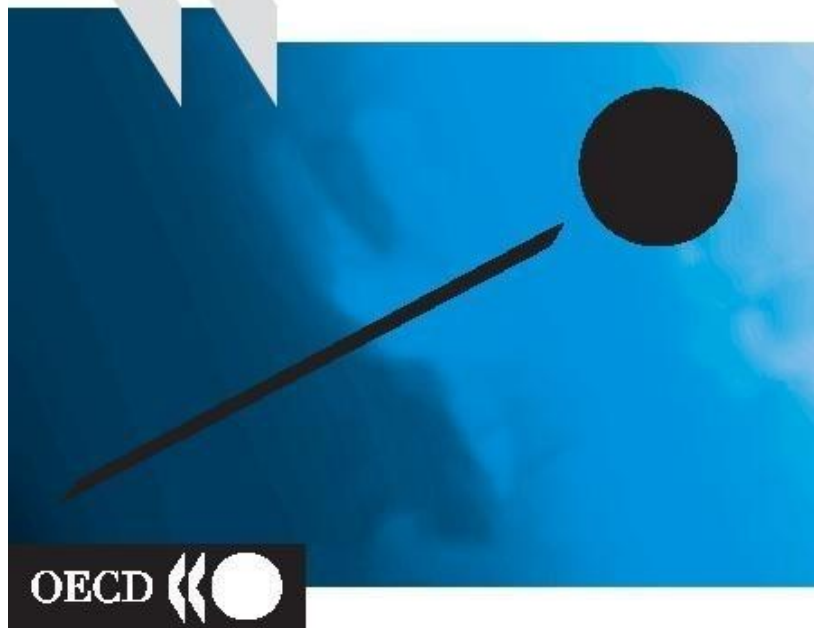


**SET OF THE CONCLUSIONS AND RECOMMENDATIONS
APPROVED BY THE OECD WORKING PARTY ON
ENVIRONMENTAL PERFORMANCE REVIEWS (2001-2009)**

Environmental Performance Reviews

2nd Cycle



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* This document presents the Conclusions and Recommendations concerning the country environmental performance reviews conducted by the OECD Working Party on Environmental Performance from 2001 to 2009.

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AUSTRALIA

1. CONCLUSIONS AND RECOMMENDATIONS

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ENVIRONMENTAL MANAGEMENT

- 2. WATER MANAGEMENT**
- 3. NATURE CONSERVATION AND BIODIVERSITY**
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- 5. ENVIRONMENT-ECONOMY INTERFACE**
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CONCLUSIONS AND RECOMMENDATIONS*

This report examines Australia's progress since the previous OECD Environmental Performance Review in 1998 and the extent to which the country has met its *national objectives and international commitments* regarding the management of the environment and natural resources. The report also reviews Australia's progress in the context of the OECD Environmental Strategy,** and compared to the recommendations of the 1998 OECD review. Progress has stemmed from environmental and economic decisions and actions by federal, state/territory and local authorities, as well as by enterprises, households and non-governmental organisations. 45 recommendations are made that could contribute to further environmental progress in Australia.

Since 1998, *Australia's GDP has grown steadily and by some 30% overall*. Real per capita GDP is now above the OECD average. Australia is a fully developed, highly urbanised, federal country with growing links to many developing and developed countries, in particular in the Asia-Pacific region. The country's exports contribute about 20% of GDP and natural resource-based exports (principally from mining and agriculture, with an important contribution from fishing) account for over half of the total. Australia is an ecologically unique continent, characterised by mega-biodiversity. *Major sources of pressure* on the environment and natural resources - including mining, agriculture, transport, manufacturing and energy production and consumption - expanded during the review period. With relatively low population density, *natural resource management-related issues* continued to dominate the environmental policy agenda during the review period.

State/territory and local governments have the main responsibility for addressing issues such as water, air and waste management, land use, transport planning and natural resource management. But as environmental pressures and issues have grown in international and national importance during the review period, debate has grown about the role the Commonwealth government should have in protecting the environment. This has resulted in greater emphasis on intergovernmental co-operation within Australia on environmental matters, as well as on sharing of responsibilities with civil society.

Looking to the future, to face its *environmental management challenges effectively*, it will be necessary for Australia to i) strengthen environmental policies and their implementation in the interest of promoting a level national playing field and improving efficiency, where appropriate; ii) further integrate environmental concerns into economic and sectoral decisions and iii) further develop international environmental co-operation.

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting in June 2007.

** The following objectives of the OECD Environmental Strategy for the First Decade of the 21st Century are covered in the Conclusions and Recommendations: maintaining the integrity of ecosystems (Section 1), decoupling of environmental pressures from economic growth (Section 2) and global environmental interdependence (Section 3).

1. Environmental Management

Strengthening the implementation of environmental policies

The *institutional framework* for environmental management has improved over the review period, in part due to restructuring of responsible government agencies at the Commonwealth and state/territory levels. The 1999 Environmental Protection and Biodiversity Conservation Act (henceforth the EPBC Act) codified the Commonwealth government's powers to regulate activities deemed likely to significantly impact environmental matters of national significance, and strengthened environmental impact assessment of major development projects. *Load based licensing* of pollution discharges has been improved and expanded. The use of *economic instruments*, particularly tradable quotas, to achieve environmental management objectives has greatly expanded, propelled in part by the National Market-Based Instruments Pilot Program. *Voluntary and partnership approaches*, including environmental management systems implemented by industry, have played a significant role in reducing environmental pressures. Initiatives have been launched to increase the efficiency of water use in the mining sector and to encourage consumers to buy more water efficient products (e.g. through eco-labelling). Commonwealth government purchasing and operations have been greened and many ministries implement environmental management systems. Similar progress has been achieved by state/territory governments.

In spite of these efforts, *capacity of environmental agencies* is not adequate to address all of their responsibilities. The existence of different sets of *environmental legislation* at the state/territory level has many benefits, but also requires extensive inter-governmental co-ordination and co-operation, and multiplies regulatory costs. Regulation of large stationary sources is not backed up with sufficient *inspection and enforcement*. Serious breaches of regulation are inadequately prosecuted in some jurisdictions. The *pricing of environmental services* is still far from levels necessary for full cost recovery in most cases, despite recent progress. The quality of environmental impact assessments is highly variable, especially at the state/territory level. *Voluntary measures* often do not include meaningful compliance mechanisms or monitoring.

Recommendations:

- further expand the use of *economic instruments*, assuring the more complete application of the polluter pays and the user pays principles for water, energy, and waste management;
- improve and expand *corporate environmental and sustainability reporting*, and increase the transparency of voluntary agreements with industry;
- expand the use of *performance and cost-effectiveness assessment* for operation of government agencies at the Commonwealth and state/territory level;
- continue to *harmonise legislation and regulation* and improve co-operation between Commonwealth and state/territory governments, with the aim of establishing, where appropriate, an environmental level playing field within the country.

Water resources management

The 2004 adoption of the *National Water Initiative* (henceforth “the NWI”) reinvigorated the reform of the water management framework that Australia launched in 1994. With the deployment of very large government funds, real progress was made towards implementing the reforms; in particular, land property rights and *water access entitlements* were separated in all states and territories, and the institutional arrangements for water trading were put in place. The new arrangements integrate the environmental constraints imposed by the continent’s predominantly dry and variable climate, by setting *environmental flow regimes* at levels deemed to protect aquatic ecosystems, and by defining water use rights as shares of the “consumptive pool” rather than as absolute amounts. The country-wide application of *catchment management bodies* by state and territory governments is helping to better integrate land and water management. Accountability has been improved by separating the responsibility for water service delivery from that of regulatory oversight. Implementation of a cap on water abstractions from the *Murray-Darling river system* has progressed, even as severe drought has gripped the country since 2000. Water salinity in the Murray River has been kept in check thanks to careful management. Progress has been made towards a nationally consistent pricing structure for drinking and irrigation water, and water utilities in some major urban areas are close to achieving full cost recovery.

Recommendations :

- steadfastly *implement all aspects of the National Water Initiative* (in particular: *full cost recovery* of water services and irrigation water delivery; *rationalisation of water allocation* in stressed water basins, allocation of adequate share of water savings to environmental flows; removal of remaining administrative barriers to *interstate trading*; strengthening of the *integrated management* of ground and surface waters; wide application of “*water sensitive*” urban design practices);
- ensure that all new investment in *water conservation infrastructure* is subject to prior economic analysis, and that landholders in the Murray-Darling Basin face consistent rules for obtaining water for irrigation purposes;
- expand the capacity of *regional natural resource management bodies* to manage river health, and to assure minimum environmental flows;
- further develop national strategies for responding to the likely *long-term effects of climate change* on available water resources, using optimisation analysis and exploring different scenarios;
- promote *public awareness and understanding* of the economic and environmental importance of improving the efficiency of water allocation and consumption.

However, there remain a number of considerable water management challenges, particularly as overall water consumption is still increasing. Important river systems and groundwater aquifers remain *over-allocated* and the incidence of blue-green algae blooms has not diminished. Many larger estuaries suffer chronic algal blooms, leading to *anoxic areas* where aquatic ecosystems are disturbed. Poor coastal water quality threatens some near shore parts of the Great Barrier Reef. Old irrigation schemes, and to a lesser extent urban water supply systems continue to suffer *large water losses* due to leakages and evaporation. Much work still needs to be done for the

NWI to take full effect at the *grass roots level*. *Full cost recovery* of irrigation water delivery has not yet been achieved. Some barriers to water trading (e.g. among states/territories, between urban and water user) still exist. *Water prices* for urban consumers remain low and thus do not encourage conservation or investment in new sources of supply. The potential for water re-use and recycling has yet to be fully exploited. Despite good progress in improving monitoring and reporting through *water accounting* and the National Land and Water Resources Audit, there is still some distance to go before policy makers and water managers dispose of nationally coherent information for decision-making.

Air quality management

During the review period, Australia adopted national air quality standards which set ambient concentration limits for six conventional pollutants, through a *National Environment Protection Measure (NEPM)*. Ambient concentrations of carbon monoxide, sulphur dioxide, nitrogen dioxide, and lead are generally below NEPM levels. Air quality remains good, overall, in Australia, although there are urban areas and local hotspots of concern (e.g. adjacent to large stationary sources, highways). The regulatory framework has been further strengthened through an advisory reporting standard on fine particulates. As recommended in the 1998 review, Australia has developed a *National Pollutant Inventory* and has begun making related data publicly available. Most Australian cities experienced improvements in urban air quality, especially for concentration of lead, SO_x and CO. A national air quality database has been established. Unleaded petrol has been mandatory for new vehicles since 1986, and the phase-out of leaded fuel was completed in 2002, rather late compared to other OECD countries. Vehicle emission standards have been in place since the early 1970s, and a voluntary agreement has been concluded to raise fuel efficiency standards by 2010. The publication of consumer information related to vehicle fuel efficiency and greenhouse gas emissions intensity is now required. *Fuel quality standards* for sulphur and benzene content have been tightened.

However, a number of significant air quality management challenges remain. In certain areas, ambient concentrations of *fine particulates and ozone* exceed the allowable national limits, with the worst examples arising from events such as bushfires. Adjacent to some specific *smelters and power plants*, air pollution hotspots pose serious local health risks. Extrapolating from experience and studies in other OECD countries, significant health benefits could be derived from further air pollution abatement and control. Despite recently launched energy efficiency and renewable energy programmes, energy-related emissions of conventional pollutants and GHGs have continued to grow with GDP. *Emissions intensities (i.e. emissions per unit of GDP)* of SO_x, NO_x and CO₂ are the highest, or among the highest, in the OECD. Road transport is a major source of urban air pollution, and as the number of vehicles and vehicle-kilometres travelled continues to rise, so do related emissions. Efforts are needed to address the growing emissions from transport. Little consideration has been given to the long distance transport of some traditional air pollutants and heavy metals (e.g. mercury, lead) and their *impact on ecosystems*, despite the often-cited fragility of the continent's ecosystems. Australia appears to be on track to meet its Kyoto commitment. While GHG emissions from energy-related sources have increased by 36% since 1990, net emissions have increased by only 2%. This was primarily due to changes and improvements in land use practices. Future progress will depend on implementing policies to reduce emissions from across all sectors.

