Despite the adjustments made to the fiscal measures to promote vehicle efficiency and fuel quality, these measures are still driven mainly by *financing motivation*. In particular, fuel taxation is not currently used to address climate change issues. Road tax differentiation has supplemented the entry barriers to used vehicles and has stimulated renewal of the commercial vehicle fleet, though over 65% of

Figure 4.3 Road fuel prices and taxes



a) At constant 2000 prices.

b) Automotive diesel for commercial use.

c) Unleaded premium (RON 95); Korea: unleaded regular.

d) In USD at current prices and purchasing power parities.

Source: IEA-OECD (2004), database of end-use prices.

lorries are still more than five years old. Specifying the tax in terms of kilometres driven rather than on a per-vehicle basis would make it more targeted. Overall, the *price and tax structures provide incentives for private car use*. Extending the road tax to personal cars would help to reduce demand for private road transport.

3.6 Traffic management in urban areas

Urban transport is the *responsibility of municipalities*, although they must co-operate with regions to integrate larger transport systems. Subsidies received from the national government aim at sustaining public transport availability and at renewing bus fleets with LPG and CNG powered buses.

Eleven regions have established *integrated transport and tariff systems* but with varying results (Box 4.6). A few municipalities have started to implement sustainable mobility plans within the Network of Healthy Cities and Local Agenda 21 projects. In most municipalities, public transport is provided by buses. Many buses are more than ten years old and run on diesel. The number of buses and minibuses equipped with LPG and CNG engines grew to 0.6% of the overall bus fleet in 2003. The number of electric vehicles (e.g. trams) has not substantially changed. The high average age of public transport vehicles contributes to high noise levels in urban areas.

While public transport is well developed, *measures to moderate demand for private transport have not been sufficiently used* and have been limited to parking fees and awareness-raising initiatives. Municipalities have rarely imposed the available motor vehicle entry fee (maximum rate of CZK 20 per day) to regulate access to the city area. While 75% of urban trips were made using public transport in the early 1990s, *the rate has now fallen to 60% in major cities*.

3.7 Reducing air pollution and noise from transport

Thanks to the renewal of the vehicle fleet, *CO*, *CH₄* and *VOC* transport emissions have decreased by 26%, 9% and 28% respectively since 1998. *NO_x* emissions show a slight decrease of 3%. *SO₂* emissions increased during 1998-2002, but preliminary data show a decrease of 29% during 1998-2003, due to the reduction of fuel sulphur content limits (Table 4.9). *Lead emissions* have reached a negligible level since the phase-out of leaded gasoline.

Nonetheless, *the transport sector continues to be a major source of air emissions* (Table 4.9), as improvement in vehicle and fuel quality have been outweighed by increasing transport volume. *CO₂* emissions have increased by 30% since 1998. Since 1990, GHG emission intensity (in terms of grams of CO₂ equivalent per GDP

Box 4.6 Transport management in Prague

Prague has experienced a *traffic increase* of over 13% (in vehicle-kilometres) since 2000, mostly from passenger cars. The use of private cars for commuting is growing and congestion is spreading. The number of heavy haulage vehicles driving through the city has also tripled since 1996, negatively affecting environmental conditions. Although traffic volume in the inner city has stabilised, it has continuously increased in the periphery. The number of private cars per 100 inhabitants is 56, 50% higher than the national figure.

Transportation investment priorities are generally given to public transport and road infrastructure, although investments in 2003 focused on repairing damage from the 2002 floods. That year, urban transport received 35% of the municipal budget.

The *Prague Integrated Transport System* is managed by a public utility company under the control of local authorities. Prague's basic transportation network is made up of an underground and a tram, with buses as a complementary service. Nearly half of the passengers travelling by public transport – 41.4% – use the underground. The system grew steadily during 1998-2003, covering an increasing number of suburban communities (from 83 to 278), tripling the number of bus lines, and adding 40 connection points between railway and bus lines. The number of passengers commuting by train doubled. As of 2003, 180 kilometres of cycling routes were created out of a planned 450-kilometre network, partly along car-free roads and park paths.

New traffic limitations have been introduced for both trucks and passenger cars, with the widening of the “environmental zone” for vehicles weighing less than six tonnes, the addition of new pedestrian zones and the installation of separators along tram lanes. Thirty-eight per cent of the tram lines now have priority over car traffic. These arrangements are part of the EU project TRENDSETTER (Setting Trend for Sustainable Urban Mobility), which also included the first city bus line connecting two large transport nodes to health care centres in the inner city.

The number of *parking* places in Prague is small relative to demand. Parking pricing applies to a “ZPS” zone on the right bank of the city centre. Rates vary between CZK 15 and CZK 40 per hour, with an annual subscription fee of CZK 500 (too low to discourage car use). Compliance with parking fees and regulations is low. Park-and-ride parking lots close to underground stations are also available, although Prague has one third fewer than Madrid or Dublin.

Prague is using a periodically updated (from 1994 to 2004) *comprehensive environment quality model* (ATEM) including the emission balance concerning all accessible line source and interchanges (i.e. the automobile traffic).

Both the urban air quality information system and the traffic tele-monitoring system have been supported financially by the *EU projects* HEAVEN (Healthier Environment through Abatement of Vehicles Emission and Noise) and PRISMATICA (Pro-active Integrated system for Security Management by Technological Institutional and Communication Assistance).

unit) has grown by 6.3% in ten years, while the EU-15 have on average managed to decrease it by 0.4%. Road and air transport are the main source of emissions (86% and 10%, respectively), with *road transport* being the major contributor for each pollutant. Emissions from passenger cars exceed those from trucks for all pollutants except NO_x and particulate matter. Since 1998, NO_x emissions have decreased for cars and increased for heavy goods vehicles. Emissions of *particulate matter* have continued to increase, reaching almost a 30% growth. These emissions come mainly from road freight and public bus transport and are due to the high average vehicle age.

As regards *noise pollution*, the 2004 legislation reduced the maximum noise limits for existing infrastructure (road and railway) from 72 dB to 70 dB, requiring infrastructure operators to implement mitigation measures. For new infrastructure, a proposed noise law requires the inclusion in land-use planning of noise mitigation measures (e.g. transport by-passes, corridors and noise barriers). Despite recent efforts in building up noise barriers and diverting traffic from city centres, *noise from traffic* remains a serious concern. In the large majority of monitoring locations, noise levels exceed the limits of 55 dB in daytime and 45 dB at night. On the main transport routes, noise levels exceed the limits of 60 dB in daytime and 50 dB at night. As for *noise from air transport*, since 1998, Prague Airport has applied noise restrictions and

Table 4.9 Air emissions from transport, 1998-2003

	Emissions from transport			Emissions from road transport		
	1 000 tonnes/ year	Change (%)	Share (%) in total emissions	1 000 tonnes/ year	Change (%)	Share (%) in transport emissions
	2003 ^a	1998-2003 ^a	2003 ^a	2003 ^a	1998-2003 ^a	2003 ^a
CO ₂	16 138.0	30	12	13 881.0	32	86
CO	240.3	-26	42	231.7	-26	96
CH ₄	1.8	-9	0	1.6	-12	88
SO ₂	2.8	-29	1	2.1	-35	74
NO _x	112.9	-3	34	95.7	-3	84
VOCs	47.5	-28	24	45.8	-28	96
PM	5.7	30	7	5.0	34	88

a) Preliminary data.

Source: Transport Research Centre, 2004.

fees on individual flights, has provided financial support for sound-insulation of buildings in the airport vicinity, and has co-operated with the association of communities affected by air transport in establishing noise contours. Since 2002, these measures have been included in an ISO 14001 certified environmental management system.

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5

ENVIRONMENTAL-SOCIAL INTERFACE*

Features

- Social context
- Environmental health
- Access to information and courts
- Environmental awareness and education

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1998. It also reviews progress with respect to the objectives of the 2001 OECD Environmental Strategy.

Recommendations

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

- continue to establish objectives and targets for *public health and the environment*, building on annual health and environment surveys;
- evaluate the effects of environmental policy on *employment*;
- promote the role of the not-for-profit sector in *environmental employment*, especially in environmentally sensitive areas;
- continue to develop the system for providing *environmental information* and implement the principles of free and easy access to this information; support citizen participation in environmental decision-making and access to justice in environmental issues; implement the OECD Council Recommendation on Pollutant Release and Transfer Registers;
- reinforce *public participation* in the context of environmental impact assessment licensing processes;
- continue to promote the *Local Agenda 21* among municipalities, building on support schemes such as the Healthy Cities and Environmental Education Centres;
- further develop the *environmental training* of elected officials, civil servants and teachers, and establish a training system for justice officials.

Conclusions

Environmental information is generally of high quality and easily accessible. Annual national reports on the state of the environment have been available since 1993, supported by annual reports for the 14 regions. Acts on the *access to environmental information* have been in place since 1998, and the Aarhus Convention was ratified in 2004. The Government Council for Sustainable Development, created with the participation of civil society representatives, has established several working groups, including for the promotion of Local Agenda 21. Good inter-ministerial co-operation led to adoption of the National Programme on *Health and Environment*. An ongoing survey evaluates contamination levels in several products, materials and environmental media, and monitors public health. A National Programme on *Environmental Education* benefits from co-operation among the Ministry of the Environment, the Ministry of Education, Youth and Sports and the regional

authorities. Environment is taught at all educational levels, and a network of 100 Environmental Education Centres works with NGOs on its management.

As *access to courts* in environmental matters was regulated only in 2003, an effort must be made in preparing the justice system for this new challenge, with appropriate environmental training programmes. Neither the administration nor the representatives of civil society were able to quantify the impacts on *employment* of environmental policy or of the large investments made to clean up black spots and to upgrade old technologies. The public's concern about global environmental issues is not reflected in *consumption patterns*, probably due to a certain lack of awareness of national issues.



Since its accession to OECD, the social context of the Czech Republic has evolved further (Box 5.1, Figure 5.1). Its population (10.2 million inhabitants) is stable; its GDP per capita is 60% of the OECD average with significant variations among regions (Table 5.1).

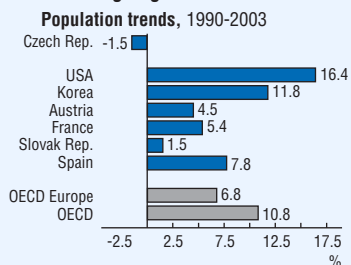
1. Environmental Health

The Czech Republic considers a healthy environment to be one of the basic conditions for protecting health and improving the quality of life. The general health conditions and variations in life expectancy and mortality rates found across the country might be partly associated with environmental conditions including air quality, drinking water quality and diet (Table 5.2, Box 5.2). The incidence of occupational disease decreased over the review period, with 1 600 cases reported in 2002 (Box 5.3). However, dust, noise, air pollution and risk of accidents in the workplace are still important concerns. Rates of workplace-related diseases are lowest in Prague and highest in Moravia-Silesia. Overall, it is likely that *considerable economic benefits* could be further derived from improved environmental health, including the benefits from reduced health expenditure and increased labour productivity.

Several important environmental health programmes were initiated during the review period. *The 1998 National Environmental Health Action Plan (NEHAP)* is evaluated by the Council for Health and the Environment, an advisory body to the government established in 1999 (Table 5.3). The 2002 *Health for Everyone in the*

Figure 5.1 Social indicators

Population and ageing

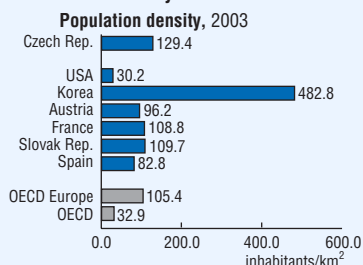


Population change	1990	2003
natural increase	‰ 0.1	-1.7
net migration	‰ 0.1	2.5

Foreign population	1992	2002
	% 0.4	2.3

Ageing	1990	2003
over 64/under 15	ratios 0.58	0.90

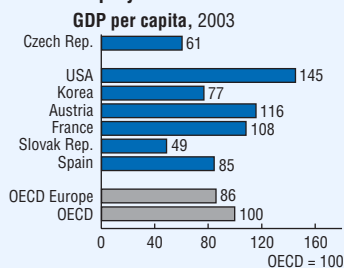
Settlement and mobility



Population by type of region	Early 2000s		
	% population	% area	density
urban	24.2	7.7	412
intermediate	70.8	83.5	111
rural	5.1	8.8	76

Mobility	1990	2002
car ownership	veh./100 inh.	23
rail traffic	billion pass.-km	13.3
		6.5

Income and employment

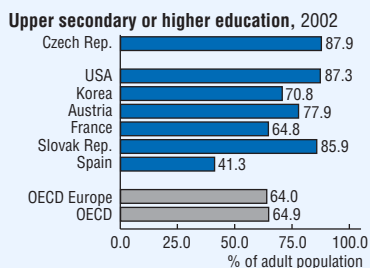


Regional disparities		Mid 1990s
GDP/inh.	variation coefficient	31

Labour force participation (% pop. 15-64)	1990	2003
total rate	% 73.6	71.2
female rate	% 69.1	63.1

Unemployment	1990	2003
total rate	% 0.8	7.8
female rate	% 0.8	9.9

Health and education



Educational attainment	1990	2002
upper secondary	% ..	87.9

Life expectancy	at birth:	1990		2003	
		total	female	total	female
	years	71.5	75.4	75.4	78.5
	at age 65:	male		female	
	years	11.6	13.8	15.2	17.1

Source: OECD, Environmental Directorate.

Box 5.1 Social context

Population

The Czech Republic's population is estimated at *10.2 million and stable*. The birth rate is one of the lowest in the world – in 2003, 1.18 children per woman were born – and as a result of long-term trends, the population is comparatively aged. The overall population density is 129 inhabitants per square kilometre, ranging from the densely populated industrial areas around Prague and in northern Bohemia and Moravia to the sparsely settled Jeseníky Mountains and southern Bohemian border areas (Figure 5.1). Of the country's 15 300 or so settlements, 98% have 5 000 or fewer inhabitants; only about 21% of the population lives in cities of 100 000 or more. The capital, Prague (Praha), has about 1.2 million people. Other large cities include Brno (370 000), Ostrava (313 000) and Pilsen (Plzeň) (164 000).

Almost *95% of the population is Czech* (Moravians consider themselves a distinct Czech subgroup). Slovaks make up 3% of the population. During the last decade, the foreign population increased six-fold and now constitutes more than 2% of the total population. Minorities in the country include Polish, German, Hungarian, Ukrainian, Slovak and Vietnamese speakers. Gypsies (Roma) form a distinct ethnic group.

Revenue

Per capita GDP is about *60% of the OECD average* (Figure 5.1). The average real wage rose by about 43% during the review period to CZK 17 418/month. Income dispersion (measured as the ratio of the richest to the poorest decile) is in the middle of the range observed in OECD countries, but is becoming more pronounced.

Employment

Unemployment rose to its peak of 10% at the beginning of 2003, with *unemployment rates* being lowest in the capital (3.8%) and highest in the Moravian-Silesian and Ústí Regions (16.4% and 17.4%, respectively) (Table 5.1). The main factors affecting unemployment were: the restructuring of the economy and notably of core industries, the privatisation of corporations, the integration of the national economy into the European and global market, and demographic changes.

The 2003 *National Action Plan of Employment* of the Ministry of Industry and Trade states that the key prerequisite to reducing unemployment is to create synergies among employment efforts in different policies (e.g. economic, regional, educational, budgetary and labour policies). It recognises that “in particular, the potential of the knowledge society and the environmental sector should be tapped”. Data on the number of employees working on environmental issues or for environmentally-related companies are not available. The ministry has supported the introduction of technologies that use raw materials, renewable resources and environmentally friendly production procedures.

Box 5.1 Social context (cont.)

Health

Life expectancy gradually increased during the 1990s (to 78.5 years for women, 72.0 years for men). *Mortality* rates differ noticeably by region, with higher rates in Prague and Central Bohemia (more than 11 deaths per 1 000 inhabitants) and lower rates in Vysočina and Pardubice (10 or fewer deaths per 1 000 inhabitants). The longer life expectancy and consequent drop in mortality are closely linked to improved medical care, positive changes in lifestyle and substantial improvement of the environment.

The most frequent disease-related causes of death include diseases of the circulatory system and cancer, together responsible for 87 000 deaths, and diseases of the digestive and nervous system. Half of men and one-third of women are *overweight*, and more than 13% of men and 16% of women are obese. Almost one-third of the population has *high blood pressure*.

Table 5.1 Selected indicators by region, 2002

	Population (1 000)	Unemploy- ment ^a (%)	GDP per capita ^b (EUR)	Health limits exceeded ^c (% of region)	PTVE ^d areas with limits exceeded (%)	Municipal waste (kg/inh.)	Drinking water ^e (m ³ /inh.)	Occupational diseases ^e (per 10 000 inh.)	Employees exposed to hazardous agents ^f (%)
Praha City	1 160	3.8	30 667	81.3	50	483	125.2	0.7	3.5
Central Bohemia	1 120	7.3	11 672	3.7	7.4	633	45.6	1.9	3.9
South Bohemia	625	6.6	12 314	0.0	89.3	461	64.7	1.8	6.8
Plzeň	550	7.2	13 578	0.4	65.3	335	65.0	2.2	4.0
Karlovy Vary	300	10.5	10 997	5.0	16.1	378	79.3	0.9	4.4
Ústí	820	17.4	11 141	20.2	46.1	462	89.2	0.9	7.1
Liberec	430	9.2	11 716	6.7	65.4	709	84.9	1.0	6.5
Hradec Králové	550	7.4	12 174	1.0	99.2	379	66.3	1.6	5.3
Pardubice	510	8.7	11 722	..	99.1	725	66.1	1.9	6.2
Vysočina	520	8.6	11 743	0.1	100	371	54.4	1.6	3.3
South Moravia	1 125	11.3	12 726	7.7	98	496	65.2	1.0	2.2
Olomouc	640	12.5	10 835	9.5	44.6	350	60.7	1.8	2.6
Zlín	590	10.5	11 665	3.6	92	355	65.7	1.0	2.7
Moravia – Silesia	1 270	16.4	11 716	53.2	73.3	351	77.6	2.9	1.5
Czech Republic	10 210	10.0	14 019	..	67.1	465	..	1.6	..

a) 2003.

b) Average GDP per capita, using 2000 PPS (purchasing power standard).

c) Limit values for protection of human health evaluated for SO₂, NO₂, PM₁₀, CO, Benzene, Benzo(a)pyrene, Cd, As.

d) Protected Territory for protection of Vegetation and Ecosystems.

e) Notified occupational diseases caused by chemicals and physical factors including lung, pleura, peritoneum, skin, and infectious and parasitic diseases.

f) Such as noise, biological factors, dust, physical stress, chemicals etc. shown as share to total employees in the region.

Source: Czech Statistical Office; Ministry of the Environment; WMIS; NIPH; OECD.

21st Century (“*Health 21*”) is a long-term programme to improve the state of health of the population. It sets out a programme for reducing environmental pollution, supporting environmental education and public awareness, promoting the integration of environmental and health concerns into the energy, industry, transport and agriculture sectors, and co-ordinating with the NEHAP goals. The *Environmental Health Monitoring System* (MSHP), in place since 1994 in 30 cities, monitors, evaluates and reports on health risk factors related to the state of the environment. It includes monitoring of the *indoor environment*, specifically for chemical, physical and biological indicators in public places like schools, hospitals, hotels, theatres and commercial centres.

Other important progress during the review period has taken place. A list of top-priority *hazardous chemical substances and chemical preparations* under the Act on Chemical Substances and Chemical Preparations was developed based on a preliminary assessment of substances produced in or imported to the Czech Republic in amounts greater than ten tonnes per year (producers and importers of such substances are required to notify the government). All registered building and installation operators were required to prepare safety documents in 2002 under the Act on Prevention of Major *Accidents* Caused by Selected Hazardous Chemical Substances and Chemical Preparations and the Act on the District Authorities. *Co-operation* has improved between the environmental and health sectors, as well as communication and information-sharing among the different institutions managing chemical substances, preventing accidents, ensuring food safety and reducing health risks from a polluted environment.

In the coming years, implementation of the Strategic European Directive 2002/49/EC will help to address the problem of *noise*. The EU Directive creates conditions for meeting the long-term EU targets, requiring the preparation of action plans that are expected to include land-use planning (transport by-passes and corridors), transport restrictions, pedestrian zones, noise barriers, noise insulation of residential and office buildings, and other similar measures.

2. Environmental Democracy: Information, Access to Information, Participation

2.1 Availability of information

The Czech Republic collects and provides information on the environment in a variety of ways: i) the *State of Environment Report* (published annually since 1993) analyses the current state of the environment, key trends, factors affecting the

Box 5.2 Teplice Programme: studies on the impact of air pollution on human health

The Teplice Programme is studying how *high levels of air pollution* affect human health, by comparing health in Teplice, a mining district in Northern Bohemia, and Prachatice, an agricultural area with clean air in Southern Bohemia.

The results show that high exposures to air pollution can affect genetic material, reproductive functions and early childhood vulnerability to infections. In both districts a *study of birth and very young children* (up to three years old) was conducted. Pediatric records (childhood morbidity and immune biomarkers measured in cord and maternal blood) showed that children born in Teplice had a significantly higher rate of otitis media, gastrointestinal infections, and upper respiratory infections and pneumonia, although they did not differ in their risk for bronchitis or for viral infections such as varicella.

An evaluation of *health risks* from exposure to SO₂, PM₁₀, NO_x, metals, volatile organic chemicals (VOCs) and polycyclic aromatic hydrocarbons (PAHs) indicated that elevated levels of SO₂ and PM₁₀ found in the ambient air of Teplice contributed to the inhabitants' poor health at least until the end of 1992. Of the 74 substances tested, PAHs represented the most important health threat. By retrospective extrapolation, it can be assumed that exposure to PAHs in the Teplice district were even higher in the 1980s, and may have caused tens of additional cancer deaths.

The course of standardised *mortality* was followed between 1982 and 1998, in districts with different air pollution levels. The results show that total and *cardiovascular mortality* decreased significantly in both genders over this period in all analysed regions. However, *cancer mortality*, especially from respiratory cancers, increased significantly in women and decreased slightly in men. The highest mortality was observed in Teplice and in the mining district of Northern Bohemia, showing that life expectancy in these polluted areas was the shortest. Factors influencing the high mortality in these areas included the socioeconomic status and low educational level of the population, the presence of disadvantaged population groups, the unhealthy life style, the prevalence of smoking and nutritional deficiency.

environment, results achieved by the State Environmental Policy (SEP), and results of an international comparison of environmental indicators; ii) the *Ministry of Environment Web site* contains similar information, as well as legislative and regulatory information; iii) *regional reports* are published annually for each of the 14 regions; iv) new information on *permits* is available since 2004 further to implementation of the Act on Integrated Prevention; v) *data on emission limits, fines and charges* are provided by the Czech Environmental Inspectorate; and vi) data on revenues and *environmental investment* are provided by the State Environmental Fund (SEF).

Box 5.3 Health risks in the workplace

The incidence of occupational disease decreased during the review period, with 1 600 cases reported in 2002 (affecting 977 men and 623 women), or 35.7 per 100 000 employees in the Czech Republic.

Reported occupational diseases were proportionally higher in the Moravian-Silesian Region (362, i.e. 22.6% of cases) and the Central Bohemian Region (213, i.e. 13.3% of cases). The highest number of cases occurred in the *health-care* sector itself (16.3% of cases), followed by *coal mining* (13.8% of cases). The greatest increase in occupational diseases (by 118%) was recorded in the production of metal structures and metal-working products. The most frequent disease was damage to peripheral nerves caused by excessive burden (177 cases) and by vibrations (174 cases). Regarding occupational disease threats, the most frequent cases were hearing defects from excessive noise (19 cases, i.e. 27.5%) and arthritis of the joints of the upper limbs caused by vibrations (15 cases, i.e. 21.7%).

In 2002, 188 467 persons were recorded as employed at *high-risk workplaces* (i.e. 6 079 per 100 000 inhabitants); 7 104 persons were employed at very high-risk workplaces (226 per 100 000 inhabitants), of which 1 220 were women. The highest numbers of employees classified at risk were in the Ústí Region (25 044), in the Central Bohemian Region.

Table 5.2 Health and environmental health data, 2003

Health care expenditure ^a		Health in the Czech Republic			
7.4% of GDP		Life expectancy	78.5 years for women 72.0 years for men		
Financed by:	(%)		Total	Male	Female
Health insurance	81.6	Annual deaths, of which:	111 000	56 000	55 000
General government	9.8	Diseases of the circulatory system	58 000	26 000	32 000
Households	8.6	Neoplasms (cancer)	29 000	16 000	13 000
		of which lung cancer	5 500	4 200	1 300
		Diseases of the respiratory system	5 000	3 000	2 000
		of which pneumonia	2 700	1 300	1 400
		Diseases of the digestive system	4 600	2 600	2 000
		Diseases of the nervous system	2 000	1 000	1 000
		Endocrine, nutritional and metabolic diseases	1 500	600	900
		Certain infectious and parasitic diseases	300	160	140
		Infant mortality	3.9 per 1 000		

a) In 2002.

Source: OECD, Environment Directorate.

However, the collection of information is not always transparent and in some cases the information is not reliable. Progress in implementing the OECD Council Recommendation on Pollutant Release and Transfer Registers has been slow. Information on economic and cost-benefit analysis and on environmental employment is often inadequate. Further steps should be taken to co-ordinate the different information systems.

Table 5.3 **National Environmental Health Action Plan priorities**

	Priority issues
Major health problems	Cardiovascular diseases Tumour diseases Accidents Disruptions in the natural turnover of the population Pathological alterations of immunity HIV/AIDS and other important infections Inborn and systematic defects in children
The change of lifestyle	Improving nutritional habits Decreasing the prevalence of the smoking habit Limiting and controlling excessive stress Improving reproductive health Lowering alcohol consumption Optimising physical activity
Priority problems in the environmental policy	Protecting the climate by reducing emissions of greenhouse gases Protecting the ozone layer Protecting biological and landscape diversity Increasing citizen awareness of the importance of protecting the environment
Water and Soil	Increasing the landscape's capacity to retain water and improving its resistance to water erosion Continuing restoration of forests in areas damaged by industrial emissions Continuing reclamation of territory devastated by mining Ensuring such a structure in the use of territory that will lead to an improvement of natural infrastructure and will be a condition for the effectiveness of component protection

Source: National Environmental Health Action Plan Czech Republic, 1998.

2.2 Public access to information and justice

The public's *right to information on the environment*, which is recognised in both the Czech Constitution and the Charter of Fundamental Rights and Freedoms, was strengthened over the review period by the 1998 *Act on the Right to Access to*

Information on the Environment and the 1999 *Act on Free Access to General Information*. The former act provides access to data which have not traditionally been disclosed, with a one-month period for providing requested information. The latter act imposes a period of 14 days. According to the *Open Society Organisation*, these acts have generally been used appropriately and the Ministry of the Environment has provided a better response to information requests than have other central or regional authorities. The Open Society Organisation reports annually on the best and worst examples of the application of the acts.