Recommendations:

- redouble efforts to cut *emissions from the transport sector*: for instance, by applying market-based instruments to stimulate cleaner vehicles fleets and to improve the balance of transport modes (e.g. congestion and road pricing, fuel and vehicle taxation, parking charges);
- further strengthen federal and state/territory *data on air pollution control* at major sources (e.g. stationary, mobile sources), accelerating the publication of monitoring data and aggregated national state of the environment reports;
- conduct a national study on the *costs and benefits of air emissions*, including all major sources;
- continue to develop the *national pollutant inventory* to support analysis of trends, costs and benefits of air pollution control, modelling of air pollution dynamics and control strategies;
- complete the incorporation of *fine particulates* in the Ambient Air Quality NEPM, and review the role of intra and interstate atmospheric transport of fine particulates in concentrations in urban areas.

Nature and biodiversity management

Australia substantially increased its *efforts to protect biodiversity* during the review period. The terrestrial area protected by formal reserves increased by 30% during the review period, and marine protected areas grew by 66%. Altogether, over 10% of *Australia's landmass* is now protected. Many nature protection activities are now *organised on a national scale*, such as the National Reserve System, the National Framework for the Monitoring and Management of Australia's Native Vegetation or the National Weeds Strategy, and the same will soon be true for *marine protected areas*. The delineation of bioregions which classify the biodiversity value of various ecosystems has helped to take a more strategic approach to nature management, and to identify remaining gaps in the reserve system. The devolution of the delivery of some national programmes to a regional or landscape scale has led to greater engagement of local communities and citizen groups. The EPBC Act has given renewed emphasis to species recovery and threat abatement planning. All Australian governments have agreed to stop loss of native vegetation through *land clearing*, long the chief threat to biodiversity in Australia. Innovative *market-based instruments* for the protection of biodiversity on private land (e.g. BushTender, tradable bio-diversity credits), are being tested in several states. Substantial Commonwealth funding through the Natural Heritage Trust has effectively leveraged state/territory and local funding including for nature management activities.

Even so, there remain several areas where efforts are not commensurate with the challenge. *Downward trends* in the conservation status of Australian species still dominate positive ones; some major *pressures* on Australia's mega-biodiversity (e.g. weeds and invasive species, climate change) have not eased during the review period. Overall, conservation efforts have not been proportional to the *economic benefits* derived through tourism and environmental services from nature and biodiversity conservation. The *resources* available for the management of the National Reserve System have not kept pace with the expansion of protected areas. The National Reserve System does not yet meet the test of being comprehensive, adequate and representative. A sharp increase in the number of species recovery plans and threat abatement plans has revealed the need to co-ordinate and streamline, perhaps through

multi-species approaches. The integration of biodiversity concerns into the catchment management plans of the regional natural resource management bodies is still patchy. While biodiversity considerations are sometimes taken into account in *land use planning decisions*, as a rule there is much room for improvement. Although the existence of the Australian Biological Resources Study and the creation of the National Land and Water Resources Audit are important steps in the right direction, *lack of policy-relevant information*, including taxonomic and trend data, still hampers biodiversity and nature conservation.

Recommendations:

- further increase the *terrestrial and marine area* under formal protection while progressing towards the objective of a comprehensive and representative National Reserve System;
- persevere with efforts to protect, *manage and restore* wetlands;
- strengthen the recovery of *threatened species and ecological communities* through co-ordination of recovery plans and pest management plans on the regional level;
- ensure that *regional natural resource management (NRM) plans* give due consideration to biodiversity issues and are co-ordinated with local authority land use plans;
- continue to develop and apply *market-based instruments* to protect biodiversity values on private land, as appropriate; ensure effective off-reserve conservation;
- enhance the collection of taxonomic data and collation of *nationally coherent information*.

2. Towards Sustainable Development

Integration of environmental concerns into economic decisions

The principles of “*ecologically sustainable development*” (ESD) have become embedded in the public policy culture across federal government and many state/territory and local governments, with substantial evidence of the effective integration of ESD dimensions and concepts within policy development. Australia’s *agricultural sector* remains among the least subsidised in the world. The *energy intensity* of the economy has diminished by 10% since 1998. There has been an *increased uptake of recycling*, not only of materials but also of water, although there is still much room for progress. Water “*cap and trading*” systems, to the extent they incorporate appropriate environmental flow provisions, are on track to give essential price signals to water users and land managers.

Despite this progress, indicators of actual integration of environmental concerns into sectoral policies are weak. *Prices* for energy, land development, water, congested roadspace and waste disposal are too low to internalise environmental costs, providing little incentive for efficiency. It is not clear whether some of the Commonwealth and state/territory expenditure relating to water resources (e.g. Government Water Fund, drought relief payments, water saving proposed investments) will be institutionalised or are seen as transitional financial assistance. Concerning transport, 40% growth in *road freight traffic* over the review period has increased associated impacts on air quality

(especially ozone and fine particles), runoff to water, etc., despite tightened fuel quality and vehicle emissions standards. *Solid waste generation* per capita remains high compared with most OECD countries, and economic instruments remain underutilised in *waste management*. Inadequate attention has been paid to the *design of expanding urban areas* to optimise their multiple environmental, social and economic functions, particularly with respect to infrastructure development, energy use, carbon emissions, and health consequences (from air pollution and the discouragement of physical activity). This is particularly a problem in coastal areas, such as along the eastern seaboard.

Recommendations:

- make concerted efforts to *decouple environmental pressures from economic growth*, especially those pressures from the energy, transport and household sectors, including urban growth;
- expand the use of *market-based instruments* to advance ecologically sustainable development, with particular attention to end-user energy prices to promote conservation, to limit emissions, to enhance long-term energy security, and (in the case of transport) to reduce land development pressures;
- continue to protect the ecological integrity and *tourism potential of key natural assets* such as the Great Barrier Reef, by targeted measures (such as exit assistance to economic actors placing undue pressure on these resources);
- strengthen policies and measures to enhance *energy efficiency*; reduce the energy sector's net greenhouse gas emissions, including through more development of renewable energy sources;
- in assessing policies, evaluate the contributions of measures against *multiple sustainability objectives*; for example, ensure that waste management measures are environmentally and socially effective and economically efficient.

Agriculture and environment

During the review period, Australia made considerable efforts to reduce the environmental footprint of its agricultural sector. These efforts included a fundamental *reform of the water sector*, support for the states and territories to implement a regional approach to natural resource management, and Commonwealth and state/territory funding made available through various channels. The extensive reforms being introduced under the *National Water Initiative*, notably water markets and full cost pricing, can be expected to considerably improve the *efficiency of irrigated agriculture* and also return water to the environment. The unflagging continuation of these efforts should be given a high priority. Almost all regional plans and investment programmes have been accredited by the Commonwealth and relevant state/territory governments; if well implemented, they will do much to make agriculture more sustainable. At the farm level, the *Landcare programme* has contributed to fostering a *stewardship ethos* and promoting more environmentally friendly land management practices, with almost 40% of landholders involved. In 2004, all Australian governments agreed to stop loss of native vegetation through *land clearing*. Governments are also developing and pilot-testing market-based instruments to protect and expand native vegetation on private land. The

range of strategic programmes funded by the Commonwealth and state/territories, was and continues to be a catalyst for progress.

Despite these gains, there is much more to be done to improve the sustainability of the agriculture sector in Australia. This will require dealing with a number of *legacy issues*, including the accumulated negative effects of some agricultural practices (e.g. over-grazing, land clearing, inefficient irrigation), which have aggravated soil salinity and acidity, erosion and pests damage. Doing so will be made even more difficult by the projected impacts of climate change. The success of the plans and programmes underway will rely very heavily on the performance of the natural resource management bodies, some of which are relatively new and untested, as well as the introduction of proper *economic incentives and prices* concerning water, land and ecosystem resources. The problems of *salinity* and *acidity* might become more widespread if the ambitious measures underway are not fully pursued. The use of *nitrogenous fertilisers* has risen during the review period, and in intensively farmed regions, fertilisers cause eutrophication of both fresh and marine waters. There is a dearth of policy-relevant information about trends in the use of *pesticides* and about the levels of pesticide residues in food, organisms and ecosystems. Despite recent improvements in some regions, the efficiency of irrigation water use could be improved by reducing *leakage and evaporation* from channels and reservoirs. With severe droughts affecting the country since 2000, there have been recurrent and large drought compensation payments. The difficult economic question for some of the farmland is whether it may be more cost-effective to induce farmers to retire from farming entirely in order to capture the benefits of the biodiversity, natural heritage and tourism potentials of restored land.

Recommendations:

- ensure that the 56 new regional *catchment management bodies* develop the *capacity* (good governance, funding, know-how, training, institutional support) to achieve the outcomes they are expected to deliver, in partnership with the agricultural industry;
- further develop and operationalise the *economic framework for sustainable agriculture*, using *market-based instruments* (taxes, charges, trading) and economic analysis;
- assure independent evaluation of the *effectiveness of voluntary approaches* (e.g. landcare, promotion of EMS); and ensure that the *lessons learned* with good land and environmental management practices are shared across the country;
- strengthen measures to reduce *irrigation water losses* and the runoff of *excess fertilisers and pesticides* to the environment;
- develop *information* on agrochemicals use and residues and more broadly on the environmental impacts of agriculture;
- evaluate the economic risks to agriculture associated with projected climate change, and take cost-effective measures to enhance the sector's capacity to *adjust to expected effects of climate change*, and continue to develop and expand the capability of the agricultural sector to reduce greenhouse gas emissions;
- where agriculture can no longer be sustainable, assist affected landholders and communities in the *transition to other land uses*.

Integration of environmental and social decisions

There are a number of positive trends at the social-environment interface. Most people enjoy *high life-expectancy* and wellbeing, in part associated with a healthy environment. Good levels of community participation in natural resource management have been sustained, and recently enhanced through the introduction of Catchment Management Authorities. *Environmental education* has been mainstreamed into school curricula. Public access to environmental information has improved, with enhanced *state of the environment reporting*, the establishment of the National Pollutant Inventory, and the creation of numerous environmental information portals. Public awareness of environmental concerns has been raised through state and local *public education campaigns*, and through the routine provision of environment-related consumer information (e.g. on water bills, through eco-labelling of consumer goods). Multi-national and primary industries have progressively become more engaged in sustainability reporting, although Australian companies trail those in many OECD countries, in terms of such reporting.

Recommendations:

- harmonise the collection and reporting of key *environmental information and statistics* at the state/territory level so as to facilitate national level aggregation and reporting;
- improve integration of “whole of government” objectives concerning *indigenous peoples* into natural resource management programmes;
- monitor the *distributional impacts of market-based approaches* to environmental management, and take steps to ensure equity (e.g. rural/urban, ethnic minorities, socio-economically disadvantaged);
- continue to use *public consultation mechanisms* to ensure that land use planning takes into account the views of communities and stakeholders, clearly indicating the timing, scope and right of appeal at all stages up to the final decision;
- ensure that *vocational and continuing education* curricula include training in how to minimise the potential environmental impacts of business operations;
- continue to prioritise the development of the *environmental services industry* and to integrate environmental objectives into government procurement and operations policies.