However, public *access to environmental information* is of course restricted; for example, some data on pollutant emissions can be considered confidential according to the current interpretation of the Act on Confidential Information and Security Qualification. In a recent case concerning the disposal of nuclear waste, the Constitutional Court recognised that this right could be claimed by individuals in a court case. A new discussion is taking place about public awareness and responsibility for the environment, about the right to have relevant information, and the most effective way to use this information for the common interest. In future, it will be important to find a good balance between the right to know and the protection of confidential business information.

Access to justice in environmental matters is part of the general regulation of administrative justice in the Czech Republic. The Charter of Fundamental Rights and Freedoms and the Act on the Right to Petition guarantee the right to petition in environmental matters. The *Act on the Code of Administrative Justice* (effective since 2003) guarantees the right to take action against an administrative decision, to challenge a failure to provide information requested under the Act on the Right to Access Information on the Environment, and to sue under certain conditions. Since the passage of the Act on the Code of Administrative Justice, the Czech legal system has been in line with the Aarhus Convention, and the Convention principles have been included in several environmental laws including the Act on the Prevention of Industrial Accidents, the Water Act, the Environmental Impact Assessment Act, the Act on Integrated Prevention, and the Act on Genetically Modified Organisms. The Czech Republic ratified the *Aarhus Convention* on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters in 2004.

2.3 Public participation

The Czech Republic has relatively progressive *public participation laws*, including several acts and provisions adopted since 1998. In addition to the previously mentioned Act on the Right to Access to Information on the Environment and Act on Free Access to General Information, these include the Act on the Public

Guardian of Rights and some new provisions in environmental laws, such as the third party right of appeal in the Act on Integrated Prevention.

In practice, the government is increasingly including *public consultation* in the environmental policy-making process. For example, the development of the recent SEP included three public hearings and several consultations with non-governmental organisations (NGOs) organised by the Ministry of the Environment. The elaboration of the 2004 National Strategy for Sustainable Development also solicited public input in various ways.

However, the Czech Republic *lacks a “participation culture”*. Efforts are needed to increase public awareness of environmental issues and desire to participate in addressing them. Public participation in environmental policy making is not as widely used or accepted as it could be, and it is sometimes weakened by administrative procedures like environmental impact assessment (EIA). There is also room for improvement in government consultations on legislation and policy proposals: the approach is too often passive and formal. Although major NGOs can adapt to this approach, it tends to exclude citizens potentially affected by the decisions.

3. Environmental Awareness, Education and Partnership

3.1 Awareness

The majority of the Czech public are not very involved in or concerned about national environmental issues. As previously noted, one important factor is the absence of a culture of participation. A survey by the *Centre for Public Opinion Surveys* also showed that, whereas concerns are growing about global environmental issues, the population is increasingly satisfied with the state of the environment nationally and with the government’s approach. The survey respondents ranked the environment 14th out of 18 issues (first place went to unemployment) and gave low priority to government action on the environment, although about one-third of the respondents described environmental issues as “very urgent”. Perhaps as a consequence, there is little attention to environmental concerns in patterns of consumption or production.

3.2 Education

Both government and stakeholders agree that more needs to be done to increase public awareness of environmental issues and to influence behaviour and consumption patterns. The Ministry of the Environment, together with other ministries including Education, Agriculture and Industry, has established a number of programmes and projects on environmental education, and has supported NGO

initiatives in this area. A *State Programme of Environmental Education and Public Awareness*, with an Action Plan 2001-03, was approved in 2000.

A new *Action Plan 2004-06* was approved in 2003. Its measures include: co-ordination of an environmental curriculum for schools and universities; support for a network of Environmental Education Centres; creation of training programmes for elected officials and public administrators; support for Local Agenda 21; and development of supporting pedagogic material. The Action Plan will also promote environmental awareness by publishing materials, diffusing radio and television programmes, and creating awards and contests on environmental themes. Progress in implementing the Plan is evaluated yearly.

A high proportion of the Czech population attains upper secondary or higher education (Figure 5.1). Regarding *environmental education in higher institutions*: courses are available in environmental law, environmental management instruments (e.g. input-output analysis, LCA), environmental technology (e.g. waste, water, air, energy, soil), and global and local environmental issues. Environmental education has traditionally been provided by the natural science and engineering faculties, and has been treated only minimally in economics and business administration courses. Environmental management instruments, environmental management systems, and management operations (procurement, production, marketing, logistics, organisation, human resources) currently receive little attention.

3.3 Role of NGOs

Non-governmental organisations (NGOs) play an active role in developing environmental policy and programmes in the Czech Republic. NGOs are now represented on each of the *monitoring committees* of the Structural Funds and Cohesion Fund in the Czech Republic. Representatives on some of the committees are selected through an open competition drawn up by the EU Committee of the Government Council for Non-State, Non-Profit Organizations. The Regional Environmental Centre for Central and Eastern Europe, an international non-profit organisation, was involved in the *strategic environmental assessment* of the National Development Plan of the Czech Republic. Co-operation between the Ministry of the Environment and environmental NGOs has improved in terms of access to information and public involvement in decision-making (Box 5.4).

NGOs and their specialised facilities, a network of more than 100 *Environmental Education Centres*, also play an important role in promoting environmental education and awareness in schools. Programmes are being introduced for civil servants at all

levels of public administration and for teachers at all school levels, but progress is slow due to financial constraints and the large number of targeted individuals.

Funding of NGOs comes mainly from the organisations' own activities, although the Ministry of the Environment contributed CZK 19.35 million annually from 1998 to 2002 and CZK 22 million in 2003. Recently, approximately one-third of proposed projects have been funded (Table 5.4). A stronger government commitment (including provisions that stimulate private donors and independent foundations), and more stable funding might be desirable.

Box 5.4 Activities of selected environmental NGOs

Hnutí Duha, established in 1989, became the Czech chapter of Friends of the Earth International in 1994. The group has sought not only environmental improvement, but also a change in the attitude of the Czech citizenry. Its approach involves negotiating with decision makers, proposing legislation, carrying out public awareness campaigns, creating consumer advocacy and education groups, and campaigning against environmentally harmful projects and research. *Hnutí Duha* has a central office in Brno and 15 local groups.

The Czech Union for Nature Conservation, *Český svaz ochránců přírody*, is the largest Czech NGO representing people and groups interested in nature and environmental protection. At present its members include 326 organisations, two hobby groups, 17 regional associations and 60 independent members. Its activities focus on care of protected territories and on work with children and young people.

The Environmental Law Service *Ekologický právní servis* is a non-profit, public interest law organisation. Its aims include eliminating unlawful and improper decision-making by the State regarding the environment and human rights, helping people gain access to the courts and building the knowledge and skills of non-profit organisations.

Cities of the Czech Republic, *Národní síť Zdravých měst ČR*, is a national association of active cities, towns and regions that are implementing the WHO Healthy Cities Project. It pursues the long-term health and sustainable development goals of Health 21, Local Agenda 21 and NEHAP, and takes other strategic steps to support health and the quality of life. Membership in the association is open to all types of municipalities.

The Children of the Earth, *Děti Země*, started up in 1989, has 11 branches with a headquarters in Plzeň. Its aim is to protect the environment and to strengthen ties between man and the environment. *Arnika* was established in 2001. Its mission is to improve the environment by preventing toxic pollution and restoring the landscape. It seeks to achieve its mission through projects, campaigns and co-operation with other NGOs.

Table 5.4 Support for non-governmental non-profit organisations

	Financial means provided (CZK 1 000)	Amount requested by NGOs (CZK 1 000)	Number of projects submitted	Number of projects supported
1998	19 350	76 532	680	230
1999	19 350	69 606	581	143
2000	19 350	51 823	498	158
2001	19 350	56 100	523	157
2002	19 350	49 183	465	142
2003	22 000	55 005	499	159
2004	20 000	49 426	483	164
2005	20 000	68 240	439	98

Source: Ministry of the Environment.

3.4 Partnerships

The elaboration of Local Agenda 21 has been an important part of the new national Strategy for Sustainable Development (adopted in 2004). In preparing the Strategy, the Council for Sustainable Development established a Local Agenda 21 Working Group that defined criteria and indicators. The Ministry of the Environment has also established special co-operation programmes with other agencies to facilitate the elaboration of Local Agenda 21. Examples are: *Healthy Cities of the Czech Republic* (an association of 31 municipalities) are developing a broader approach to their activities, and NGOs that manage the activities of several *environmental education centres* are presenting projects to develop Local Agenda 21 for the cities concerned.

During the review period, *public-private partnership* was promoted in the provision of public services and infrastructure, as a means toward fiscal moderation and a systematic control over long-term public sector liabilities. This should facilitate investments in certain socially sensitive areas, although attention should be paid to avoid creating excessive financial dependency. The policy is seen as contributing to long-term economic growth and social stability objectives.

A systematic *application of public-private partnership* is expected to lead to: real financial benefit and a better utilisation and allocation of public funds; faster development of efficient public infrastructures; good quality in public services; economic growth and increased direct international investments by creating

incentives for private investment in public infrastructure and public services; efficient control over the formation of long-term private sector liabilities; limitation of the negative impact of non-systematic public-private partnership projects; and increased possibility of drawing on EU Funds by having a higher co-financing share from the private sector in projects of public interest.

Selected sources

The government documents, OECD documents and other documents used as sources for this chapter included the following. Also see list of Web sites at the end of this report.

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6

INTERNATIONAL CO-OPERATION*

Features

- Ratification of multilateral environmental agreements
- Accession to the European Union
- Implementation of the Kyoto Protocol
- Transboundary pollution
- Trade, investment and the environment

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1998. It also reviews progress with respect to the objectives of the 2001 OECD Environmental Strategy.

Recommendations

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

- implement the measures in the national programme to abate the *climate change* impacts so as to get closer to the European average for greenhouse gas emissions per capita and per unit of GDP; use economic analysis to increase the efficiency of policies and measures to reduce the economy's carbon intensity;
- improve the *capacity to absorb* European environmental support (e.g. Cohesion and Structural Funds);
- continue to *reduce air emissions* (e.g. NO_x emissions) to meet the 2010 targets of relevant EU Directives and CLRTAP protocols;
- continue to reduce the *pollution of transboundary rivers* (e.g. Elbe, Oder, Morava rivers and tributaries);
- strengthen the implementation of the *Washington Convention* on International Trade in Endangered Species of Wild Fauna and Flora;
- continue to increase *development assistance* and environmental development assistance;
- continue to ensure that *foreign direct investment* in the Czech Republic strictly conforms to environmental law.

Conclusions

The Czech Republic has managed its international and European action concerning the environment both rigorously and efficiently. It has been timely in preparing and adopting documents with precise objectives and deadlines for ratifying and implementing *multilateral environmental agreements* (MEAs) and in preparing for accession to the European Union. It has also satisfactorily negotiated the *environmental acquis*, *transposing numerous EU Directives* into national law and negotiating transition periods for just three Directives that are particularly expensive to implement. The Czech Republic has fulfilled or is on its way to fulfilling its international obligations, especially with regard to the Montreal Protocol, the Geneva Convention on Long-range Transboundary Air Pollution (CLRTAP) and the Kyoto Protocol. Lastly, the Czech Republic has taken active steps to increase its *development assistance* and foster bilateral co-operation.

However, despite these very significant results, much remains to be done. The extent of the Czech Republic's contribution to reducing acidity in the region remains questionable: the Czech Republic still has *very high emissions* of SO₂ and NO_x per capita and per unit of GDP compared to other OECD countries. It also has very high emissions of CO₂ per capita and per unit of GDP. As an upstream country, and despite real progress, much remains to be done about transboundary water pollution. It is not certain that the *National Strategy for Sustainable Development* will offer a transition to different modes of production and consumption, a decoupling of energy use from economic growth, or the responses needed for participation in the single European market, especially as regards *transport*. There have been delays in adopting a national biodiversity strategy. The current environmental enforcement system may not be able to guarantee effective monitoring of offences relating to *trade in endangered species* and the Washington CITES.



1. Objectives

Two major developments took place during the review period, in the pursuit of objectives set or confirmed in the 2001 State Environmental Policy (SEP). First, the Czech Republic acceded to many *multilateral environmental agreements*; second, it prepared for joining the *European Union (EU)*. Rigorous planning enabled the government to lay the foundations for these two developments and to promote the Czech Republic's role in international environmental co-operation.

The *1998 OECD Environmental Performance Review (EPR)* contained seven recommendations. It recommended that the Czech Republic:

- ratify and implement relevant international environmental agreements (Reference II);
- enact national laws which would enable the Czech Republic to become a party to those significant international environmental agreements to which it is not yet a party;
- improve public awareness in relation to new environmental commitments associated with membership in the OECD and with EU accession;
- fully implement recent OECD recommendations on environmental information and pollutant release and transfer registers;
- develop a national programme to reduce greenhouse gas emissions, improve energy efficiency and prepare for the adoption of appropriate legal measures;

- increase resources to carry out international commitments, to prepare accession to the EU and to enforce new legislation approximating that of the EU;
- make full use of opportunities for foreign assistance, with the aim of strengthening environmental infrastructure and contributing to the solution of priority international environmental problems.

1.1 *Ratification of multilateral environmental agreements*

Following the recommendations of the first OECD EPR, the Czech Republic adopted (in 1999) and has largely implemented a special plan for accession to and ratification of numerous *MEAs* (Table 6.1).

The country has systematically introduced the laws and regulations needed to implement these agreements at national level. It has strictly complied with its legal obligations to define focal points, submit reports and attend meetings of Contracting Parties. The *considerable effort* made in this area was recognised internationally when the Czech Republic was featured at the 2002 Earth Summit as one of the most active nations in acceding to *MEAs*.

The following agreements still remained *to be ratified*:

- the Framework Convention on the Protection and Sustainable Development of the Carpathians (signed in May 2003 at the Kiev Conference);
- the Protocol on Pollutant Release and Transfer Registers (PRTR) to the Aarhus Convention (Kiev, 2003);
- the Protocol on Strategic Environmental Assessment to the Espoo Convention (Kiev, 2003).

1.2 *Accession to the European Union*

Preparations for accession to the EU and support measures were carried out in the framework of: the national programme to prepare the Czech Republic for EU membership in the environmental sphere (updated yearly from 1999 to 2004), the SEP (revised in 2001 and 2004), the plan to transpose European legislation into Czech law (adjusted yearly from 1999 to 2004), and the strategy for financing investment related to implementing the EU environmental *acquis*.

The Czech Republic became a member of the European Union on 1 May 2004. In its negotiations for entry, it requested *transition periods* for compliance with the Community *acquis* for a number of environmental Directives, including some relating to water (the 1991 Urban Waste Water Treatment Directive, the 1998 Drinking Water

Directive, the 1976 Directive on Pollution by Discharge of Certain Dangerous Substances, the 1991 Nitrates Directive), nature conservation (the 1992 Habitats Directive) and waste (the 1996 Integrated Industrial Pollution Prevention and Control (IPPC) Directive). In the end, the Czech Republic obtained transition periods for only three Directives: i) Directive 91/271/EEC concerning urban waste water treatment, until 31 December 2010; ii) Directive 94/62/EC on packaging and packaging waste, until 31 December 2005; and iii) Directive 2001/80/EC on air emissions from large combustion plants, until 31 December 2007.

Table 6.1 **MEAs ratified or accepted by the Czech Republic, since 1999**

Amendment to the Basel Conv. on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
 Montreal Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer
 Beijing Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer
 United Nations Conv. to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification
 Rotterdam Conv. on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade
 Conv. on the Protection and Use of Transboundary Watercourses and International Lakes
 Protocol on Water and Health to the Conv. on the Protection and Use of Transboundary Watercourses and International Lakes
 Conv. on the Transboundary Effects of Industrial Accidents
 Conv. on Environmental Impact Assessment in a Transboundary Context
 Kyoto Protocol to the Framework Conv. on Climate Change
 Cartagena Protocol on Biosafety to the Conv. on Biodiversity
 Amendment to the Agreement on the Conservation of Bats in Europe
 Stockholm Conv. on Persistent Organic Pollutants
 Protocol on Heavy Metals to the Conv. on Long-range Transboundary Air Pollution
 Protocol on Persistent Organic Pollutants to the Conv. on Long-range Transboundary Air Pollution
 Protocol to abate Acidification, Eutrophication and Ground-Level Ozone to the Conv. on Long-range Transboundary Air Pollution
 Aarhus Conv. on Access to Information and Public Participation in Environmental Decision-Making and Access to Justice in Environmental Matters
 European Landscape Conv.
 Protocol on Environmental Protection to the Antarctic Treaty
 International Convention for the Regulation of Whaling
 Protocol to the International Convention for the Regulation of Whaling
 Amendment to Article XXI of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Gaborone Amendment)

Source: Ministry of the Environment.

Of the ten new EU members, the Czech Republic has one of the fewest transition periods for compliance. Consequently, and as far as the environment is concerned, the accession negotiations may be considered a *definite success*. This success was facilitated by a number of steps taken during the pre-accession period which: improved and mobilised the relevant administrative apparatus in the Czech Republic; accelerated legal procedures leading to compliance; adopted application menus, especially for the licencing and inspection systems; trained administrative agencies in the appropriate use of European funds, (including the EUR 340 million received through ISPA for 2000-03 to facilitate compliance with the Community *acquis*, especially relating to water); and negotiated EUR 415 million from the Cohesion Fund and EUR 142 million from Structural Funds to finance environmental investment over 2004-06 to implement the Urban Waste Water Directive.

Regarding *actual implementation of the Community acquis* during 2004-10 (the period covered by the 2004 SEP) and leaving aside the introduction of regulatory measures (which will require further effort in integrated pollution prevention and control, nature conservation and the monitoring of discharges of dangerous substances), steps must be taken to ensure that private sector, household, central, regional and local government funding is indeed mobilised to invest the amounts needed to bring the Czech Republic into line with the environmental *acquis*, at an *estimated cost of EUR 9 billion*.

2. Implementation of the Framework Convention on Climate Change (FCCC)

2.1 Objectives and achievements to date

The Czech Republic acceded to the FCCC in 1993 and completed the process of approval of the Kyoto Protocol in November 2001. In accordance with its FCCC obligations, it has submitted three national reports to the Convention Secretariat, the most recent in 2001. This latest report includes an *inventory of the Czech Republic's greenhouse gas (GHG) emissions*, presents a list of measures that could be used to reduce them, and projects emissions to 2020 according to various scenarios, together with comprehensive and sectoral support measures.

Research on the *potential impact of climate change* on the Czech Republic and its ecosystems confirms a "statistically significant increase" in annual maximum, minimum and average temperatures over the period 1961-2000 and predicts less snowfall and greater evaporation, reducing the available annual water supply. A *national programme to abate the climate change impacts*, which takes account of Council decision 99/296/EC and of the European Climate Change Programme, was

drawn up under the aegis of the Ministry of the Environment and was approved in March 2004. The programme's analysis of past performance suggests both positive conclusions and causes for concern.

Under the Kyoto Protocol, the Czech Republic has a legal obligation to reduce its GHG emissions by 8%. In practice, it has already reduced total emissions by almost 25%, from 190.5 million tonnes (of CO₂ equivalent) in 1990 to 144 million tonnes in 2003, an achievement that sets it *well on the path* to fulfilling its obligations for 2008-12.

However, this reduction had already taken place by 1995, mainly due to economic restructuring. After 1995, a number of measures were implemented in various sectors which also contributed to GHG emissions reduction. Nevertheless, certain GHGs have increased since 1999 and furthermore, the Czech Republic has some of the highest *CO₂ emissions per unit of GDP* among OECD and EU countries (Figure 2.1). Likewise, per capita emissions of CO₂ equivalent are also very high, at 11.84 tonnes per capita in 2002, compared with the EU-15 average of 8.44 tonnes.

2.2 Objectives for the future

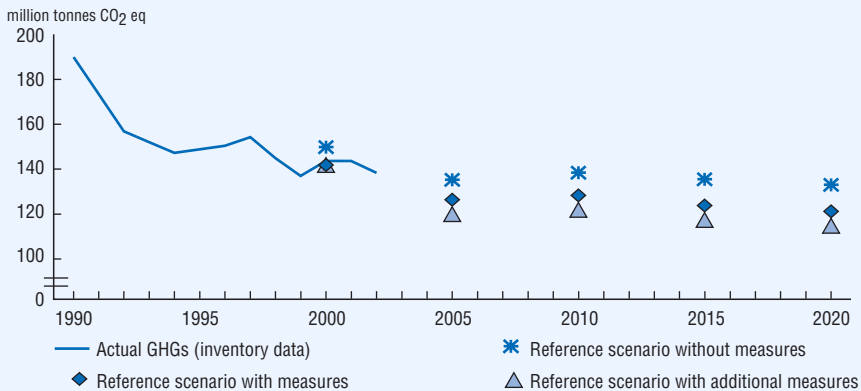
The Czech Republic is aware that ambitious climate change objectives will likely be pursued in the context of post-Kyoto negotiations and EU policy. In anticipation, the national programme outlines three scenarios for 1990-2020, based on different hypotheses regarding economic growth. All three scenarios make the following core assumptions: continued operation of nuclear power stations; no limits on imports of oil, gas or coal; limits on imports of electricity; and maintenance of environmental standards for lignite. Each scenario makes projections for GHG emissions with three variants: i) with measures used to implement legislation on protection of the atmosphere and conversion to gas, ii) without such measures, and iii) with additional measures to reduce GHG emissions.

In all three scenarios, and especially in the reference scenario based on an average annual growth rate of 3.5%, GHG emissions can be significantly reduced relative to their 2001 level only when additional voluntary measures are introduced to *curb energy use* and encourage the use of *renewable energy* sources (Figure 6.1). In this context, the national programme recommends introducing measures to: reduce CO₂ emissions per capita by 30% relative to 2000, continue that trend between 2020 and 2030, and increase the share of renewable energy sources to 6% of primary energy sources in 2010 and 20% in 2030.

The national programme contains a set of policies and measures to reduce GHG emissions and assesses their economic impact. The measures include an *environmental tax on energy use linked to GHG emissions*, and financial incentives,

such as advantageous pricing, to encourage the use of renewable energy sources. The national programme also sets out *adaptation measures* for the sectors most affected by climate change.

Figure 6.1 **GHG emissions, 1990-2020 (reference scenario^a)**



a) The difference between inventory data and projections for 2000 is due to recent inventory recalculations.

Source: CHMI, ENVIROS s.r.o.

2.3 Implementation of flexibility mechanisms

The Czech Republic has undertaken to implement the flexibility mechanisms created by the Kyoto Protocol, focusing on joint implementation and emissions trading. Under the *pilot scheme for joint implementation projects*, a National Reference Centre was created at the Ministry of the Environment. Five pilot projects have been carried out, sometimes under the aegis of multinational firms, the outside investors being France, Germany, the Netherlands and the United States. Following the pilot phase, the Ministry drew up rules for preparing and carrying out projects, in preparation for the general introduction of joint implementation, which began in 2002. The rules defined the scope, the criteria for assessing projects and the processing procedure. However, experience shows that managing such projects can be expensive. Application of the additionality criterion also seems to be a discouraging factor. Moreover, the joint implementation mechanism could interfere with the introduction of emissions trading. In these circumstances, there is some doubt as to how effective this mechanism will be in reducing GHG emissions.

In contrast, the Czech Republic seems to show more interest in *emissions trading* as set forth in Article 17 of the Kyoto Protocol and implemented in the framework of the EU Emissions Trading Directive (2003/87/EC). As a result of the progress made between 1990 and 1994 in reducing and then stabilising GHG emissions, Czech operators could find themselves in the position of sellers on the market for emission allowances established by the European Commission (1 January 2005).

This is the context in which the Czech Republic submitted its *national allocation plan for 2005-07* to the Commission, in September 2004. The plan seems unlikely to encourage the 477 installations concerned to reduce GHG emissions during the first allocation period, as it takes into account the Czech Republic's compliance with the Kyoto Protocol. The plan echoes the position of manufacturers who believe there is no reason to exceed the legal obligations of the Kyoto Protocol, even though GHG emissions have not been reduced since 1994. It is therefore unlikely that the allocation plan will do much to promote the voluntary reduction measures envisaged by the national climate change plan.

The Czech Republic is in an unusual position, as it has substantially reduced its GHG emissions, yet still has high emissions per capita and per unit of GDP. Implementation of the Kyoto Protocol and of the national programme to reduce the impacts of climate change should be accompanied by a significant programme of research on how to reduce GHG emissions in an economically efficient and effective way. In addition, in the international context, the Czech Republic should play an active part in *framing post-Kyoto objectives*.

3. National Strategy for Sustainable Development

The decision to draw up a national sustainable development strategy was taken following the EU's adoption of a Strategy for Sustainable Development (Gothenburg, June 2001) and the conclusions of the Earth Summit (Johannesburg, September 2002). *The Government Council for Sustainable Development* was set up in August 2003 and co-ordinated elaboration of the National Strategy for Sustainable Development (Chapter 4). The fact that the process exists at all is an achievement and evidence of progress in terms of the country's institutional capacity to frame an integrated sustainable development policy.

The *National Strategy for Sustainable Development* was approved by the government in December 2004 (Chapter 4). Steps still need to be taken to ensure that ministries and other institutions with an economic and social brief make an effective contribution. The implementation and monitoring of the strategy should be taken as an opportunity to integrate the policies of the sectors concerned (e.g. environment,

energy, transport, agriculture) and to foster a common approach to the challenges of development.

4. Transboundary Issues

4.1 Transboundary air pollution

Since the late 1970s, the Czech Republic has been *affected by transboundary air pollution* as well as domestic one. The resulting acidification of the atmosphere has contributed to damage to the country's forests, lakes, watercourses, soil, buildings and historic monuments, as well as to human health. Reduced pollution (e.g. in the former GDR, Poland and the Czech Republic) has considerably reduced acid deposition levels.

The Czech Republic has ratified the 1979 CLRTAP and all eight of its protocols covering emissions of SO₂, NO_x, VOCs, ammonia, heavy metals and persistent organic pollutants (POPs). It ratified the protocol on acidification, eutrophication and ground-level ozone in 2004 and introduced the necessary *legislation and programmes* to fulfil its obligations under the convention and its protocols. The most recent integrated programme gives a timetable for activities until 2010, the date set by the Gothenburg protocol for further NO_x reductions (Table 6.2 and Figure 2.1).

In addition to very substantial reductions in SO₂, NO_x and CO emissions, between 1990 and 2003, emissions of heavy metals covered by the 1998 Aarhus protocol were reduced: by 35% for cadmium, 62% for mercury and 79% for lead. POP emissions have also fallen considerably since 1990, by 42% for PCBs, for example. These results show that the Geneva Convention and its protocols have been applied effectively. Nevertheless, in 2003, *emissions of traditional pollutants were still comparatively high*, at 22.2 kg of SO₂ per capita compared with the EU-15 average of 15.0 kg, and 32.3 kg of NO_x per capita compared with the EU-15 average of 24.7 kg. Furthermore, NO_x emissions have not been reduced since 1998, meaning that the Czech Republic is unlikely to comply with the Gothenburg protocol requirements by 2010.

Forests in the Czech Republic are continuously monitored in both an EU and a pan-European framework. Results show that 20 to 25% of trees, whether coniferous or deciduous, have a defoliation rate of more than 25%. The *health of mountain forest ecosystems* is therefore still unsatisfactory in the medium-term, despite the measures taken under the CLRTAP and its protocols.