Further progress is needed in a number of areas. Aggregation of *environmental information* collected by the various levels of government (local, state/territory, national) is hindered by inconsistencies in data collection, lack of standard indicators and lack of co-ordination. Economic data related to environmental management is sparse (e.g. environmental expenditure, environmental employment, environment-related taxes, water prices). *Indigenous peoples’* life expectancy remains significantly lower than the national average, and this is associated in part with Indigenous people receiving below average delivery of environmental services. There is still considerable scope for better integration of environmental and natural resource management objectives in the “whole of government” approach to improving indigenous people’s quality of life. Environmental pressures from *land development* continue to increase with urban sprawl, and the consideration of zoning and development decisions at the local level do not guarantee that long-term social and environmental values are

adequately taken into account. *Vocational training* programmes give inadequate attention to imparting needed environmental management skills.

3. International Commitments and Co-operation

Australia has made strong progress towards its international environmental commitments during the review period. Concerning *GHG emissions*, the country has established a comprehensive *GHG accounting system* and has reduced the GHG intensity of its economy by 11% during the review period. Australia is on track to meet its Kyoto target, despite not having ratified the Protocol. Energy efficiency improvements have been promoted through the establishment of *efficiency standards* for appliances and buildings, and the introduction of fuel efficiency labelling on new motor vehicles. Vulnerable to stratospheric ozone depletion, the country has complied, on time or early, with all deadlines for the phase-out of *ozone-depleting substances* under the Vienna Convention. It also actively and effectively assures compliance at its borders with CITES and Basel Convention restrictions related to trade and environment. Control of *marine pollution* and oil spill risk is effective, with the number of oil spills down, OPRC arrangements regularly tested, and the highest rate of *port state control* within the Tokyo MOU area. Concerning marine fisheries, efforts against illegal, unreported, and unregulated fishing have been reinforced, and inspection increased. *Fishing capacity* has been reduced and regulated, and the on-board observer system expanded. Australia has phased out and destroyed chemicals banned under the Stockholm Convention and has lent technical assistance to neighbouring countries in the Pacific to do likewise.

However, challenges still abound. The country's *greenhouse gas emissions intensities* (per unit GDP, per capita, per TPES) are the highest among OECD countries. Furthermore, greenhouse gas emissions from several major source categories (e.g. electric power plants, industrial processes) are still growing. Discharges to marine waters from land-based sources, recreational and fishing boats are inadequately controlled, and are the main contributors to degradation of coastal water quality. Separate charges for *waste reception at ports* create a perverse incentive for ships to discharge wastes at sea. Concerns remain about fishing practices, including bottom trawling, which have destructive impacts on vulnerable marine ecosystems in the Australia EEZ. A number of *fish stocks are still overexploited* (e.g. orange roughy, gemfish and school shark). Although there has been a recent tightening, fines and sanctions for CITES offences remain rather low, compared to the potential gains of non-compliance. The country is conscientious about integrating environmental concerns and priorities in its *official development assistance*, but official development assistance as a percent of gross national income (0.3% in 2006) remains below the Rio target (0.7%).

Recommendations:

- introduce a *price on carbon* through a national greenhouse gas emissions trading scheme and/or a carbon tax;
- assess the extent of *marine pollution* from land-based and marine sources, and implement cost-effective measures to limit their discharges;
- progressively increase the ratio of *Official Development Assistance*/Gross National Income towards the Rio target (0.7% of GNI), ensuring that environmental objectives are comprehensively met;
- introduce *integrated port service charges*, that include waste reception fees, to remove the incentive for ships to discharge wastes at sea;
- review to what extent sanctions and fines used to implement *Multilateral Environmental Agreements regarding trade and environment* are dissuasive, and adjust if deemed necessary;
- continue efforts towards the protection of *vulnerable marine habitats* and sustainable management of *commercial fisheries* on a regional and global level.

AUSTRIA*

1. CONCLUSIONS AND RECOMMENDATIONS

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Part III
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REFERENCES

* Also available in German.

CONCLUSIONS AND RECOMMENDATIONS*

Austria's GDP increased by 27% between 1990 and 2001. The *Austrian economy*, which is very open and highly dependent on foreign exchange, experienced an economic upswing in the late 1990s and a slowdown in 2001-02. Federal and provincial governments have long had ambitious environmental policies to respond to pressures on the environment from sectors such as industry, transport, agriculture and energy, as well as the reliance on the environment of the tourism and leisure industry, which generates about 18% of GDP.

Austria's *decoupling of environmental pressures from economic growth* was very strong during the review period. Overall, the energy, material and pollution intensity of the economy have continued to decrease. However, progress has been elusive for municipal waste generation, certain air emissions and biodiversity conservation. As a landlocked country, Austria partly depends for its environmental quality on progress by its neighbours. Within the context of its membership of the European Union since 1995 and of its expanding relations with central and eastern European countries, Austria faces both further pressures on its environment and opportunities to co-operate with its close partners. Today, *priority environmental issues* include climate protection, nature and biodiversity conservation, waste management, and water and soil management.

To meet these challenges, Austria will need to i) implement more efficient environmental policies; ii) further integrate environmental concerns into economic and sectoral policies; and iii) further strengthen its international environmental co-operation. This report evaluates Austria's performance in meeting its *domestic objectives and international commitments* concerning environmental management, especially since the 1995 OECD Environmental Performance Review. It also reviews the country's progress in implementing the objectives of the *OECD Environmental Strategy*. Some 44 recommendations are made with the aim of helping to further strengthen Austria's environmental performance in the context of sustainable development.

1. Environmental Management

Implementing more efficient environmental policies

Austria's environmental policies have been quite effective in meeting a number of *demanding environmental objectives* (e.g. strict air quality standards; quality of receiving waters; sewerage connection rate reaching 85% of households; reintroduction of Danube salmon to designated river reaches; high rates of material recycling for several waste streams). This success results from a convergence of public demands, federal and provincial administrative efforts and industry's commitment to environmental

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

** Objectives of the "2001 OECD Environmental Strategy for the First Decade of the 21st century" covered in these Conclusions and Recommendations include maintaining the integrity of ecosystems (Section 1), decoupling of environmental pressures from economic growth (Sections 2.1 and 2.3), the social and environmental interface (Section 2.2) and global environmental interdependence (Section 3).

progress. Expenditure on pollution abatement and control (PAC) has exceeded 2.1% of GDP since 1990, placing the country *among the top PAC spenders in the OECD*. The emphasis of this expenditure has gradually moved from air and water management towards waste management. Austrian policies rely on detailed environmental regulation, targeted investment support, use of best available technology and solid federal and provincial environmental administrations. Austria has been a member of the European Union since 1995, and its environmental regulation is increasingly shaped by EU regulation. For instance, steps have been taken to streamline environmental permitting procedures by implementing the EU directive on integrated pollution prevention and control, although differences remain concerning inspection frequency and reporting requirements. *Federal funds to support environmental investment* have effectively stimulated priority environmental investments (e.g. in wastewater treatment facilities, for energy conservation). Since 2001, water-related investment support has been slightly restructured to give utilities incentives to improve the cost-effectiveness of their services. Austria has recently increased its use of *economic instruments* and voluntary approaches. Waste recycling and energy recovery have been promoted effectively through a mix of taxes, charges and voluntary initiatives. A 1989 *landfill levy* has served as a strong disincentive for landfilling of waste, especially in substandard facilities; it has also generated funds to clean up orphaned contaminated sites.

Although Austrian environmental policies have been quite effective and have generated significant economic benefits (e.g. exports of environmental technology and positive conditions for the tourism industry), there is scope for improved cost-effectiveness. Meeting several *challenging environmental objectives* (e.g. for climate, NO_x and NMVOCs, water and soil protection, waste, nature and biodiversity conservation) *at least cost* will require use of the most efficient policy instrument packages possible, including economic instruments. *Environmental legislation* remains complex and dispersed in numerous federal and provincial laws and ordinances, although the recent elevation to the federal level of legislative powers concerning waste management, air quality management and environmental impact assessment has helped in constructing a nationally harmonised approach in these areas. Despite progress in adhering to the *user pays and polluter pays principles* with respect to provision of environmental services, full cost recovery is not yet being achieved. Overall, there is *insufficient economic analysis* in the setting of environmental objectives and in the choice of instruments to reach them. In addition, the sharing of costs and responsibilities among provinces concerning a number of commitments (e.g. climate protection, nature conservation) needs to be more clearly addressed. *Spatial plans* set at the provincial level are often not fully co-ordinated with detailed planning and zoning decisions taken at the municipal level, particularly as regards nature conservation, flood protection and transport. Although the 1995 National Environment Plan was a significant first step in national-level *environmental planning*, and was catalytic in solidifying socio-political consensus on environmental objectives, its implementation and monitoring were not pursued.

Recommendations:

- extend the use of economic instruments for environmental management, seeking to more fully apply the *polluter pays and user pays principles*;
- improve the *efficiency and transparency* of water and waste management services provided at municipal level;
- increase *economic analysis* of environmental policy measures with the aim of achieving environmental objectives more cost-effectively;
- further integrate environmental concerns into *spatial plans* at provincial level and into planning and zoning decisions at municipal level;
- improve *co-ordination among the provincial and federal governments* with regard to meeting national and international environmental commitments (e.g. on climate protection, nature conservation).

Air

Over the last ten years, the country has made continuous progress in reducing emissions of a range of air pollutants, including hazardous substances, from most major sources. Emissions of a number of pollutants have been successfully *decoupled from economic growth*; SO_x, NO_x and CO₂ emissions, both per capita and per unit of GDP, are among the lowest in the OECD. Austria's *air management policies* have been driven by the precautionary principle, with limit values and targets often stronger than those of EU and international law. Ambient air quality has generally improved (e.g. as concerns SO₂ and CO). Sustained investment in pollution control, often using best available technology, has led to significant decreases in emissions from power generation, heating systems and industry. Austria's *energy policies* have prioritised energy efficiency improvements and the development of renewable energy sources. Energy intensity per unit of GDP is among the lowest in the OECD, and renewables (mostly hydropower and biomass) represent 24% of the energy supply. *Transport* policies have also contributed to meeting air management objectives through early introduction of cleaner vehicles and fuels, and effective inspection and control. Steps have been taken to promote environment-friendly transport, domestically and internationally, and public transport is well developed. An "eco-point" system to regulate transit road freight traffic has helped improve the average emission performance of transit freight vehicles.

However, Austria has not met, nor is it on the way to meeting, its national emission reduction targets for NO_x and NMVOCs. Related *air quality*, in urban areas and along major Alpine transport corridors, raises concern. Integration of air management issues into transport policies and provincial spatial plans is insufficient, as are measures to influence the use of private cars and strengthen competitive alternatives to road freight transport. Transport and energy taxes and charges are not fully in accordance with the *polluter pays and user pays principles*; distorted incentives in the energy sector favour large consumers and some carbon-intensive fuels. Austria faces challenging targets for NO_x and NMVOCs under the Gothenburg Protocol and the EU directive on national emission ceilings. Given Austria's already low emission levels and energy intensity, its continued traffic growth and an expected slowdown in emission reductions by industry, further progress may prove more costly than expected and will require i) more strategic planning; ii) greater attention to implementation and cost-effectiveness, extending the

range of instruments to economic and social ones; and, iii) more effective co-ordination among all relevant government administrations and levels.

Recommendations:

- develop and implement a *national emission reduction strategy* to meet the objectives of the EU directive on national emission ceilings, giving priority to cost-effectiveness and to achieving synergy with the National Climate Strategy;
- further extend the use of *market-based instruments in the energy and transport sectors* (including road pricing and emission trading programmes) to help achieve national objectives regarding NO_x, NMVOC and CO₂ emissions;
- further reduce *ambient levels of ozone and small particulates* through measures related to mobility, energy, climate and spatial planning;
- assure *effective co-ordination* among federal ministries and federal, provincial and local governments with respect to i) implementation and monitoring of measures to achieve federal emission targets and ii) integration of air quality concerns into sectoral policies;
- develop and implement a *sustainable transport strategy*, including measures to reduce vehicle emissions, to strengthen alternatives to road transport for long-distance freight shipping and to promote integrated services for freight and passenger transport.