For this reason, *forest regeneration and soil improvement programmes* have been introduced in addition to pollution prevention measures, under the aegis of the

Reforestation Agency set up in 1994 and supported by the PHARE programme. The programmes cover North-west Bohemia, the Krušné Mountains and the Jizerské Mountains. Planting policy has been changed to take account of ecological requirements: for example, during the review period, new plantings of beech and oak increased, while plantings of spruce fell.

Table 6.2 **Emissions of transboundary atmospheric pollutants: Czech commitments^a and results**

	Protocol		Commitment period	Target (%)	Observation period	Result (%)
SO ₂	Helsinki	(1985)	1980-1993	-30	1980-1993	-37
	Oslo	(1994)	1980-2000	-80	1980-2000	-88
	Gothenburg	(1999)	1990-2010	-44	1990-2002	-87
NO _x	Sofia	(1988)	1987-1994	0	1987-1994	-53
	Gothenburg	(1999)	1990-2010	-56	1990-2002	-43
VOC _s	Gothenburg	(1999)	1990-2010	-54	1990-2002	-54
NH ₃	Gothenburg	(1999)	1990-2010	-6	1990-2002	-46

a) In the framework of the CLRTAP.

Source: EMEP.

4.2 Transboundary watercourses

The Czech Republic is party to the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes, which it ratified in 2000. It includes part of the basins of *three transboundary rivers* and contributes to the implementation of three international conventions created specifically for their conservation and management:

- the *Convention on Co-operation for the Protection and Sustainable Use of the Danube River* came into effect in 1998; the International Commission for Protection of the Danube River approved in 2001 the Joint Action Programme for the Danube River Basin 2001-05 and in 2004 the Action Programme for Sustainable Flood Protection. The Czech Republic is party to the Convention on account of the Morava River, an important tributary of the Danube which discharges into the *Black Sea*. The water quality of the Morava river improved

significantly between 1992 and 2002, reflecting a more general improvement in the quality of Czech watercourses, though the river and its tributaries are mostly ranked in class III (“polluted” water) and still warrant measures to reduce water pollution;

- the *Convention on the International Commission for the Protection of the Elbe* came into effect in 1993. Its aims are to reduce water pollution, re-establish the natural ecosystem and reduce polluting discharges into the *North Sea*. After the 1997 floods, the Elbe Commission made flood prevention and the restoration of ecological balances a priority. A flood action plan was introduced in October 2003. Overall water quality in the Czech part of the basin improved between 1992 and 2002, though many tributaries are still ranked in classes III and IV (“polluted” or “very polluted”);
- the *Convention on the International Commission for the Protection of the Oder against Pollution* came into effect in 1999. Its aims are to reduce pollution in the Oder and the *Baltic Sea*, to guarantee use of the water for human and agricultural needs, to restore aquatic ecosystems and to prevent flooding. Water quality in the Czech part of the Oder river basin has improved considerably in the last ten years.

Since EU enlargement in 2004, the basins covered by the Elbe and Oder river conventions are entirely situated within the EU. Consequently, the 2000 EU *Water Framework Directive* fully applies to management of the basins. The river conventions serve as a framework for implementing the Directive (Box 2.4).

5. Trade, Investment and the Environment

5.1 Protection of the ozone layer (*Montreal Protocol*)

The Czech Republic became a party to the *Montreal Protocol* on 1 January 1993, and the Beijing amendment on control of production of HCFCs and bromochloromethane came into force in the country in 2002. At that time, production and imports of CFCs amounted to 1 430 tonnes per year, compared with 5 510 tonnes per year in 1986. This figure fell to 7 tonnes in 1997 and has since remained stable. Both halon imports and methyl bromide consumption dropped to zero or nearly zero by 2003.

In 2002, the Czech Republic introduced *measures* to control substances that deplete the ozone layer in a new law on protection of the atmosphere, adopted in the context of the country’s imminent admission into the EU. The measures included: introducing a system for recovering used ozone-depleting substances, especially from

discarded refrigerators (the State Environmental Fund) allocated USD 2 million to this scheme in 2001-03); increasing the amount of substances destroyed; reducing leaks of the substances from plants in use; and increasing the recovery of halons. Industry has invested in this programme and is now exporting its know-how, including in the framework of regional co-operation on public funds.

The Czech Republic also plays an active role in the institutions of the 1985 Vienna Convention and the Montreal Protocol. It hosted the Conference of the Parties to the Montreal Protocol in November 2004, and the Environmental Inspectorate has been asked to be on the alert for illegal traffic in the substances concerned. Implementation of the Montreal Protocol in the Czech Republic has been a *definite success*, with a positive alliance between action to protect a common good (the ozone layer) and the promotion of advanced technologies in industry.

5.2 Trade in endangered species (CITES)

The Czech Republic has transposed the criminal provisions of CITES into its Penal Code, but an *illegal trade in endangered species* seems nevertheless to have developed which the law enforcement agencies have not been able to suppress. The Environmental Inspectorate and the Customs Service have co-operated in stepping up border and market controls, but without any material results. It is clear that stopping the trade in endangered species will depend first and foremost on the *mobilisation of agencies responsible* for prosecuting offenders.

5.3 Movements of hazardous waste (Basel Convention)

According to its most recent report, the Czech Republic has fully complied with its obligations under the Basel Convention, including the *ban on exports to non-OECD countries*. It has transposed the provisions of the convention into national law and has introduced a Waste Management Plan for 2003-13 which covers the management of hazardous waste as well as the principles for decision making in relation to waste imports and exports.

The Basel Convention covers not only the movement of hazardous waste but also, in Article 4, the minimisation of waste production. The Czech Republic has made progress in this area, reducing the production of hazardous waste by one third between 1999 and 2003, from 3.0 to 1.9 million tonnes. However, the level remains high both in absolute terms and in comparison to the European averages per capita and per unit of GDP. *Statistical monitoring of hazardous waste and controls of movements* are due to be stepped up under the Waste Management Plan.

5.4 Foreign direct investment

Total annual foreign direct investment (FDI) to the Czech Republic has reached 9 to 12% of GDP in the last few years, the highest rates within the OECD (Box 6.1, Table 6.3).

6. Official Aid

6.1 Czech Republic as donor

Although the Czech Republic is not yet a DAC member, it rapidly restructured its *official aid policy* when it became an OECD member in 1995, bringing its principles into line with those of other OECD donor countries and increasing the amount of aid. In March 2004, the government adopted a set of principles for its development assistance and reduced the list of eligible countries to ten. Total official assistance (all ministries) amounted to CZK 2.75 billion in 2004, or 0.11% of GDP, of course still a long way from the UN rate of 0.7%.

Promoting sustainable development and its environmental pillar has become one component of *Czech aid policy*. From 1997 to 2004, the Ministry of the Environment

Table 6.3 **Direct investment flows**
(USD billion)

	Outflows				Inflows				Net inflows ^a
	2000	2001	2002 ^b	2003 ^c	2000	2001	2002 ^b	2003 ^c	
Czech Republic	0.0	0.2	0.2	0.2	5.0	5.6	8.5	2.6	36.7
United States	159.2	120.0	134.8	173.8	321.3	167.0	72.4	39.9	18.7
Korea	5.0	2.4	2.6	3.4	9.3	3.5	2.4	3.2	3.4
Austria	5.7	3.1	5.3	7.1	8.8	5.9	1.0	6.9	7.6
France	177.5	86.8	49.5	57.3	43.3	50.5	48.9	47.0	-301.0
Slovak Republic	0.0	0.1	0.0	0.0	2.4	1.6	4.1	0.6	10.9
Spain	54.7	33.1	31.5	23.4	37.5	28.0	35.9	25.6	-46.7

a) Cumulative FDI flows 1994-2003.

b) Preliminary.

c) Estimate.

Source: OECD, Environment Directorate.

Box 6.1 Foreign direct investment, export credits, and the environment

Total annual foreign direct investment (*FDI*) inflows have reached 9 to 12% of GDP in the Czech Republic in the last few years. In 2003, when privatisation receipts were low, they reached 3.03% of GDP, still *among the highest rates within the OECD*. The accumulated net inflows reached USD 36.7 billion during 1994–2003. One-third of the FDI comes from Germany, followed by the Netherlands and Austria. The manufacturing sectors that receive the largest share of total FDI include machinery and equipment, basic metals and metal products, and refined petroleum and chemicals. Foreign investors are currently moving toward higher value-added FDI projects in the service sector, which is less capital intensive.

The high level of FDI inflow is a result of the Czech authorities' positive investment promotion measures as well as the country's well-educated and relatively cheap workforce and its geographic location. The Czech supplier development programme (1999) has also helped to attract foreign investors. The *Act on Investment Incentives* No. 72/2000 offers investors who introduce or expand production a variety of incentives, including corporate tax relief, job creation grants, and training and re-training grants. Enacted in 2004, The Act on Public Procurement removed provisions that gave preferential treatment to domestic companies. The Framework Programme for support of technology centres and business support services, launched in 2004, aims to attract FDI in high value-added sectors. The privatisation of remaining government stakes in State-owned enterprises is expected to attract significant amounts of FDI and the major inflow of greenfield projects is expected to continue.

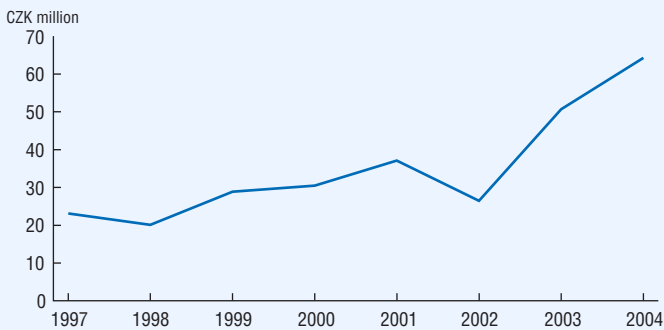
It is important that national environmental regulations be fully applied to foreign investors, without exemptions or subsidies. The Czech Republic indicated its intention to do so when it joined other OECD countries in endorsing the revised *OECD Guidelines for Multinational Enterprises*, which make non-binding recommendations on responsible business conduct, including environmental management.

On the OECD's recommendation, the Czech Republic has introduced legislation requiring public bodies that support exports (Foreign Trade Bank and insurance credit organisations) to apply procedures enabling them to assess the potential environmental impact of the exports they support. These procedures are now systematically applied and are in line with the OECD Council Recommendation on Common Approaches on Environment and Officially Supported *Export Credits*.

supported 53 projects in 32 countries at a total cost of CZK 276 million (Figure 6.2). The priorities were: implementation of multilateral environmental agreements, inclusion of environmental concerns into industrial activities, sustainable use of natural resources, environmental geology, and clean-up of contaminated sites.

Concerning multilateral environmental aid, in 1994 the Czech Republic became a donor country to the Global Environment Facility (of which it has also been a beneficiary), allocating SDR 1 million a year. Projects supported by the Czech Republic include those relating to protection of the ozone layer. Between 1991 and 2005, the government contributed USD 5.8 million to the Multilateral Fund for the Implementation of the Montreal Protocol.

Figure 6.2 Official aid provided through the Ministry of the Environment



Source: Ministry of the Environment.

6.2 Czech Republic as recipient

The *official aid* received by the Czech Republic from DAC donor countries has been increasing from USD 8 million to USD 882 million during the review period. In 2002, its environmental share was about 15%. However, in the same years, official aid from DAC donor countries was some 25 times smaller than direct EC aid.

Selected sources

The government documents, OECD documents and other documents used as sources for this chapter included the following. Also see list of Web sites at the end of this report.

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- 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. Abbreviations
- IV. Physical context
- V. Selected environmental events (1998-2005)
- VI. Selected environmental Web sites

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	9629	378	99	7713	270	84	31	79	43	338	
Major protected areas (% of total area)	2	8.7	9.2	25.1	17.0	7.1	18.5	32.4	28.0	3.4	15.8	11.1	9.1
Nitrogenous fertiliser use (t/km ² of arable land)		4.0	4.3	6.1	9.6	19.2	1.9	57.2	8.0	17.8	8.7	8.8	6.3
Pesticide use (t/km ² of arable land)		0.10	0.14	0.18	1.36	1.47	0.07	0.63	0.21	1.11	0.13	0.13	0.06
FOREST													
Forest area (% of land area)		45.3	33.9	32.6	68.9	63.8	21.4	34.7	41.6	22.4	34.1	12.7	75.5
Use of forest resources (harvest/growth)		0.4	0.2	0.6	0.4	0.1	0.6	..	0.7	0.9	0.7	0.7	0.7
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)		33.7	33.2	18.8	24.0	17.0	27.0	15.2	22.0	26.5	18.9	22.0	11.9
Birds (% of species known)		13.6	16.9	11.6	12.9	14.1	13.0	27.7	26.0	12.8	49.5	14.5	13.3
Fish (% of species known)		7.6	23.7	14.4	25.3	1.3	0.8	8.9	41.7	51.2	40.0	15.8	11.8
WATER													
Water withdrawal (% of gross annual availability)		1.5	15.5	19.2	20.3	35.6	6.2	..	4.2	45.1	11.9	4.4	2.1
Public waste water treatment (% of population served)		72	25	71	64	78	..	80	86	38	70	89	81
Fish catches (% of world catches)		1.1	1.5	5.4	5.1	2.2	0.2	0.6	-	-	-	1.6	0.2
AIR													
Emissions of sulphur oxides (kg/cap.)		76.2	12.2	49.4	6.7	20.4	142.6	17.2	4.4	14.8	22.2	4.5	16.4
(kg/1000 USD GDP)	4	2.6	1.5	1.4	0.3	1.3	5.4	0.8	0.2	0.6	1.5	0.2	0.6
change (1990-early 2000s)		-27	..	-31	-14	-41	71	10	-55	-57	-88	-86	-64
Emissions of nitrogen oxides (kg/cap.)		78.3	12.0	63.9	15.8	24.4	86.0	51.8	24.5	28.2	32.3	35.5	40.5
(kg/1000 USD GDP)	4	2.6	1.4	1.8	0.6	1.6	3.2	2.4	0.9	1.1	2.2	1.2	1.6
change (1990-early 2000s)		-6	18	-19	-2	23	20	48	-3	-20	-40	-31	-32
Emissions of carbon dioxide (t./cap.)	5	16.2	3.8	19.8	9.2	9.9	17.0	8.4	8.3	11.1	11.8	9.5	12.6
(t./1000 USD GDP)	4	0.54	0.43	0.57	0.36	0.54	0.64	0.40	0.30	0.42	0.82	0.33	0.48
% change (1990-2002)		20	28	18	12	99	28	42	16	7	-20	3	22
WASTE GENERATED													
Industrial waste (kg/1000 USD GDP)	4, 6	..	50	..	40	50	..	10	70	50	50	20	130
Municipal waste (kg/cap.)	7	350	320	730	410	380	690	400	510	480	280	660	480
Nuclear waste (t./Mtoe of TPES)	8	4.9	0.1	0.9	1.8	2.8	-	-	-	1.9	0.9	-	1.9

.. 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) IUCN management categories I-VI and protected areas without IUCN category assignment; national classifications may differ.

3) Total imports of cork and wood from non-OECD tropical countries.

4) GDP at 2000 prices and purchasing power parities.

Source: OECD Environmental Data Compendium.

OECD EPR / SECOND CYCLE

FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	SLO	ESP	SWE	CHE	TUR	UKD*	OECD*
549	357	132	93	103	70	301	3	42	324	313	92	49	506	450	41	779	245	35042
13.3	31.5	5.2	8.9	9.5	1.2	19.0	17.1	18.9	6.4	29.0	8.5	25.2	9.5	9.5	28.7	4.3	30.1	16.4
12.3	14.9	6.6	7.6	7.9	33.4	8.1	x	27.3	11.4	5.8	4.1	5.6	6.0	7.0	12.1	4.6	20.0	6.3
0.44	0.25	0.31	0.17	-	0.20	0.79	0.67	0.77	0.09	0.07	0.63	0.25	0.23	0.06	0.35	0.09	0.58	0.21
31.6	30.2	22.8	19.5	1.3	9.4	23.3	34.5	9.5	39.2	30.0	36.9	41.6	33.3	73.5	30.8	27.0	11.6	34.4
0.6	0.5	0.6	0.5	-	0.7	0.5	0.5	0.6	0.5	0.6	0.8	0.5	0.5	0.7	0.8	0.5	0.6	0.6
6.8	1.8	2.8	0.1	2.8	11.2	7.1	-	15.6	3.6	0.3	17.6	0.1	6.2	2.2	0.6	0.5	2.7	4.0
19.0	41.8	36.4	71.1	-	6.5	40.7	51.6	15.6	3.4	15.7	17.7	22.2	26.3	22.4	33.8	22.2	21.9	..
19.2	29.2	13.0	18.8	42.7	21.8	18.4	50.0	26.2	7.7	14.5	13.7	14.4	25.5	19.1	42.6	6.7	14.2	..
7.6	31.3	24.3	32.1	-	33.3	29.0	27.9	31.1	-	14.5	22.9	24.1	52.9	16.4	44.7	9.9	11.1	..
17.5	20.2	12.1	4.7	0.1	..	32.1	3.7	9.9	0.7	18.6	15.1	1.4	34.7	1.5	4.8	17.0	20.8	11.5
79	93	56	32	33	73	63	95	98	73	55	42	53	55	86	96	17	95	64
0.7	0.2	0.1	-	2.1	0.4	0.3	-	0.6	2.9	0.2	0.2	-	1.2	0.3	-	0.6	0.8	28.6
9.0	7.4	47.7	35.3	35.0	24.6	11.4	6.8	5.3	4.9	37.7	28.4	19.0	38.0	6.5	2.6	31.3	16.6	28.4
0.3	0.3	2.7	2.8	1.3	0.8	0.5	0.1	0.2	0.1	3.6	1.6	1.6	1.8	0.2	0.1	4.7	0.7	1.2
-60	-89	4	-64	22	-48	-63	-80	-58	-58	-55	-9	-81	-29	-45	-58	33	-73	-40
22.7	17.2	29.8	17.7	90.5	31.1	21.8	38.3	26.7	46.9	20.6	27.8	19.0	35.3	27.1	12.4	14.1	26.3	34.3
0.9	0.7	1.7	1.4	3.2	1.0	0.9	0.8	1.0	1.3	2.0	1.6	1.6	1.7	1.0	0.4	2.1	1.0	1.4
-29	-48	11	-24	-2	5	-34	-27	-28	-5	-38	13	-53	14	-25	-46	48	-43	-17
6.2	10.3	8.2	5.5	7.7	10.9	7.4	20.9	11.0	7.8	7.6	6.1	7.2	7.5	5.8	5.9	2.8	8.8	11.0
0.23	0.41	0.46	0.43	0.28	0.35	0.30	0.43	0.41	0.21	0.72	0.35	0.62	0.36	0.21	0.20	0.43	0.34	0.45
1	-12	27	-17	11	32	8	-11	13	25	-17	58	-30	43	6	-	40	-7	13
70	20	40	20	1	60	30	120	40	20	150	70	40	30	90	10	30	30	60
540	590	440	460	730	700	510	650	620	620	270	440	320	650	470	660	370	580	550
4.3	1.2	-	1.8	-	-	-	-	0.2	-	-	-	3.2	1.1	4.5	2.4	-	5.1	1.6

UKD: pesticides and threatened species: Great Britain; water withdrawal and public waste water treatment plants: England and Wales.

5) CO₂ 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.

I.B: SELECTED ECONOMIC DATA (1)

	CAN	MEX	USA	JPN	KOR	AUS	NZL	AUT	BEL	CZE	DNK	
GROSS DOMESTIC PRODUCT												
GDP, 2003 (billion USD at 2000 prices and PPPs)	949	905	10398	3377	906	540	86	230	272	152	155	
% change (1990-2003)	42.8	43.1	46.2	18.7	103.6	54.2	45.3	30.2	26.8	9.5	29.7	
per capita, 2003 (1000 USD/cap.)	30.0	8.8	35.7	26.5	18.9	27.2	21.5	28.5	26.2	14.9	28.7	
Exports, 2003 (% of GDP)	37.8	28.4	9.5	11.8	38.1	18.1	29.8	51.8	82.1	66.0	43.5	
INDUSTRY 2												
Value added in industry (% of GDP)	32	27	23	31	43	26	25	32	27	40	27	
Industrial production: % change (1990-2003)	42.3	42.2	43.4	-3.2	164.7	29.8	26.9	53.2	17.6	3.0	36.1	
AGRICULTURE												
Value added in agriculture (% of GDP)	3	3	4	2	1	4	4	7	2	1	4	3
Agricultural production: % change (1990-2002)	9.7	34.7	18.5	-9.8	32.7	10.7	35.2	6.5	20.2	..	2.2	
Livestock population, 2003 (million head of sheep eq.)	108	281	786	54	27	272	99	17	27	13	25	
ENERGY												
Total supply, 2003 (Mtoe)	248	166	2291	514	209	116	18	32	58	44	20	
% change (1990-2003)	18.8	33.9	18.9	15.4	125.3	32.3	30.1	26.0	19.8	-7.8	16.5	
Energy intensity, 2003 (toe/1000 USD GDP)	0.26	0.18	0.22	0.15	0.23	0.21	0.21	0.14	0.21	0.29	0.13	
% change (1990-2003)	-16.8	-6.5	-18.7	-2.8	10.7	-14.2	-10.5	-3.2	-5.5	-15.8	-10.1	
Structure of energy supply, 2003 (%)	4											
Solid fuels	11.9	5.1	23.7	20.0	22.3	42.6	9.5	12.4	11.0	46.1	27.2	
Oil	36.0	57.5	40.4	50.0	49.2	31.4	38.8	42.9	42.9	19.5	38.1	
Gas	28.1	26.7	22.6	13.8	10.5	18.5	21.6	24.1	23.0	17.4	21.9	
Nuclear	7.8	1.6	8.9	12.7	16.2	-	-	-	21.4	15.0	-	
Hydro, etc.	16.2	9.1	4.4	3.6	1.8	7.5	30.1	20.6	1.8	2.1	12.7	
ROAD TRANSPORT 5												
Road traffic volumes per capita, 2002 (1000 veh.-km/cap.)	10.1	0.7	15.9	6.2	2.3	9.8	10.7	8.3	8.8	4.4	9.0	
Road vehicle stock, 2002 (10 000 vehicles)	1891	1953	23457	7226	1395	1280	265	542	539	402	246	
% change (1990-2002)	14.2	97.7	24.2	27.9	310.9	30.9	43.6	46.8	26.5	54.9	26.8	
per capita (veh./100 inh.)	60	19	81	57	29	65	67	67	52	39	46	

.. 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.

OECD EPR / SECOND CYCLE

FIN	FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	SLO	ESP	SWE	CHE	TUR	UKD	OECD
138	1592	2061	198	134	8	123	1461	22	433	168	418	177	65	872	247	216	480	1576	28357
26.8	25.2	22.1	41.8	19.5	37.7	131.2	20.1	78.3	34.2	50.6	52.0	32.7	23.5	39.9	27.4	11.8	50.1	34.5	36.6
26.5	26.6	25.0	17.9	13.3	28.8	31.0	25.1	49.0	26.7	36.8	10.9	16.9	12.1	20.8	27.6	29.4	6.8	26.1	24.6
37.0	25.9	35.7	20.2	61.8	35.3	82.9	25.4	142.5	61.3	41.2	33.9	30.7	78.0	27.9	43.9	43.7	27.4	25.1	21.9
32	25	30	23	31	27	42	29	20	26	38	30	29	32	30	28	27	31	26	29
71.3	13.4	9.7	11.7	67.4	..	302.4	11.8	39.3	16.5	33.6	81.5	17.7	10.9	24.1	45.0	19.4	65.9	9.0	26.2
4	3	1	7	4	9	3	3	1	3	2	3	4	5	3	2	1	12	1	3
-9.9	5.4	-5.9	13.6	-22.6	9.5	4.1	5.3	x	-4.9	-14.3	-14.3	0.7	..	15.0	-10.4	-6.0	12.9	-7.9	..
8	157	121	20	13	1	53	67	x	42	7	57	19	5	98	13	12	111	114	2630
37	270	345	30	26	3	15	181	4	80	24	92	26	18	135	50	27	80	229	5391
27.2	18.9	-3.1	34.8	-8.6	55.3	38.5	18.4	18.7	20.5	10.9	-7.5	44.8	-15.1	48.2	7.2	7.7	51.6	8.2	19.1
0.27	0.17	0.17	0.15	0.19	0.40	0.12	0.12	0.19	0.19	0.14	0.22	0.15	0.28	0.16	0.20	0.13	0.17	0.15	0.19
0.3	-5.0	-20.7	-4.9	-23.5	12.8	-40.1	-1.4	-33.4	-10.2	-26.4	-39.1	9.1	-31.3	6.0	-15.8	-3.7	0.9	-19.6	-12.8
22.4	5.0	24.6	30.0	14.9	2.9	16.8	8.4	2.0	10.9	3.4	59.8	12.9	24.4	14.5	5.3	0.5	27.9	16.7	20.6
28.6	33.1	36.1	57.8	25.3	23.8	56.3	49.5	69.6	40.0	29.7	23.1	59.9	15.9	51.1	31.3	46.0	37.6	34.4	40.9
11.1	13.9	22.9	6.8	46.6	-	25.1	35.7	27.0	45.9	21.5	12.1	10.4	31.0	15.7	1.6	9.6	22.1	37.4	21.8
16.1	41.7	12.5	-	11.3	-	-	-	-	1.3	-	-	-	25.3	11.9	35.1	26.2	-	10.1	10.8
21.7	6.3	3.9	5.4	2.0	73.4	1.8	6.4	1.4	1.9	45.4	5.0	16.9	3.4	6.7	26.7	17.6	12.4	1.4	5.9
9.4	8.7	7.2	7.5	2.3	10.4	8.5	8.3	9.0	7.1	7.5	3.6	6.3	2.4	4.5	8.6	7.9	0.8	8.0	8.2
254	3514	4728	480	314	18	171	3768	34	778	237	1328	514	148	2288	447	401	624	3135	62375
13.7	23.5	26.7	90.3	..	37.1	79.9	26.0	55.8	35.9	21.7	107.5	133.8	50.3	58.4	13.8	23.3	164.3	24.3	32.8
49	59	57	44	31	64	44	65	77	48	52	35	49	27	56	50	55	9	52	54

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

4) Breakdown excludes electricity trade.