Water

The quality of Austria's *surface waters* continued to improve during the review period. About 87% of the total length of rivers and streams satisfies the standards for water quality Class I or II ("very good" or "good"), up from 72% in 1995. Previously identified hot spots of industrial pollution have disappeared, thanks to the introduction of cleaner production methods and the closure of some old plants. Concerning *groundwater*, some early signs indicate that measures to reduce nitrate pollution are having effect: while average concentrations remained broadly stable at around 30 mg per litre, exceedances of the nitrate standards decreased. Concentrations of pesticides in groundwater also fell. The quality of Austria's groundwater as a source of *drinking water* is a matter of national pride. Concerning *wastewater treatment*, Austria met the targets and deadlines of the EU Urban Waste Water Treatment Directive well ahead of schedule through concerted investment. The sewerage connection rate had increased to 86% by 2001, meeting a domestic target originally set for 2010. Tertiary treatment has become the rule in municipal treatment stations, and discharges of nitrogen and phosphorus to the environment have been decoupled from population size.

These successes notwithstanding, much remains to be done. Efforts to restore *heavily modified river channels* to a more natural state have fallen short of targets. Recent *floods* have shown that many areas previously considered safe are vulnerable to flooding, and that special provisions for designated natural hazard zones have not been sufficiently enforced. Mean *nitrate levels in groundwater* have only recently begun to show a tentative decline; continued efforts will be required to consolidate this trend. It is difficult to evaluate the performance of industry in meeting objectives related to water conservation and control of certain pollutants, because comprehensive national statistics are lacking. Implementation of the *EU Water Framework Directive* will require some

significant changes in Austria's approach to water management, such as greater emphasis on cost recovery for water services and on the cost-effectiveness of measures, as well as a move to a river basin approach. At present, water tariffs only partly reflect the user pays and polluter pays principles. Recent scrutiny of water utility operating costs has suggested that cost reductions could be achieved through economies of scale and efficiency improvements.

Recommendations:

- continue programmes to *restore designated river channels* to their near-natural state as a means of enhancing flood protection and nature conservation;
- ensure that *land use planning* in upper catchments takes full account of potential downstream effects on flood prevention and control, and take measures to enhance enforcement of *construction and land use restrictions* in designated hazard zones;
- continue efforts to improve the *cost-effectiveness of water management*, seeking economies of scale where possible and enhancing best-practice sharing among utilities;
- move towards greater transparency in *water pricing* and fuller application of the user pays and polluter pays principles;
- continue programmes to reduce the environmental impacts of *agriculture*, reinforcing efforts to control nitrate run-off in particularly sensitive areas;
- improve statistics on water use and wastewater discharges by *industry*, including consolidation at federal level.

Nature and biodiversity

Important economic activities in Austria (e.g. tourism, forestry) depend on nature and landscapes. The Constitution delegates almost exclusive authority for nature conservation to the nine provinces (Länder). Since 1990, they have considerably extended their *legislation on nature conservation* and their knowledge base (expertise, cartography, institutions) on nature, biodiversity and land use planning. However, the federal government also plays a role in nature conservation: co-ordinating compliance with EU directives and international agreements, funding programmes it conducts jointly with the provinces (e.g. national parks) and drawing up national strategies and plans (e.g. concerning sustainable development, biodiversity, sustainable forest management). *Transboundary co-operation* concerning nature conservation has also been expanded and strengthened (e.g. Neusiedlersee National Park with Hungary; Alpine Convention with other European countries and the European Union). Six *national parks* have been designated, and a seventh is planned. In all, almost 30% of Austria's national territory is listed as either a protected landscape or another form of conservation area, although the degree of protection varies greatly. A special effort has been made in recent years to *restore riverine habitats*; progress has been notable, but has fallen short of targets.

Nevertheless, the state of *biodiversity is still declining*. All native amphibian and most reptile species are threatened. Austria's mosaic of protected areas (national parks, nature reserves, the Natura 2000 network, biogenetic reserves) does not yet form a coherent *network of protected areas*, with migration corridors. Some of Austria's national parks do not meet IUCN management standards, and conservation measures need strengthening in protected areas in general. Austria continues to authorise the *hunting* of certain species, and the use of certain hunting methods, disallowed by EU legislation. The country has not ratified the 1979 Bonn Convention on the Conservation of Migratory Species of Wild Animals. Alleviation of environmental pressures from *agriculture and tourism* is heavily dependent on subsidies granted for participation in agri-environmental programmes. Opportunities for co-financing of agri-environmental measures by the tourism sector, which benefits from the positive environmental externalities offered by the agriculture sector, should be further developed. In recent years, *land conversion* has amounted to a loss of 25 hectares of natural habitat per day. Nature conservation objectives expressed in spatial plans are often not reflected in municipal land use zoning decisions. In short, efforts to protect nature, biodiversity and landscape do not compensate for the pressures exerted by economic activities. Existing measures should be stepped up considerably to assure the development of sustainable agriculture, forestry and tourism.

Recommendations:

- set up a national *co-ordinating body* to help establish a coherent *national network of protected areas*, with wildlife migration or dispersal corridors that take into account the needs of endangered or threatened species;
- ensure that nature conservation objectives are more systematically incorporated into *spatial planning* at provincial level, and *planning and zoning* at municipal level;
- adjust *hunting regulations* to fully implement EU legislation concerning the protection of birds, and ratify the Bonn Convention;
- maintain programmes to *rehabilitate and restore* riverine habitats and wetlands, and further extend cross-border co-operation to this end;
- pursue nature conservation objectives in *agri-environmental* programmes and explore possibilities for co-financing from the tourism sector.

2. Towards Sustainable Development

Integrating environmental concerns into economic decisions

Austria's overall progress in *decoupling environmental pressures* from economic growth was remarkable in the review period. While GDP increased by 27% between 1990 and 2001, further decoupling was achieved concerning materials and energy use, emissions of SO_x, NO_x and NMVOCs, and use of nitrogenous fertilisers and pesticides. Improvements in material efficiency and energy efficiency stemmed from a shift towards less input-intensive production processes, as well as sharp increases in waste recovery and recycling rates. Austria's economic growth has also become less pollution intensive in recent years, reflecting the introduction of cleaner production processes and the strengthening of technological pollution controls. Integration of environmental concerns in *energy policies* has led to high energy efficiency and a high share of renewables in the energy supply. The introduction of an energy consumption tax

on electricity and natural gas has created energy conservation incentives for some end-users despite its limited tax base and its lack of differentiation in proportion to fuels' environmental externalities. The incentive structure created by *feed-in tariffs* for electricity produced from "new renewable" energy sources (wind, biomass, biogas, geothermal), while a step in the right direction, was overly complex but has recently been harmonised at the national level. Greater differentiation of fiscal instruments in the *transport sector* has helped contain the trend towards more powerful and more fuel-consuming private cars, although there is a bias in favour of diesel vehicles that is difficult to justify on environmental grounds, and tax rates on motor vehicle fuels remain lower than those in several neighbouring countries. A 1998 report from the tax reform commission outlined comprehensive and detailed proposals for a planned *ecological tax reform*. A recently adopted green tax reform, to enter into force in January 2004, will recalibrate and increase levies on natural gas, fuel oil, diesel and gasoline, and introduce a new tax on coal, though with many exemptions. *Agri-environmental measures* have been effectively and widely used to moderate environmental pressures from agriculture, for instance, Austria had the lowest average nitrogen balance in the EU in 2001. The *2002 National Strategy for Sustainable Development* attaches priority to integrating environmental concerns into sectoral policies. To be translated into action, objectives of the strategy will require priority setting and negotiation to allocate responsibilities among the provinces. Ex-post evaluation of the benefits and costs of the "first step" measures already undertaken should be used to inform this process.

Recommendations:

- identify the most cost-effective measures to meet the objectives of the *National Strategy for Sustainable Development*, and incorporate them into relevant sectoral plans and programmes;
- implement and further develop the agreed *ecological tax reform*, adjusting tax levels and tax bases so as to better internalise environmental externalities and remove distortionary exemptions;
- continue to review potentially *environmentally harmful subsidies*, and take action to reduce their distortionary impacts;
- assure that road pricing provisions allow full internalisation of environmental costs;
- introduce cost-effective *demand management measures* to decouple municipal waste generation and road traffic growth from economic growth, in line with Objective 2 of the OECD Environmental Strategy;
- harmonise *eco-labelling* standards for organic foodstuffs at the national level, and support related international efforts.

Austria's decoupling progress has been less than satisfactory with regard to *municipal waste* (whose growth tracked that of GDP) and the impact of *road traffic* (which grew faster than GDP from 1990 to 2001), signalling a need to reinforce demand management measures to influence consumer choices. Considerable room remains for adjustment of energy and transport taxation to internalise environmental externalities and to remove environmentally harmful price and fiscal distortions. In implementing a recently adopted system of distance-based electronic road pricing for lorries, Austria should work to ensure that the system allows the internalisation of external environmental costs. The complexity of *eco-labels* for organic food undermines their effectiveness in shaping

consumer choice; their simplification and standardisation at national and international level should be pursued.

Integrating environmental and social concerns

Austria's *environmental employment* policy has generated an environmental manufacturing and service sector contributing 2.3% of employment and 3% of GDP. Some 60% of the revenue of Austria's eco-industry originates from exports. *Consultation of social partners* during the formulation of laws and policies is traditionally strong in Austria, involving not only industry federations and labour unions (with voluntary membership), but also Chambers of Commerce and Chambers of Labour (with compulsory membership). This process contributes to high compliance with environmental laws and regulations. Provision of and access to *environmental information* is good. Environmental education and training are systematically provided, with curricula reflecting major environmental policy objectives, reinforcing the high public awareness of environmental issues. Consumers express support for eco-labelled products, with a majority saying they are willing to pay up to 20% more than market price for environmentally friendly goods. Environment-related public health issues are very limited, although the number of premature deaths related to air pollution from transport remains significant.

Recommendations:

- continue the active and effective *environmental employment* policy, with its positive effects on the environmental manufacturing sector and associated exports;
- improve *access to justice* for environmental stakeholders and broaden the scope for legal representation by non-governmental organisations in environmental cases;
- strengthen *public participation* in the early stages of permitting, licensing and environmental impact assessment procedures;
- broaden *environmental education* to promote more sustainable consumption patterns and to encourage households to help reach the ambitious waste separation targets;
- introduce a *pollutant release and transfer register*, and assure public access to the data thus generated;
- assure access to *environment-related economic and social data* and continuity in their production.

However, ratification of the Aarhus Convention and implementation of the recent EU directive on public access to environmental information are still pending and will require broadening of opportunities for *public participation* and possibly *access to courts*. Although the right to appeal government decisions affecting environmental outcomes is assured for affected citizens within the framework of EIA and permitting processes, the general public does not have the right to appeal. Nor do NGOs have a general right to stand in court to represent the public interest on environmental cases. The *distributive effects* of environmental policies and of natural resource pricing are not commonly analysed and thus not usually taken into account in decision making. The implementation of the 1997 *National Environmental Health Plan* has not been assessed. Meeting ambitious national objectives regarding sorting of household waste, as well as

promotion of sustainable consumption patterns more generally, will require expanded environmental education on these topics.

Sustainable forest management

The forestry sector, counting both domestic and imported wood resources, is second only to tourism as a *source of foreign exchange*. Forests cover 47% of the Austrian territory, and the *wooded area* has increased by an average of 7 700 hectares per year since 1990, mostly through abandonment of agricultural land and mountain pastures as part of agricultural policy reform. The growing stock has been increasing for decades, as less than 70% of the total increase in wood volume is harvested. This has helped reduce Austria's CO₂ output via sequestration. Energy production from biomass has increased significantly and now accounts for 11% of primary energy production. *Regulatory measures*, which have long contributed to preservation of the forest area, were reinforced by a 2002 amendment to the Forest Act. Specific provisions apply to forests in Alpine areas to enhance the protection they provide against avalanches and flooding. "*Close-to-nature*" *sylviculture* is increasingly applied; the share of forests with indigenous broadleaf species and with mixed conifer and broadleaf trees increased in the 1990s, and more than 50% of total forest area is now under natural regeneration. The extent of defoliation declined in the 1990s (it now affects 10% of the forest cover), partly through reductions in acid deposition. Sustainable forest management was recently made an explicit goal of forest legislation. Since recognition of the country's *forest eco-certification* programme by the Pan European Forest Certification (PEFC) Council in 2000, all of Austria's regions and many of its timber companies have been PEFC certified, though there is no evidence yet that certification has had any impact on forest management.

Recommendations:

- establish quantified *environmental goals for the forestry sector* and monitor their achievement, possibly as part of the forthcoming National Forest Programme;
- improve *policy and planning integration* between the federal and provincial levels concerning forestry as it relates to hunting, nature conservation, spatial planning and agriculture;
- in the context of agricultural policy reform, which will reduce support to agricultural production, compensate forest owners for environmentally beneficial services at levels sufficient to improve the *economic returns from small-scale forestry*;
- assess the environmental benefits of the *forest subsidy programme*, and make support to forest owners conditional on fulfilling ecological criteria; explore the use of *economic incentives* to forest owners;
- develop *voluntary initiatives* aimed at forest quality enhancement (e.g. contracts between hunters and forest owners to protect the natural regeneration of forests; agreements between tourism operators and managers of natural forest reserves to improve and extend the reserve network).

Despite this overall positive picture, with the broad objective of preserving the forest area more than fulfilled, forest management in Austria presents several weaknesses. Although *protection forests* are essential to stabilise hillsides against landslide and avalanche, more than half (400 000 hectares or 10% of Austrian forests) are in poor condition and have insufficient regeneration. This state results from a lack of *forest management practices*, for economic reasons, that has led to old even-aged monoculture stands susceptible to wind and insect damage. It also results from pressure on the forest ecosystem from *cattle grazing and game browsing*: nearly 65% of regeneration areas are browsed by game, including artificially high deer populations. Nor has *forest biological diversity* been given full attention in the past: natural forest reserves cover only 8 300 hectares, and forest biodiversity in nature protection areas has not been monitored until recently. *Policy integration* is made difficult by the fact that forest management is a matter of federal jurisdiction while responsibility for spatial planning, hunting, nature conservation and grazing rights lies with the provinces. In particular, long-term, adaptive forest land use planning is difficult because spatial planning takes place at provincial level, with only advisory input from the federal level. Detailed forest management plans are not explicitly required by law and often do not exist for small forest estates. In addition, *much of the sector is economically fragile*; as forest property is highly fragmented, with 56% of owners (who are mostly farmers) holding lots of less than five hectares, owners tend to be dependent on government support and unlikely to make necessary investments. *Support* has been provided to maintain wood production and employment opportunities, though it is at levels much lower than those for agricultural production. Little effort has been made to tie support to provision of environmental services rather than to timber production.

3. International Environmental Co-operation

As Austria has a very open economy and shares borders with eight countries, its environmental diplomacy priorities have long been shaped by *strong regional interdependencies*, both environmental and economic. The country has also played a proactive role in promoting international co-operation on global issues such as ozone layer protection, backed by strong public support. Concerning *climate change*, Austria has adopted a comprehensive national strategy, ratified the Kyoto Protocol and agreed to a challenging target of reducing greenhouse gas (GHG) emissions under the EU burden-sharing agreement. The energy intensity of the Austrian economy (TPES/GDP) is among the lowest for OECD countries. CO₂ emissions per unit of GDP have decreased by 13% since 1990. Concerning *transboundary air pollution*, the country has met almost all its commitments to reduce SO_x, NO_x and NMVOC emissions under the Convention on Long-Range Transboundary Air Pollution, and recently ratified the Aarhus Protocol on Persistent Organic Pollutants. A relatively minor contributor to the pollutant loading of the Danube River, Austria has been proactive in strengthening international efforts to protect the Danube basin, although progress on funding mechanisms has been slow. The country's implementation of international agreements *concerning trade and environment* is generally good, with strong inspection and enforcement at borders, although enforcement of reporting obligations need to be strengthened. Environmental impact assessment procedures have been applied systematically to bilateral aid projects since 1997. Concerning *export credits and credit guarantees*, Austria has introduced procedures for environmental screening and evaluation of proposed projects that are consistent with those called for in the draft OECD recommendation on environment and

officially supported export credits; however, further steps will be necessary to meet relevant benchmarking objectives.

To build on these accomplishments, and to further improve its record on international co-operation on environmental issues, Austria should prioritise action in several areas. With regard to *climate protection*, additional concerted and efficient effort will be necessary if Austria is to meet the Kyoto target of cutting its total GHG emissions by 13% between 1990-95 and 2008-12; total emissions have in fact increased by nearly 3% since 1990. The development of climate protection measures has thus far included little consideration of cost-effectiveness or distributive concerns, and no burden-sharing agreement exists among provinces. Environmental tax reform is recognised as a priority in the 2002 National Climate Strategy; the recently approved green tax reform should be implemented as soon as possible and further developed so as to support future GHG reductions. Although the commitment period for the Gothenburg Protocol is half over, progress towards the *NO_x and NMVOC reduction targets* has been limited, and measures under way appear insufficient. Austria's *official development assistance* (ODA), which totalled 0.29% of GNI in 2001, is still far from meeting the 0.7% UN target to which Austria subscribes; the country made a commitment, at the 2002 Barcelona EU Council meeting, to reach 0.33% by 2006. In general, there is relatively little translation of the country's environmental diplomacy objectives into ODA programmes and into financial assistance to central and eastern European countries.

Recommendations:

- identify and carry out cost-effective measures to achieve the objectives of the *National Climate Strategy*; in particular, implement them with full participation of, and clear division of responsibilities among, all relevant sectors and various levels of government;
- continue to support international efforts to inventory, and set reduction targets for, *pollutant discharges to the Danube River* and to strengthen regional institutions (e.g. the DABLAS Task Force) in the interest of facilitating needed investments in downstream countries;
- improve enforcement of reporting obligations regarding *trade and environment* issues (e.g. hazardous waste and chemicals, tropical timber, endangered species), and clarify reporting requirements at provincial level;
- ensure that environmental evaluations of projects supported by *export credits and credit guarantees* reflect good practice, using international standards or equivalent host country standards as benchmarks;
- increase ODA levels, and give greater emphasis to environmental projects that support the priorities set out in the *2002 Development Co-operation Act* (e.g. management of water resources, development of renewable energy sources);
- improve coherence between objectives of Austria's *environmental diplomacy* in central and eastern Europe and official aid priorities (e.g. improving wastewater treatment in the Danube basin, implementing climate protection measures through Kyoto mechanisms).

BELGIUM*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR AND WATER MANAGEMENT**
- 3. NATURE AND BIODIVERSITY MANAGEMENT**

Part II
SUSTAINABLE DEVELOPMENT

- 4. ENVIRONMENTAL-ECONOMIC INTERFACE**
- 5. ENVIRONMENTAL-SOCIAL INTERFACE**
- 6. ENVIRONMENTAL-HEALTH INTERFACE**

Part III
INTERNATIONAL COMMITMENTS

- 7. INTERNATIONAL CO-OPERATION**

REFERENCES

* Also available in Dutch.

CONCLUSIONS AND RECOMMENDATIONS*

This report examines Belgium's progress since the previous OECD Environmental Performance Review in 1998 and the extent to which the country is meeting its *domestic objectives and international commitments* regarding the environment.** The progress made by Belgium during the review period is seen in the report as resulting from the authorities' environmental and economic decisions and actions, as well as from the efforts of private enterprises, households and non-governmental organisations. Forty-seven recommendations are made that could contribute to further environmental progress in Belgium.

In a country as densely populated and economically developed as Belgium, *pressures on the environment are strong*. As much as one-fourth of the territory is built-up or covered with dense networks of roads, railways and navigation canals. Industry, heavy freight and passenger traffic, and intensive livestock production and crop cultivation also put pressure on the air, soil, water resources and nature. In this context, making development economically, environmentally and socially sustainable is a challenge. Because of Belgium's very open economy (exports reaching 83% of GDP and imports 81%), and its location, there are many physical and economic interdependencies among Belgium, its European partners and beyond. This explains the very proactive attitude of Belgium concerning international environmental issues.

In the period leading up to 1993, Belgium went through a series of institutional reforms which transformed it into a federal state made up of three regions and three linguistic communities. Since then, environmental responsibilities have been clearly defined and the federal, regional, community and local authorities have done a great deal to accelerate efforts to reduce pollution, protect nature and biodiversity, and also promote sustainable development.

However, Belgium is still catching up on the *environmental backlog from the past*. The challenge now will be to: i) pursue efforts to implement environmental policies effectively and efficiently; ii) further integrate environmental concerns into economic and social decisions; and iii) meet the country's international environmental commitments.

1. Environmental Management

Strengthening the implementation of environmental policies

After periods of uncertainty and of major environmental reforms associated with the process of federalisation of the country, Belgium's federal and regional

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 25 September 2006.

** The report also reviews Belgium's progress in the context of the OECD Environmental Strategy. 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).

authorities were able, during the review period, to build on: i) *stable environmental institutions* with a clear division of responsibilities and mechanisms for co-operation, ii) *EU environmental legislation* as well as the country's international commitments, and iii) *co-operation and partnership* with industry, trade unions and environmental NGOs. Total expenditure on pollution abatement and control grew significantly, reaching about 1.7% of GDP. Nature protection also progressed, with the extension of protected areas in the context of the Natura 2000 network, despite the very high densities of population, activities and infrastructure of the country. Well established regional environmental administrations now all have *planning cycles*, indicators of progress and policy review mechanisms, and all have implemented *advanced environmental policies*. Federal authorities have exercised their responsibilities (e.g. ecotaxes, product standards, trade matters, international matters, radiation protection and protection of the marine environment). Better environmental management was achieved through a *mix of policy instruments*, including economic instruments, information campaigns, agreements (between the regions, provinces and municipalities), regulations (which were codified or streamlined) and voluntary actions (taken by industry). *Inspection authorities* improved their effectiveness and efficiency. Progress with single permitting and the use of environmental impact assessment was noteworthy. All these efforts have contributed to *partly repay the country's outstanding environmental debt*.

Recommendations:

- increase the use of *economic instruments* (e.g. taxes, charges, trading mechanisms) and *economic analysis* (e.g. cost-benefit analysis);
- strengthen the review by regional authorities of municipal *land-use plans* to increase their effectiveness in addressing environmental objectives; strengthen *co-operation among regions* in land-use planning and environmental impact assessment;
- strengthen environmental *inspectors*; increase their effectiveness and efficiency, where appropriate;
- review the experience with *partnerships* between government and non-governmental organisations (e.g. industry, trade unions, environmental NGOs) to see how such partnerships can be made more ambitious, cost-effective and transparent and how they can be associated with other instruments.