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

I.C: SELECTED SOCIAL DATA (1)

	CAN	MEX	USA	JPN	KOR	AUS	NZL	AUT	BEL	CZE	DNK	
POPULATION												
Total population, 2003 (100 000 inh.)	316	1027	2910	1276	479	199	40	81	104	102	54	
% change (1990-2003)	14.2	26.4	16.4	3.4	11.8	16.5	19.2	4.5	4.1	-1.5	4.8	
Population density, 2003 (inh./km ²)	3.2	52.5	30.2	337.8	482.8	2.6	14.8	96.2	339.8	129.4	125.0	
Ageing index, 2003 (over 64/under 15)	70.2	18.8	59.1	135.8	40.8	64.0	54.0	93.7	97.2	90.4	79.1	
HEALTH												
Women life expectancy at birth, 2002 (years)	82.2	77.4	79.8	85.2	80.0	82.6	80.9	81.7	81.1	78.7	79.5	
Infant mortality, 2002 (deaths /1 000 live births)	5.2	20.1	6.8	3.0	6.2	5.0	6.3	4.1	4.9	4.2	4.4	
Expenditure, 2002 (% of GDP)	9.6	6.1	14.6	7.8	5.9	9.1	8.5	7.7	9.1	7.4	8.8	
INCOME AND POVERTY												
GDP per capita, 2003 (1000 USD/cap.)	30.0	8.8	35.7	26.5	18.9	27.2	21.5	28.5	26.2	14.9	28.7	
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	32.7	25.2	57.7	46.3	x	49.2	32.3	x
EMPLOYMENT												
Unemployment rate, 2003 (% of total labour force)	7.6	3.3	6.0	5.3	3.4	5.9	4.7	5.7	8.1	7.8	5.6	
Labour force participation rate, 2003 (% 15-64 years)	79.4	55.5	76.0	77.5	66.9	76.1	76.5	78.8	66.9	70.9	80.3	
Employment in agriculture, 2003 (%)	4	2.8	16.3	1.7	4.6	8.8	4.0	8.2	5.6	2.2	4.5	3.1
EDUCATION												
Education, 2002 (% 25-64 years)	5	82.6	12.6	87.3	83.7	70.8	60.9	76.2	77.9	60.8	87.9	80.0
Expenditure, 2001 (% of GDP)	6	6.1	5.9	7.3	4.6	8.2	6.0	5.8	5.8	6.4	4.6	7.1
OFFICIAL DEVELOPMENT ASSISTANCE												
ODA, 2003 (% of GNI)	7	0.24	..	0.15	0.20	..	0.25	0.23	0.20	0.60	..	0.84
ODA, 2003 (USD/cap.)	64	..	56	70	..	61	41	63	179	..	325	

.. 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.

OECD EPR / SECOND CYCLE

FIN	FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	SLO	ESP	SWE	CHE	TUR	UKD	OECD
52	598	825	110	101	3	40	581	5	162	46	382	104	54	419	90	73	707	605	11545
4.6	5.4	4.0	9.4	-2.4	13.5	12.8	2.4	17.5	8.5	7.6	0.2	5.8	1.5	7.8	4.7	9.4	25.9	5.1	10.8
15.4	108.8	231.1	83.6	108.8	2.8	56.2	192.8	174.6	390.7	14.1	122.2	113.6	109.7	82.8	19.9	177.9	90.7	247.0	32.9
87.2	87.1	126.6	111.9	94.5	51.5	53.0	126.2	74.6	74.2	74.1	73.4	102.0	62.2	116.3	95.8	98.9	19.0	82.3	68.5
81.5	82.9	81.3	80.7	76.7	82.3	80.3	82.9	81.5	80.7	81.5	78.7	80.5	77.8	83.1	82.1	83.0	71.0	80.4	..
3.0	4.1	4.3	5.9	7.2	2.2	5.1	4.7	5.1	5.0	3.9	7.5	5.0	7.6	3.4	2.8	4.5	38.3	5.3	..
7.3	9.7	10.9	9.5	7.8	9.9	7.3	8.5	6.2	9.1	9.1	6.1	9.3	5.7	7.6	9.2	11.2	6.6	7.7	..
26.5	26.6	25.0	17.9	13.3	28.8	31.0	25.1	49.0	26.7	36.8	10.9	16.9	12.1	20.8	27.6	29.4	6.8	26.1	24.6
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	37.2	x	55.8	x	48.9	47.1	x	35.5	38.2	..	31.8	x	x	..	41.7	..
9.1	9.7	8.7	9.5	5.9	3.3	4.7	8.8	3.8	3.5	4.5	19.6	6.4	17.4	11.3	4.9	4.0	10.5	5.0	7.1
74.4	70.2	75.9	64.8	60.1	86.1	69.9	61.7	67.0	67.2	80.2	62.9	76.0	69.8	69.0	76.5	87.6	51.8	76.2	71.1
5.1	3.6	2.5	16.5	5.5	7.3	6.4	4.9	1.3	3.0	3.7	18.4	12.7	5.8	5.7	2.1	4.1	33.9	1.2	6.2
74.8	64.8	83.0	50.5	71.4	59.0	60.3	44.4	56.6	66.5	86.3	47.0	20.4	85.9	41.3	81.6	82.4	25.2	64.3	64.9
5.8	6.0	5.3	4.1	5.2	6.7	4.5	5.3	3.6	4.9	6.4	5.2	5.9	4.1	4.9	6.5	5.7	3.5	5.5	5.6
0.35	0.41	0.28	0.21	..	..	0.39	0.17	0.81	0.80	0.92	..	0.22	..	0.23	0.79	0.39	..	0.34	0.25
107	121	82	33	..	..	127	42	429	245	447	..	31	..	47	268	177	..	104	79

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.

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	D	R	R	R
1949	Geneva	Conv. - Road traffic	Y	R		R	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	Y				
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	D	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 (replaces the 1971 Convention)	Y	R	R	R	
2000	London	Amendment to protocol (limits of compensation)	Y	R	R	R	
2003	London	Protocol (supplementary fund)					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	

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	SVK	ESP	SWE	CHE	TUR	UKD	EU	
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
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	
D			D	D	D	D	D	D			R	S			D	D	R	R	R	R	R	D	R	R	D		
R			R			S		S							R		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	R	R	R	R	R	
S			S			S					S				R			R									
			R					R									R		R	S					S		
			S	R	R	R	S	R	R	R			R		R	R	R	R	S	R	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	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	
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	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	R	D	D	D	R	D	D	D	D	D	D	D	D	D	
R	R		R	R	R	R	R	R	R		R	D	R	R	R	R	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	R	R	R	R	R	R	R	R	R	
D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	R	D	D	D	D	D	D	D	D	
R			R	R	R	R	R	R	R	R	D	R			R	R	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	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	R	R	
			R	R	S	R	S	R	R		R	R			S	R			R	R	R				R		

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

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

		CAN	MEX	USA	JPN
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 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		Y 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 R
1978	London	Annex IV		Y	R
1978	London	Annex V		Y	R R R
1997	London	Annex VI		Y	S
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	
2001	Canberra	Agreem. - Conservation of albatrosses and petrels (ACAP)		Y	
1982	Montego Bay	Conv. - Law of the sea		Y R	R R
1994	New York	Agreem. - relating to the implementation of part XI of the convention		Y R	R 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 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	R R
1999	Beijing	Amendment to protocol		Y R	R 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 R	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			

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	SVK	ESP	SWE	CHE	TUR	UKD	EU
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
R	R	R	R		R	R	R	R	R	R	R	R	R	R		R	R	R	R	R		R	R		R	R
R	R		R		R	R	R		R		R					R		R				R				R
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	R			R	R	R	R		R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	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	R	D	R		R			R	R	R			R	D	R	R	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	R	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
R	R		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					R	R	R		R
					R	R	R	R	R	R	R	R		R			R		R	R	R	R	R			R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
R	R	R	R	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
					S	R	R	R	R	R	R	R		R	R	R	R	R	R	R	R	R	R	R	R	R
					R	R											R		R	R	R	R	R		R	
					S	R	R	R	R	S	R			R		R	R					R	R	R	R	S
					R	R			S													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	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
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	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	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	

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

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

		CAN	MEX	USA	JPN	
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
2000	London	Protocol - Pollution incidents by hazardous and noxious substances (OPRC-HNS)				
1992	Rio de Janeiro	Conv. - Biological diversity	Y	R	R	S
2000	Montreal	Prot. - Biosafety (Cartagena)	Y	S	R	R
1992	New York	Conv. - Framework convention on climate change	Y	R	R	R
1997	Kyoto	Protocol	Y	R	R	S
1993	Paris	Conv. - Prohibition of the development, production, stockpiling and use of chemical weapons and their destruction	Y	R	R	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	Y	R	R	R
1994	Vienna	Conv. - Nuclear safety	Y	R	R	R
1994	Paris	Conv. - Combat desertification in those countries experiencing serious drought and/or desertification, particularly in Africa	Y	R	R	R
1996	London	Conv. - Liability and compensation for damage in connection with the carriage of hazardous and noxious substances by sea (HNS)			S	
2000	London	Protocol - Pollution incidents by hazardous and noxious substances (OPRC-HNS)				
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		R
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)	Y	R		S
2001	London	Conv. - Civil liability for bunker oil pollution damage				S
2001	London	Conv. - Control of harmful anti-fouling systems on ships				S
2001	Stockholm	Conv. - Persistent organic pollutants	Y	R	R	S

Source: IUCN; OECD.

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	SVK	ESP	SWE	CHE	TUR	UKD	EU	
	R	R		R		R	S	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	R	R		R		
						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	R	R	R	R	R	R
S		S	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	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		R	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	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
						S	S		S							S	S					S			S		
							S	S	S	S	R					R		R				R					
	S				S									S													
R	R		R	R	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					
R	R	R	R	R	R	R	R	R	R	R	R	R		R	R	R	R		S		R	R	R	S	R	R	
														S								R	S				
	S					R	S									R	R					R	R				
S	R	R	R	S	R	R	R	R	R	S	S	R	S	S	R	R	R	S	R	R	R	R	R	S	S	S	

II.B: SELECTED MULTILATERAL AGREEMENTS (REGIONAL)

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

		CAN	MEX	USA	JPN
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	R
1958	Bucharest	Conv. - Fishing in the waters of the Danube		Y	
1959	Washington	Treaty - Antarctic		Y R	R R
1991	Madrid	Protocol to the Antarctic treaty (environmental protection)		Y R	R R
1960	Paris	Conv. - Third party liability in the field of nuclear energy		Y	
1963	Brussels	Supplementary convention		Y	
1964	Paris	Additional protocol to the convention		Y	
1964	Paris	Additional protocol to the supplementary convention		Y	
1982	Brussels	Protocol amending the convention		Y	
1982	Brussels	Protocol amending the supplementary convention		Y	
1988	Vienna	Joint protocol relating to the application of the Vienna Convention and the Paris Convention		Y	
1968	Paris	Conv. - Protection of animals during international transport		Y	
1979	Strasbourg	Protocol		Y	
1969	London	Conv. - Protection of the archaeological heritage		Y	
1979	Bern	Conv. - Conservation of European wildlife and natural habitats		Y	
1979	Lima	Conv. - Conservation and management of the Vicuña		Y	
1979	Geneva	Conv. - Long-range transboundary air pollution (CLRTAP)		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)		Y R	R
1998	Aarhus	Protocol (persistent organic pollutants)		Y R	S
1999	Gothenburg	Protocol (abate acidification, eutrophication and ground-level ozone)		Y S	R
1980	Madrid	Conv. - Transfrontier co-operation between territorial communities or authorities		Y	
1995	Strasbourg	Additional protocol		Y	
1998	Strasbourg	Second protocol		Y	

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

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

		CAN	MEX	USA	JPN
1980 Bern	Conv. - International carriage of dangerous goods by train (COTIF)			Y	
1989	Agreem. - Co-operation in environmental protection				
1991 Espoo	Conv. - Environmental impact assessment in a transboundary context		Y	R	S
2001 Sofia	Amendment				
2003 Kiev	Prot.- strategic environmental assessment				
1992 Helsinki	Conv. - Transboundary effects of industrial accidents		Y	S	S
2003 Kiev	Prot. - Civil liability and compensation for damage caused by the transboundary effects of industrial accidents on transboundary waters				
1992 Helsinki	Conv. - Protection and use of transboundary water courses and international lakes			Y	
1999 London	Prot. - Water and health				
2003 Kiev	Prot. - Civil liability and compensation for damage caused by the transboundary effects of industrial accidents on transboundary waters				
1992 La Valette	European Conv. - Protection of the archaeological heritage (revised)			Y	
1994 Lisbon	Treaty - Energy Charter			Y	R
1994 Lisbon	Protocol (energy efficiency and related environmental aspects)			Y	R
1994 Sofia	Conv. - Co-operation for the protection and sust. use of the Danube river				
1990 Magdeburg	Agreem.-International commission for the protection of the Elbe river				
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	
2003 Kiev	Prot. - Pollutant Release and Transfer Registers (PRTR)				
1998 Strasbourg	Conv. - Protection of the environment through criminal law				
2000 Florence	Conv. - European landscape convention			Y	
2000 Geneva	Agreem. - International carriage of dangerous goods by inland waterways (AND)				
2003 Kiev	Conv. - Framework Convention on the Protection and Sustainable Development of the Carpathians				

Source: IUCN; OECD.