However, a number of indicators show that the results are not sufficient. Energy use, material use and pollutant emission *intensities* (i.e. per unit of GDP) remain relatively high. Indicators of *densities* of environmental pressures (i.e. per km²) are also very high. Addressing this will require Belgium to strengthen and/or extend its environmental efforts and to make them more cost-effective by increasing the use of *economic instruments* (e.g. taxes, charges, emission trading mechanisms) and *economic analysis* (e.g. cost-benefit analysis), notably for air, water and waste management. Belgium has still not fully implemented all EU environmental directives. The mix of policies covering waste management could often be more efficient. *Voluntary approaches* could often be more ambitious. *Land-use legislation, planning and policy*, which formally address environmental concerns, need to do so more widely in practice, to better control urban sprawl and the loss of green spaces.

Air

Overall, Belgium made good progress over the review period in reducing air emissions. The *adoption of best available technology* significantly reduced emissions from the *industrial sector*. *SO₂ emissions* were further decoupled from economic growth. Nearly all air management objectives for *hazardous substances* were met (e.g. targets met for 20 of 22 substances regulated by the North Sea Conference, including dioxins) and further targets have been set. Ammonia (*NH₃*) emissions have been falling since 2000 as a result of livestock limitations and application of low emission standards for manure treatment. Concerning electricity production, emission reduction targets set under a *voluntary approach* were all met (*SO₂* reduced by 92% and *NO_x* by 66% between 1980 and 2003), and a further target was agreed. The National Emission Ceiling (NEC) target for *VOCs from transport* was met thanks to fuel regulations and a switch to diesel vehicles. The last ten years also saw significant improvement in establishing air *monitoring networks*. Both federal and regional authorities have recognised the importance of improving the availability of public transportation, and several new projects are envisaged (e.g. the Diabolo project to establish a direct rail link between the Brussels airport and several large towns).

Recommendations:

- strengthen measures to reduce *PM* emissions, especially from the transport sector (e.g. fuel quality control, stricter car inspection for diesel vehicles);
- boost efforts to reduce *ozone* episodes; reduce emissions of *NO_x*, *VOCs*, *PAHs* and trichlorobenzene; consider additional measures to reduce *household emissions* (e.g. *PAHs*, *NMVOCs*);
- better control air pollution from *ocean and inland navigation* (e.g. fuel quality standard);
- evaluate and implement policy mixes (including use of economic instruments) to *improve the efficiency of air quality management*;
- adopt a *national transport plan* and ensure that the various (e.g. federal and regional) transport plans are consistent, mutually supportive and well implemented;
- develop *transportation* pricing and taxation (e.g. excise tax on fuel, road pricing) to help internalise the environmental damage costs;
- improve *energy efficiency* in all sectors, with special attention to the building sector.

However, further efforts are needed to reduce the emissions of certain substances and to capture related economic health benefits (e.g. reduced health expenditure and higher labour productivity). Reducing *PM* emissions (e.g. from the transport and industrial sectors) should be given higher priority with particular attention to *PM_{2.5}* and health effects. In spite of good progress in reducing *NO_x* from stationary industrial sources, the NEC target will not likely be met. The ground level *ozone* air quality standard was exceeded a dozen times during the summer of 2003, and no improvement has been observed. NEC targets for *SO₂* and *NO_x* transport emissions are not likely to be met in 2010 without additional measures. Overall, Belgium has found it harder to implement measures to reduce air emissions from household (residential and mobile emissions) sources than from industrial stationary sources. Federal and regional *transport policies* are not well co-ordinated and air pollution from road transport is

increasing. Measures are also needed to reduce emissions from *ships*. Though highly subsidised, *public transportation* is losing ground compared with private vehicles. Attention should be given to developing an appropriate *policy mix* (e.g. including economic instruments such as higher diesel fuel taxes and road pricing). The *energy intensity* of Belgium is relatively high and should be reduced. In particular, energy efficiency in the building sector should be improved.

Water

Thanks to the concerted effort of the three Belgian regions, the share of the population connected to a *waste water treatment* plant grew from 26 to 46% over the last decade. As a result, the concentration of pollutants in many surface waters dropped, and aquatic life became more abundant. The clean-up of contaminated sediments in Flemish water courses proceeded according to plan. Further reforms in the *financing of water infrastructure* led to a more consistent application of the polluter-pays principle. Overall, Belgium's pricing policy reflects that *water is an economic commodity with a social dimension*. *Industrial discharges* to water continued to decline. The reduction targets set by the International Conference on the Protection of the North Sea were achieved for 25 out of 37 substances. The federal government adopted *new laws* to protect the marine environment. Flanders adopted a decree on integrated water policy and Wallonia codified its water laws. Implementation of the EU Water Framework Directive was actively pursued by all relevant federal, regional and local administrations, including in the international basins of the Scheldt and Meuse rivers. Belgian administrations reviewed and updated their approach to *reducing flood hazard*.

Yet despite these efforts, *Belgium still faces major water pollution challenges*. First, the very intensive *agriculture* found in parts of Belgium (with indicators of livestock density and use of pesticides and nitrogenous fertilisers among the highest in the OECD) continues to have a very deleterious impact on the country's water resources. A large and increasing proportion of groundwater aquifers have high levels of *nitrates* and *pesticides*. Although progress was made over the review period in implementing the EU *Nitrates Directive*, Belgium's current policies for reducing nutrient loads are unlikely to be sufficient to meet the directive's targets. Second, *water quality* in many streams and rivers, notably in the more densely settled parts of the country, is still far below what will be required by 2015 under the EU Water Framework Directive. The share of bathing waters that satisfy EU standards is not as high as in many other EU countries. The concentrations of nutrients, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), lindane and organotin compounds in coastal waters are of some concern. Third, despite its efforts, Belgium has not met the deadlines of the EU *Urban Waste Water Treatment Directive*. Public and private expenditure on waste water management, at 0.50% of GDP, remains low in view of the effort needed to eliminate the infrastructure backlog. A considerable investment in sewerage systems will be needed in the years to come. Delays have been due partly to the difficulty of building new infrastructure in densely settled areas, but also to a lack of co-ordination in planning treatment stations and sewerage networks. Moreover, the current share of combined systems in the country's sewerage networks, which allows the undesirable entry of storm water into sewers, compromises the investment in treatment stations. Progress toward full cost recovery of waste water expenditure has been slow and is not likely to be achieved soon.

Recommendations:

- review and revise *manure management and fertiliser use policies* in order to further reduce nutrient loading of ground and surface waters;
- bolster current efforts to reduce *pesticide* contamination of water sources (e.g. by increasing the rate of the existing pesticide tax);
- maintain the recent acceleration of construction of *waste water infrastructure*, including upgrading existing sewerage networks; ensure that financing arrangements do not slow progress; improve synchronisation in the construction of regional waste water treatment and municipal sewerage infrastructure;
- firmly implement measures to achieve full *cost recovery of sewerage and waste water activities* through “polluter pays” charging systems, with due regard to social concerns;
- speed up the *provision of sewage treatment* for all dwellings outside zones served by public systems;
- formulate measures to identify and remove remaining and new sources of *hazardous substances*.

Nature and biodiversity

During the review period, Belgium stepped up very significantly its efforts to protect nature and biodiversity. A comprehensive assessment of biodiversity and inventory of species was completed. *Protected areas* were expanded and now cover 11.6% of the country. Wallonia designated new nature parks and other protected areas, the Brussels-Capital Region set up a “green and blue network”, and Flanders established a legal framework for development of the Flemish Ecological Network, of which about 70% has been designated. Nearly 13% of the national territory was designated as part of *Natura 2000*, providing new opportunities to combat fragmentation of habitats, expand protected areas and further involve stakeholders (farmers, forest owners) in nature conservation. Co-operation agreements led to establishment of “chartered reserves” and nature conservation on military domains. Implementation of *sustainable forest management* was actively pursued, and forest certification increased. Belgium contributed to *international co-operation* concerning migratory species (e.g. designating more Ramsar sites) and trade in endangered species (e.g. stepping up controls and penalties for CITES violations).

However, economic activities in the context of Belgium’s very high densities of population (341 inhabitants/km²) and roads (488 km/100 km²) exert high pressures on species and habitats, and *the loss of biodiversity is increasing*. If Belgium is to halt biodiversity loss on its territory by 2010 (an EU target adopted in 2001), much needs to be done to further protect species and habitats, expand marine protection, continue with sustainable forestry and better integrate nature concerns into agriculture and land use. The management of protected areas generally needs to be improved and their protection objectives made more explicit (e.g. nature parks in Wallonia). Efforts to combat fragmentation should be continued. Financial resources for biodiversity need to be significantly increased and *economic instruments* more widely used. The biodiversity objectives of the federal plan for sustainable development need to be followed up by federal biodiversity action plans, and regional comprehensive packages of actions

focusing on sustainable agriculture, sustainable forestry and habitat protection should be further developed and implemented.

Recommendations:

- complete the *National Biodiversity Strategy* (as required under the UN Convention on Biological Diversity) with close co-operation between regional, federal and local authorities and stakeholders; include quantitative targets, as appropriate;
- strengthen the *management of protected areas* (e.g. new nature parks, agreements with landowners and/or land users) and the *connectivity between protected areas* in the context of Natura 2000, including through enhanced regional co-operation; extend biodiversity corridors by improving the ecological water quality of rivers, as required by the EU Water Framework Directive;
- enhance *nature conservation on farmland*; set targets and periodically evaluate achievements;
- promote *common forest management* among private forest owners, so as to create economies of scale and foster environmentally-friendly land use, thereby enabling sustainable forest management;
- enhance public and private *financing of nature and biodiversity conservation* (e.g. hunting plans and fees to control large game populations, local nature tax on building permits);
- further *implement international agreements* to protect nature and biodiversity (e.g. CITES, CBD).

2. Towards Sustainable Development

Integration of environmental concerns into economic decisions

Belgium made progress over the review period in *decoupling* environmental pressures from economic growth for some conventional pollutants (e.g. SO_x and NO_x emissions) and for water abstractions. Growth in household waste for final disposal was also decoupled from economic growth due to high rates of recycling. *Sustainable development institutions* were developed at the federal level (Sustainable Development Law, establishment of a governmental committee and of a council for sustainable development, creation of a Secretary of State position for sustainable development). Two federal plans were adopted along the three pillars of sustainable development, together with evaluation and consultation procedures. Principles of sustainable development were also embodied in the regional environmental plans. The regional governments made some progress in *integrating environmental concerns into agriculture* (by augmenting support for agri-environmental measures). *Climate change policy* is moving ahead with the regional climate change plans and national burden-sharing agreement, and through a range of domestic measures, participation in the EU emission trading scheme and the Kyoto Protocol flexibility mechanisms.

However, there is still a need to decouple *road freight transport* from economic growth, as the increase in road freight transport is of high concern. *Energy intensity* (total primary energy supply per unit of GDP) is still considerably higher than in neighbouring countries. Integration of environmental concerns into energy policy is lagging. Energy

prices should internalise environmental external costs. *Pressures on water and soil resources* (from water abstractions, nitrate and pesticides) are *among the highest in the OECD*. The targets to expand *organic agriculture* have not been met. A number of tax concessions lead to perverse effects on the environment. No action has started on a *green tax reform* as recommended in the last OECD environmental performance review. The effectiveness and economic efficiency of the country's subsidy schemes for rewarding environmental behaviour may need to be reviewed. Quantitative targets are needed and cost-benefit analysis should be used more systematically for setting priorities.