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	SVK	ESP	SWE	CHE	TUR	UKD	EU
	R	R	R	R	R	R	R	R	R	R	R		R	R	R	R	R	R	R	R	R	R	R	R	R	R
			S					S									S									
	R	R	R	R	R	R	R	R	R	R	S	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
								R						R											R	
S			S	S	S	S	S	S	S	S	S		S	S	S	S	S	S	S	S	S	S	S		S	
	R	S	R	R	R	R	R	R	R	R				R	R	S	R	R	S	R	R	R	R	R	R	
	S	S		S	S			S	S					S		S	S	S				S			S	
	R	R	R	R	R	R	R	R	R	R				R	R	R	R	R	R	R	R	R	R	R	R	
			R	R	S	S	S	S	S	R	S			S	R	S	R	S	S	R	S	S	S	S	S	
	S	S		S	S			S	S					S		S	S	S				S			S	
			S	R	S	R	R	R	S	R			R	S	S	S	R	R	R	R	S	R	R	R	R	
S	R	R	R	R	R	R	R	R	R	R	S		S	R	R	R	R	S	R	R	R	R	R	R	R	
S	R	R	R	R	R	R	R	R	R	R	S		S	R	R	R	R	S	R	R	R	R	R	R	R	
	S		R					S		R															R	
			R					R																	R	
			S					S																	R	
			R					S																	R	
	S	R	R	R	R	R	S	S	R	S	S	S	R	S	S	R	R	R		S	S	S		S	S	
	S	S	S	S	S	S	S	S	S					S	S	S	S	S	S	S	S	S	S	S	S	
	S	S		S	S	S	S	S		S				S	S								S		S	
	R	R	R	S	S			S					R	S	S		R	R	R	S	S	S	S	R		
	S			S	S			R					S	S	R						S					
			S					S													S				S	

Reference III

ABBREVIATIONS

AOX	Absorbable organically bound halogens
ANCLP	Agency for Nature Conservation and Landscape Protection
BAT	Best available technology
BOD	Biochemical oxygen demand
CFC	Chlorofluorocarbon
CGS	Czech Geological Survey
CITES	Convention on International Trade in Endangered Species of wild fauna and flora
CLRTAP	Convention on Long-range Transboundary Air Pollution
CMEA	Council for Mutual Economic Assistance
COD	Chemical oxygen demand
CSO	Czech Statistical Office
EIA	Environmental impact assessment
EIB	European Investment Bank
EMAS	Eco-Management and Audit Scheme (EU)
EMEP	Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air pollutants in Europe
EPR	Environmental Performance Review (OECD)
FAO	Food and Agriculture Organization of the UN
FCCC	Framework Convention on Climate Change
FDI	Foreign direct investment
GEF	Global Environment Facility (UNEP)
GHG	Greenhouse gas
HCB	Hexachlorobenzene
IEA	International Energy Agency
ISOH	Waste management information system of the Czech Republic
ISPA	Instrument for Structural Policies for Pre-accession (EU)
IUCN	World Conservation Union
LCA	Life cycle assessment
MEA	Multilateral environmental agreement
MPS	Market price support
Mtoe	Million tonnes of oil equivalent
MSHP	Environmental Health Monitoring System

NEC	National Emissions Ceiling
NEHAP	National Environmental Health Action Plan
NIPH	National Institute of Public Health of the Czech Republic
PAC	Pollution abatement and control
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCDD/F	Polychlorinated dibenzo dioxins and furans
p.e.	Population equivalent
PHARE	Poland and Hungary: Action for Restructuring of the Economy (EU)
POP	Persistent organic pollutant
PPPs	Purchasing power parities
PPS	Purchasing power standard
PRTR	Pollutant release and transfer registers
PSE	Producer support estimate
SAPARD	Special Accession Programme for Agriculture and Rural Development (EU)
SCI	Sites of Community Importance (EU)
SDR	Special Drawing Right
SEA	Strategic environmental assessment
SEF	State Environmental Fund
SEP	State Environmental Policy
SPA	Special Protection Area (for birds) (EU)
TFC	Total final energy consumption
TPES	Total primary energy supply
TSES	Territorial System of Ecological Stability
TSP	Total suspended particulate matter
Toe	Tonnes of oil equivalent
UNECE	UN Economic Commission for Europe
UNDP	UN Development Programme
UNEP	United Nations Environment Programme
VOC	Volatile organic compound
WHO	World Health Organization
WMIS	Waste Management Information System
WMP	Waste Management Plan

Reference IV

PHYSICAL CONTEXT

The *Czech Republic* shares borders with Austria, Germany, Poland and the Slovak Republic, its former federal partner. This landlocked Central European country is composed of the traditionally Czech regions of Bohemia and Moravia (sometimes known as the “Czech lands”) plus a small part of Silesia. The Bohemian Massif (Česká vysočina) makes up much of the country’s 78 864 km² area.

The entire country lies in the basins of three major *international river systems*: the Labe (Elbe), which flows towards the North Sea; the Odra (Oder), which flows towards the Baltic Sea; and the Morava, part of the Dunaj (Danube) system, which is bound for the Black Sea. The country has 455 natural lakes, most of them fairly small: the largest, Černé jezero, covers 18.4 hectares. Some 21 800 artificial ponds, chiefly used for fish farming, also dot the landscape. This part of Europe has long been known for its wealth of mineral springs.

As much as 54% of the Czech Republic’s *land use* is agricultural; 43% of its territory is covered in arable and permanent crop land. Much of the original forest cover has been cleared for farming, but approximately 34% of the country is still wooded. Spruce, beech, pine and oak are the main species. Several decades of acid deposition have seriously weakened and damaged Czech forests. Taiga and tundra vegetation is found above the timber line. Large areas of cultural landscapes have been preserved; a number of these are protected by law and several have been inscribed on UNESCO’s list of World Heritage Sites.

The country’s *mineral resources* include black and brown coal, kaolin and other clays, and graphite. Indigenous brown coal, of fairly low quality, was the main source of energy as recently as 1993, though efforts to diversify energy sources have since been strengthened. *Black and brown coal* together still supply 52% of primary energy. They represent almost 90% of indigenous energy resources.

Reference V

SELECTED ENVIRONMENTAL EVENTS (1998-2005)

1998

- An act on free access to information on the environment is approved.
- An act on chemical substances and chemical preparations is approved.
- An act on fertilisers, auxiliary soil substances, auxiliary plant preparations and substrates and on agro-chemical testing of agricultural land is approved (the “Act on Fertilizers”).

1999

- An act is approved on preventing major accidents caused by selected hazardous chemical substances and chemical preparations and amending the Act of 1990 on the District Authorities (the “Act on Prevention of Major Accidents”).
- A new system of economic arrangement of forests (economic planning) is introduced.
- The 10th International Workshop on the Mapping of Critical Loads is held in Prague.
- The government of the Czech Republic and the government of the Slovak Republic sign an agreement on co-operation on border waters.
- The Czech Republic signs up to the UNEP International Declaration on Cleaner Production.

2000

- An act on management of genetically modified organisms and products is approved.
- An act on protection of public health is approved.

- A United Nations – Economic Commission for Europe (UN-ECE) Workshop on Control Options/Technologies to Abate Heavy Metals and Persistent Organic Pollutant Emissions from Stationary Sources and Products is held in Pruhonice.
- The 50th Session of the OECD Working Group for Waste Management is held.
- The Czech Ministry of the Environment and the German Federal Ministry of the Environment, Nature Conservation and Reactor Safety sign an agreement on implementation of a joint pilot project on environmental protection in the Czech Republic aimed at reducing transboundary environmental pollution, “Reconstruction and Modernisation of the Most-Chánov and Teplice-Bystřany Waste Water Treatment Plants”.
- The Czech Ministry of the Environment and the Bulgarian Ministry of the Environment and Water Management sign an agreement on co-operation in environmental protection.

2001

- An act on waste is approved.
- An act on packaging is approved.
- An act on waters is approved.
- An act on environmental impact assessment is approved (The “Act on Environmental Impact Assessment”).
- An act on water mains and sewer systems for public use is approved (the “Act on Water Mains and Sewer Systems”).
- The Czech Republic completes EU accession negotiations on the chapter “Environment” (1 June).
- A Global Environment Facility (GEF) – UN Development Programme (UNDP) International Workshop on Climate Change is held in Prague.
- The Czech Ministry of the Environment arranges for a meeting in Prague of the countries of Central and Eastern Europe to discuss the implementation and national action plans of the Convention to Combat Desertification (September).
- The Czech Ministry of the Environment and the Mongolian Ministry of Nature and Environment sign an agreement on the main directions of environmental co-operation.

- The European Centre for Medium-range Weather Forecast and the Czech Republic sign a co-operation agreement.

2002

- An act on protection of the air is approved (the “Act on Air Protection”).
- An act on integrated pollution prevention and control, the integrated pollution register is approved (the “Act on Integrated Prevention”).
- The new Clean Air Act, including implementing regulations, comes into effect, implementing current EU requirements. The Integrated National Programme of Emission Reduction in the Czech Republic is drawn up (including the National Programme of LCP Emission Reduction), providing particularly for implementation of Directives 96/61/EC and 2001/80/EC. Regional programmes of emission reduction and improvement of air quality are based on the Integrated Programme.
- A Concept for the Czech Tourism Policy for 2002-07 is prepared by the Ministry for Regional Development in co-operation with the Ministry of the Environment.
- The 7th UN Environment Programme (UNEP) High-Level Seminar on Cleaner Production is held in Prague.
- The Czech Ministry of the Environment and the Netherlands Ministry of Housing, Spatial Planning and the Environment make a co-operation agreement.
- A World Bank – PCF International Training Workshop on Joint Implementation, with a case study of the PCF Umbrella Project, is held in Prague.
- The Visegrad Group Countries’ Summer School on Development Aid and Co-operation is launched.
- A World Bank – PCF International Workshop on the implementation of JI-PCF projects in Central and Eastern European Countries is held in Znojmo.
- The steering and planning committee of the INECE network meet in Prague.
- A Workshop on the Environmental Management System in the Military Sector is held in Vyskov.
- The Czech Ministry of the Environment and the German Federal Ministry of the Environment, Nature Conservation and Reactor Safety sign an agreement on implementation of a joint pilot project on environmental protection, “Renewal of the Station for Measuring Water Quality in Obříství and in Zelčín and also the Central Laboratory in Prague”.

- The 5th meeting of the EMAS Article 14 Committee is held in Prague.

2003

- An act on chemical substances and chemical preparations is approved (in force from the date of EU accession).
- An act on conditions for the operation of zoological gardens is approved (the “Act on Zoological Gardens”).
- An act on the Antarctica is approved.
- The Czech Republic accedes to the LIFE-Natura programme.
- The Czech Republic gains EU observer status (1 May).
- A Czech national conference, “Sustainable Consumption – Challenge for the 21st Century”, is held under the auspices of the Czech Ministry of the Environment, and organised by UNEP in collaboration with the Czech Eco-Counselling Network (STEP) and the Czech UNEP National Committee (May).
- An international workshop on preparation of GEF projects in land degradation and deforestation is held in Lednice (July/August), organised by the Secretariat of the UN CCD and the UNDP, the GEF implementing agency, in co-operation with the Czech Ministry of the Environment.
- The Global Ecolabelling Network is held in Prague.
- The Government Council for Sustainable Development is established (August).
- The Czech Ministry of the Environment and the German Federal Ministry of the Environment, Nature Conservation and Reactor Safety sign an agreement on Implementation of a joint pilot project on environment protection, “Loučná Wind Park”.
- The GEF-UNDP project “National Capacity Assessment for Global Environment Management” begins.

2004

- The State Environmental Policy of the Czech Republic (2004-10) is adopted by the Government (March).
- The Building Code is amended concerning Natura 2000 territories.

- The act on nature conservation and landscape protection is amended to fully transpose both the Habitats Directive and the Birds Directive to the Czech legislation (enters into force in April).
- A Workshop on Strengthening of Co-operation based on Chemicals and Hazardous Waste Conventions is held in Pruhonice (March).
- A Seminar on Possibilities for Encouragement of Sustainable Consumption and Production, organised by the Ministry of the Environment in co-operation with the Work Group for SCP and the International Institute for Industrial Environmental Economics, is held in Lund, Sweden (April).
- The Czech Ministry of the Environment and the State Environmental Protection Administration of the People's Republic of China sign a memorandum of understanding on environmental co-operation (April).
- The UNDP Project "Support for the Preparation of a Sustainable Development Strategy in Selected Regions of the Czech Republic" begins.
- The Czech Republic enters the EU (1 May).
- The 5th EMEP Task Force Meeting on Measurements and Modeling is held in Prague (May).
- Annual Meeting of the Central European Disaster Prevention Forum (CEUDIP) is held (June).
- The Czech Ministry of the Environment and the Ministry of Environment and Physical Planning of the Republic of Macedonia agree on a Protocol on Co-operation in the field of Environmental protection (June).
- An annual EUMETSAT-Meteorological Satellite Conference is held in Prague (May). Co-operating State Agreement between the Government of the Czech Republic and the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) was signed.
- The 2nd meeting of the UN-ECE Task Force on POPs is held in Prague (May/June).
- The Czech Ministry of the Environment and the Ministry of State for Environmental Affairs of the Arab Republic of Egypt sign a protocol on co-operation in the field of environmental protection (September).
- The 16th Meeting of the Parties to the Montreal Protocol is held in Prague (November).
- The National Strategy for Sustainable Development is adopted by the Government (December).

- An act on protection of wild flora and fauna by regulation of trading with them and other measures for their protection (Act on trading with endangered species) is approved.
- An act on conditions of greenhouse gas emission allowance trading is approved.

2005

- An act on promotion of the use of renewable sources of energy is approved.
- The act on access to environmental information is amended.
- The act on waste is amended.

Reference VI

SELECTED ENVIRONMENTAL WEB SITES

Web site	Host institution
www.vlada.cz	Government of the Czech Republic
www.env.cz	Ministry of the Environment
www.nature.cz	Nature and Landscape Protection Agency
www.ceu.cz	Czech Ecological Institute
www.cgu.cz	Czech Geological Survey
www.chmi.cz	Czech Hydrometeorological Institute
www.cizp.cz	Czech Environmental Inspectorate
www.mzcr.cz	Ministry of Health
www.szu.cz	National Institute of Public Health
www.mmr.cz	Ministry for Regional Development
www.mdcr.cz	Ministry of Transport
www.mze.cz	Ministry of Agriculture
www.mzv.cz	Ministry of Foreign Affairs
www.mvcr.cz	Ministry of the Interior
www.mfcr.cz	Ministry of Finance
www.mpo.cz	Ministry of Industry and Trade
www.ippc.cz	Integrated Pollution Prevention Control (Ministry of Industry and Trade)
www.msmt.cz	Ministry of Education, Youth and Sports
www.mpsv.cz	Ministry of Labour and Social Affairs
www.czso.cz	Czech Statistical Office
www.wtd.vlada.cz	Government Council for Sustainable Development
www.cenia.cz	CENIA, Czech Environmental Information Agency
www.rec.org	Regional Environmental Center for Central and Eastern Europe
www.foeurope.org	Friends of the Earth Europe

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