Recommendations:

- establish a *green tax commission* and review, and if necessary revise, the relevant taxes and other economic instruments to improve their effectiveness and economic efficiency; review systematically the environmental effectiveness and economic efficiency of the country's financial assistance schemes;
- further implement the federal plan for *sustainable development (2004-08)*; develop and implement a national strategy for sustainable development, in line with UN commitments;
- set *quantitative targets* for the environment in relevant planning (e.g. economic and sectoral); make further use of economic analysis for setting environmental and sustainable development priorities;
- further *integrate environmental concerns into sectoral policies* (e.g. energy, transport, agriculture) through strategic environmental assessment and development of market-based mechanisms; further implement policy and measures to improve *energy efficiency*;
- strengthen *institutional co-operation* between departments and between federal and regional governments, in particular as regards the environment-energy interface;
- conduct a *comprehensive review of climate* mitigation measures beyond the EU emission trading scheme.

Integration of environmental and social decisions

Innovative pricing and financing instruments now help ensure *access for all to essential environmental services* such as water services. Water pricing differentiates between (low-priced) essential uses and (high-priced) luxury uses. Belgium can be considered to be fully implementing the *right to water* in its internal legislation. People in need will not be disconnected and the price of water will be affordable to poor households. Wallonia will introduce a tax on billed public water supply to finance development assistance in the water sector. Concerning *environmental information*, environmental data collection and publication improved substantially at regional and federal levels, leading to high quality *environmental reporting*, to more evidence-based and outcome-oriented environmental governance, and to performance-oriented planning. Concerning *environmental awareness* and related action, much has been done at federal, regional, community and local levels, including: communication campaigns, financial transfers to local authorities, voluntary regional-municipal covenants, and support for innovative waste prevention and eco-consumption projects. The voluntary regional-municipal covenants are particularly innovative. Several *partnerships* with

private enterprises, trade unions, local authorities and environmental NGOs have succeeded in improving environmental management. Environmental work by NGOs has often received government financial support. Directly or indirectly, the environmental sector contributes to *employment* in Belgium, and related jobs increased by about 10% over the review period.

Recommendations:

- continue to improve *access for all to environmental information*, and improve the *comparability* of information among regions;
- increase citizens' *access to justice* in environmental matters;
- implement the user-pays principle for environmental services (water, waste) while continuing to give access to these services to *the poor*; consider extending fiscal incentives for energy-saving building insulation;
- continue to develop *environmental education*, particularly at higher education levels;
- continue to *develop partnerships with NGOs* and further involve local volunteers in managing protected areas, including in densely populated areas;
- further analyse the impacts of environmental policy on *employment in Belgium*.

However, *access to environmental information* is hindered by being so widely dispersed among a multiplicity of sources in the federal, regional and provincial administrations. Citizens also need to be better informed about their rights concerning access to information and to courts in environmental matters. Public consultation could be improved by allowing more time to take comments into account. *Environmental education* could be further improved, especially at higher education levels (e.g. university level), to increase *eco-consumption*. Energy efficiency and use of public transportation could be increased. Available information on the *impact of environmental policy on employment* in Belgium is not sufficient to support a better integration of environmental and employment policies.

Health and environment

Belgium has vigorously taken up the challenge posed by the growing concerns about health and environment (e.g. growing numbers of respiratory diseases, asthma, allergies, cancers and obesity). The *federal government, regions and communities* closely collaborate on environmental health issues and have signed a co-operation agreement with the force of law. At all levels, the governments give importance to *science-based* assessments, providing *information* to the population, the *precautionary principle, planning and action*. During the review period they adopted the National Environment and Health Action Plan (NEHAP), which will soon include measures on children's environmental health (CEHAP), and established a permanent management structure to carry out joint research and monitoring. The federal government now includes environmental health in its responsibilities for *product standards*. Brussels-Capital is implementing a noise abatement plan and participates in an international project on air pollution and health. Flanders included environmental health outcomes in its most recent environmental policy plan and has since 2002 been implementing an environmental health action plan; it has also initiated an extensive, ongoing human

biomonitoring survey. Wallonia is developing a regional environmental health action plan with a series of indicators and plans to adopt a regional noise abatement plan, as well as a nutrition and health plan. All three regions have established services to provide diagnostic assistance in cases where the *indoor environment* is suspected of causing health problems. Good work is also being done in public awareness-raising and *education* about health and environmental issues, including the health benefits of access to nature.

Still, Belgium has yet to marshal all the elements needed to set *priorities* in this field efficiently. Environmental risk factors are implicated in the main causes of mortality (e.g. cardiovascular diseases, cancer, respiratory diseases). The *economic aspects of the environment-health interface*, essential to identifying the cost of diseases and the benefits of action, is still largely absent in the research and monitoring now taking place, although public health expenditure represents 9.6% of GDP and is growing. In particular, work is needed on *fine and very fine particles* in ambient air. The number of annual *ozone* episodes will need to be brought down substantially if Belgium is to stay within the 25-day maximum set for 2010 by the EU Ozone Directive. Progress is also needed in reducing *noise*, including that from road transport, railways and airports. Regarding water quality, *nitrate* in groundwater are a widespread problem as many aquifers show a nitrate content close to the limit of 50 mg per litre. High *pesticide* concentrations in some aquifers also pose problems for the drinking water supply. Pesticide use per unit of agricultural area remains the highest in OECD-Europe.

Recommendations:

- further develop and firmly *implement the NEHAP and CEHAP*; specify appropriate *environmental health outcomes* and incorporate these in the plans of all governments;
- build on the current *co-operation among federal, regional and community entities to address environmental health issues*; in particular, strengthen research on and monitoring of the link between exposure to environmental conditions and human health, including multi-factorial effects;
- analyse the *costs and benefits* of environmental health policies;
- ensure that *data collection efforts* focus on policy-relevant information and establish mechanisms to transfer policy-relevant research to policy makers; consider extending the Flemish biomonitoring programme to cover the whole country;
- continue to strengthen the possibility for the *public to make balanced decisions* on health and environment, e.g. through education, product labelling and information campaigns;
- place greater emphasis on public *access to green urban areas* in land-use planning policies.

3. International Co-operation

In recent years, Belgium has improved its record in ratifying international agreements and in transposing EU Directives, and has reduced delays in ratification processes as a result of enhanced co-ordination between federal and regional authorities on international issues. Concerning *marine issues*, Belgium initiated “sea-use planning” and the creation of marine parks in its newly designated exclusive economic zone, following ratification of the Law of the Sea in 1999. Aerial surveillance of illegal discharges at sea was extended (Bonn Protocol); the control of ships calling at Belgian ports was improved to comply with the Paris Memorandum of Understanding on port state control; and efforts were made to strengthen oil spill preparedness, response and control. Concerning *trade*, with a very open economy, Belgium actively promotes multilateral approaches to trade/environment issues, implementation of specific multilateral environmental agreements, and an EU policy to import tropical timber from certified forests. Over the review period, *CO₂ emission intensity* decreased and Belgium prepared for timely implementation of the new *EU emission trading scheme*, including by creating a national greenhouse gas registry. A comprehensive national climate plan is being prepared building on a national burden-sharing agreement. *Belgium’s official development assistance* increased from 0.35% of gross national income in 1998 to 0.53% in 2005.

However, integration of *climate change* objectives in energy policy could be strengthened: the impacts of energy pricing and of the energy mix on mitigation should be further assessed, a CO₂ tax is no longer envisaged, and there is a tendency to rely on buying credits on external markets to comply with Kyoto commitments. CO₂ emission intensity is still high by European standards and efficiency gains could be obtained by enhancing co-ordination of regional climate plans. Nitrogen loads in water bodies remain very high, and Belgium still has difficulty complying with the EU Nitrates Directive and *North Sea* commitments to reduce land-based sources of pollution. The share of *official development assistance* devoted to the environment (e.g. water) is low, and efforts should be made to ensure that bilateral and development co-operation by the regions does not erode the national focus on selected countries and sectors. Monitoring and inspection efforts concerning illegal *trade* (ozone-depleting substances, hazardous waste, endangered species) should be stepped up.

Recommendations:

- adopt and implement the comprehensive *National Climate Plan*, taking account of the National Allocation Plan, reviewing reliance on buying credits on external markets and other flexibility mechanisms, and maximising synergies between federal, regional and sectoral policies and measures;
- integrate objectives related to climate change in *energy and transport policies* (e.g. energy efficiency, energy pricing and taxation, transport pricing and taxation);
- enhance protection of *marine ecosystems*, e.g. through creation of new marine nature reserves; continue efforts to reduce pollutant releases into the North Sea, by increasing urban waste water treatment and reducing agricultural run-off;
- strengthen efforts to prevent illegal trade of *ozone-depleting substances and hazardous waste*;
- increase the environmental component of *official development assistance* (e.g. water);
- proceed with pending *ratifications*, including through better co-ordination among Parliaments.

CANADA

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR MANAGEMENT**
- 3. WATER MANAGEMENT**
- 4. NATURE AND BIODIVERSITY MANAGEMENT**

Part II
SUSTAINABLE DEVELOPMENT

- 5. ENVIRONMENTAL-ECONOMIC INTERFACE**
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REFERENCES

CONCLUSIONS AND RECOMMENDATIONS*

The Canadian economy grew by 39% overall between 1990 and 2002 (despite an economic slowdown, along with the global downturn in 2001) while the population increased by 13% to reach 31 million today. *GDP per capita is among the highest in the OECD area.* With trade liberalisation Canada's economy has become more export-oriented and *more closely linked to the economy of the United States*; the US now accounts for three-quarters of Canadian exports and two-thirds of its imports. *Natural resources* continue to make an important contribution to Canada's economy. Agriculture, forestry and fishing represent 13.6% of GDP. Canada accounts for about 40% of world exports of softwood lumber and is a major exporter of wheat and fish, as well as of energy products and minerals. The *provinces and territories* play an active role in economic development, particularly with respect to manufacturing in Ontario and Quebec, fishery in the Atlantic provinces, forestry in British Columbia, agriculture and oil and gas production in the prairie provinces, and mining in the North.

Despite Canada's very low population density, pollution and natural resource depletion issues have continued to be politically significant over the years. *Decoupling* of environmental pressure from economic growth has been achieved in some areas (e.g. SO_x and NO_x emissions), but Canada still faces challenges associated with high energy intensity, biodiversity loss, and fishery resource depletion. Today the *priority environmental issues* include climate change, health protection, nature protection, air and water quality, waste water collection and waste disposal. As the goal of environmental protection is not explicitly embodied in Canada's Constitution, environmental federalism implies that specific environmental governance issues are to be addressed by federal, provincial or territorial authorities. Although *sustainable development* is a major stimulus for changes in governmental structure and behaviour, it still largely remains to be translated into practical institutional and market-based integration.

To meet these challenges, it will be necessary for Canada to: i) thoroughly implement its environmental policies, improving their cost-effectiveness and inter-jurisdictional co-ordination; ii) further integrate environmental concerns into economic and sectoral decisions; and iii) pursue its international environmental co-operation. This report examines progress made by Canada *since the previous OECD Environmental Performance Review* in 1995, and 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 42 recommendations are made that could help strengthen Canada's environmental progress in the context of sustainable development.

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting in January 2004.

** Objectives of the "2001 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 2.3), integration of social and environmental concerns (Section 2.2) and global environmental interdependence (Section 3).

1. Environmental Management

Implementing more efficient environmental policies

Since the mid-1990s Canada has made many significant improvements in its environmental policies. It has presented some major *intergovernmental policy statements*, including a Canada-wide Acid Rain Strategy, Canada-wide Standards for Particulate Matter and Ozone, and agreements on harmonisation of assessments, approvals, monitoring and enforcement. The *legislative framework* has been substantially enhanced, notably through the 1999 Canadian Environmental Protection Act (CEPA). Comprehensive *compliance and enforcement policies* and strong public reporting mechanisms have been developed to support these efforts. Environmental impact assessment legislation has been strengthened, with improved intergovernmental and interagency co-ordination and with better public reporting and follow-up. The federal government is promoting increased *awareness of economic instruments* through the National Round Table on the Economy and the Environment. Federal and provincial governments are also continuing substantial analytical and design work on instruments (e.g. trading of GHG, SO_x and NO_x emissions permits). The federal government has reviewed Canadian experience with *voluntary approaches* and has developed a policy framework to enhance their effectiveness.

Recommendations:

- further implement federal and provincial environmental legislation, ensuring that *federal and provincial compliance and enforcement programmes* are well co-ordinated and adequately resourced;
- consider ways to improve the cost-effectiveness of environmental policies by extending the use of *economic instruments* such as charges for water supply and air and water pollution; further implement *emissions trading schemes* (e.g. for greenhouse gases, SO_x and NO_x);
- continue to develop cost-effective *voluntary approaches* within industry, ensuring that these approaches are consistent with Environment Canada's 2001 policy framework;
- review the economic efficiency and environmental effectiveness of various incentive schemes proposed under current or planned environmental programmes (e.g. for air, water, waste management) and apply more rigorously the *polluter pays principle* and the user pays principle.

Following a period of devolution of environmental responsibilities to the territories and within some provinces, and despite efforts to strengthen the implementation of legislation, doubts remain about the capacity to fully implement and enforce legislation and standards at federal level (e.g. the CEPA agenda on toxics) and sometimes at provincial level. In the second half of the 1990s there were *large cuts in federal and provincial environmental budgets* as a result of fiscal consolidation efforts at both levels of government. This was followed in the early 2000s by increases in the federal and some provincial environmental budgets. Overall, total pollution abatement and control expenditure (i.e. public and private, investment and current) reaches *1.1% GDP*, on the lower side among G7 countries. *Actual use of economic instruments* (e.g. environmental charges, environmental trading) could be expanded. The wide use of *voluntary approaches* has not always been effective or efficient. Concerning the *polluter*

pays principle, to which Canada subscribes, further progress could be made in internalising pollution externalities and reducing government financial assistance to pollution abatement and control, thereby increasing the *cost-effectiveness of environmental policies* and contributing to an environmental “level playing field”. Further recognition of economic opportunities for environmental products and technologies could be pursued. Greater *intergovernmental co-ordination* is required to ensure continued progress on several key policy issues (e.g. climate change, water catchment area management).

Air

SO₂ emissions have decreased significantly over the last ten years, largely as a result of provincial reduction targets implemented through regulations or voluntary approaches. Consequently, sulphate loads affecting eastern Canada have been reduced and lake sulphate levels have shown considerable improvement. Ambient levels of NO_x, SO_x, CO and total suspended particles have decreased in urban areas. Canada-wide standards have recently been endorsed for PM_{2.5} and ground-level ozone, as well as some toxic substances such as benzene, dioxins, furans and mercury, with targets to be achieved by 2010. Increasingly stringent *emission standards for motor vehicles* have been adopted; by 2010 national standards on NO_x and VOCs will be aligned with US standards. Progress has been made in improving periodic vehicle emission inspections. New regulations will reduce the *sulphur content of road fuel* to 15 parts per million for diesel by 2006, and to an average of 30 ppm for gasoline by 2005 (from the current levels of 500 ppm and 150 ppm, respectively). Most direct *subsidies to the fossil fuel supply industries* have been reduced if not eliminated in recent years. Concerning *energy efficiency*, voluntary sector-specific targets have been defined and continuously evaluated; comprehensive regulation has been issued for energy efficient appliances and buildings, as well as standards and guidelines for energy efficient technology. Significant federal investment has been committed for energy efficient infrastructure, including through Green Municipal Funds. The share of *renewable energy* (including large hydro) in total energy supply has remained relatively high (16%). A target has been established requiring that 10% of new electricity generating capacity come from emerging renewable sources such as wind, solar, biomass and small hydro. Production incentives (for wind energy), purchase refunds and fiscal concessions have been granted to develop the use of renewable energy sources. An *emissions trading scheme for SO₂ and NO* was recently launched, targeting large emitters in Ontario’s electricity sector; the design of this scheme could be improved.

However, emissions of traditional air pollutants in Canada remain very high compared with most OECD countries. While new initiatives were signed recently aimed at further progress in air management, the 1991 Geneva (VOCs) and 1999 Gothenburg (acidification, ground-level ozone) Protocols to LRTAP have not yet been ratified. *NO_x and VOC emissions* have increased since the early 1980s, partly reflecting sustained growth in vehicle use. Lake sensitivity to acid rain is greater than initially thought; a further 75% reduction in SO₂ emissions, beyond current commitments, may be needed in some regions. Although levels of primary airborne pollutants have decreased, many parts of Canada (both urban and rural) continue to experience unacceptable air quality, including for fine particles and ground-level ozone (there are high levels in the Windsor–Quebec City corridor). Canada is still characterised by high *energy intensity*. Ongoing market liberalisation of the energy sector could depress electricity prices. *Road fuel prices* have been virtually unchanged in the last ten years. They are still much lower than

the OECD average, though higher than prices in the US. The use of *economic instruments* could be expanded. The instruments used either have little incentive effect (e.g. motor vehicle tax rebate) or primarily respond to objectives other than environmental ones (e.g. bio-diesel tax rebate). The 2001-03 Sustainable Development Strategy of Transport Canada suggests moving towards “full cost pricing” with transport costs reflecting, to the extent possible, full economic, social and environmental costs.

Recommendations:

- further reduce *SO₂ and NO_x emissions* (in line with 2010 targets) using the most cost-effective available policy measures (e.g. emissions trading in polluted areas, air emission charges, binding air emission standards and voluntary approaches); set a reduction *target for VOC emissions* and ratify the Gothenburg Protocol to the Convention on Long-range Transboundary Air Pollution (LRTAP);
- ensure proper implementation of Canada-wide Standards for ambient concentrations of *PM_{2.5} and ground-level ozone* by 2010;
- improve the design of Ontario's *NO and SO₂ emissions trading scheme*, particularly by extending its source coverage and by fixing an overall emission cap;
- reduce the *energy intensity* of the economy and increase the share of low-emission energy sources, particularly through further internalising environmental externalities in energy prices for industry and households;
- expand use of *economic instruments in the transport sector* (e.g. tax breaks for individuals using public transport, incentives to promote shift from road to rail freight transport, incentives to purchase fuel-efficient vehicles, gasoline taxation).

Water

Canada has moved in recent years towards a *more strategic approach to water resource management*. Several provinces have modernised their water legislation, as well as adapting comprehensive water management strategies or plans for the first time. The river basin approach already applied in some major watersheds (e.g. the Great Lakes) is being extended to other catchments. Further progress was made during the review period in reducing water demand in the *electricity and manufacturing sectors*. Industrial pollution loads, including toxics in the Great Lakes, have also been reduced. While settlement patterns have ruled out substantial growth in *municipal sewerage* connection rates beyond the current three-quarters of the population, the proportion of sewered waste water that is untreated before discharge has fallen from 10.6% of the population in 1991 to 2.5%. The level of treatment has improved; the share of the total Canadian population benefiting from secondary or tertiary treatment increased over ten years from 47.5 to 57.9%. A more rigorous approach is being taken to reducing the environmental impacts of *agriculture* on the water environment.

Recommendations:

- firmly implement water management policies, including *provincial water strategies* (e.g. basin management, ecosystem approach, stakeholder participation) and enforcement of regulations (e.g. inspections, sanctions); accelerate the development of integrated water resource management and water efficiency plans;
- improve *efficiency in the delivery of water and waste water services*, through improved *governance* (e.g. consolidation of operators, quality assurance, accountability mechanisms), improved *supply management* (e.g. source-to-tap approaches for municipal drinking water systems, protection of rural water supply wells against contamination, maintenance and renewal of municipal water-related infrastructure) and *demand management* (e.g. water metering, technical measures, use of economic instruments, appropriate pricing levels and structures);
- speed up the access to *water supply and sanitation infrastructure* for all Canadians;
- review systematically *subsidies for water supply and treatment infrastructure and water pricing practices*, aiming at cost-effectiveness and long-term financing in the maintenance and upgrading of facilities; review *subsidies for flood and drought control projects* in terms of their long-term impact on risk; progressively move to *full-cost pricing* while taking account of social factors and the needs of First Nation and Inuit communities;
- continue to promote reduction of water use and releases of water effluents from large as well as small and medium *enterprises*;
- ensure that the environmental intentions of the *Agricultural Policy Framework* are firmly translated into actions and environmental results (e.g. with respect to nutrients, pesticides, irrigation);
- improve the *information and knowledge base* for water management, including i) harmonised and up-to-date monitoring of ambient water quality; ii) better data on expenditure, prices and financing; and iii) further analysis of micro-economic conditions facing key water users.

However, slow progress with the clean-up of the Great Lakes demonstrates the difficulty of restoring impaired ecosystems. Following some decentralisation and delegation of water management responsibilities in some parts of the country, Canada experienced two major drinking water contamination incidents resulting in deaths. These incidents shook public confidence throughout Canada and jolted authorities into closely scrutinising drinking water management practices, including protection of source areas. Large increases in animal manure production, particularly from rapidly expanding piggeries in Quebec and Ontario, are of special concern in this regard. Moreover, poor inspection and maintenance of septic tanks serving over one-quarter of the population is a safety risk for the many wells that are the main source of individual water supply in rural areas. Residential water use per capita has increased. At the current rate of progress, it could take another 20 years or so for Canada to extend and upgrade its water infrastructure to the level required. Inadequate attention has been given so far to groundwater resources management. Despite the long-standing intention to increase efficiency of water and waste water services, and to implement the user and polluter pays principles, much remains to be done to achieve these objectives. For instance, user fees still cover only part of the cost of delivering water services, while fee structures

generally do not encourage conservation. Subsidies and financial transfers are too often expected to take care of financial gaps. Provincial governments and municipalities should often take a more positive approach to full-cost water pricing, which might allow more rapid renewal of existing assets. Better harmonised and more up-to-date provincial/territorial monitoring data on the quality of Canada's water resources, and water-related economic information, should support these efforts.

Nature and biodiversity

Canada was early in ratifying the UN Convention on Biological Diversity (1992) and releasing a Canadian *Biodiversity Strategy* (1995). Two national action plans have been prepared for the agriculture and forestry sectors (although without clear environmental targets or time frames). The 2003 *Species at Risk Act* will help strengthen efforts towards protection and recovery of species at risk and their critical habitats. Ecosystem protection has progressed, with a 40% increase in total area under protection over the decade. Canada plans to establish ten new national parks, thereby covering 34 of 39 natural regions. *Co-operation with Aboriginal people* has been strengthened with respect to protection of wildlife habitats and forest management. Canada's *wooded area* (over 10% of the world's forests) has remained constant and provides habitat for two-thirds of the country's wildlife. Populations of most monitored forest bird species have remained stable or increased. The share of forest area under strict protection has increased (to 7%). Co-ordination of *forest management* is enhanced by the Canadian Council of Forest Ministers, which has developed criteria and indicators of sustainable forest management, and by the Canada Forest Accord, which contributes to implementation of the National Forest Strategy (released in 2003). Forest certification is increasing rapidly. It now covers one-quarter of working forests. CITES enforcement has been strengthened in recent years, but fines remain low.

Recommendations:

- complete the *national park system*; expand protected areas in the southern part of the country (where habitats are under much pressure); implement the new legal and institutional setting to improve management of national parks;
- substantially increase the total area of *marine and wetland ecosystems* under protection;
- implement the new legislation for the protection and recovery of *species at risk*, with particular emphasis on priority species;
- take the necessary regulatory and financial steps to control the introduction and spread of *invasive alien species*;
- expand the use of *economic instruments* to internalise in a transparent way the positive ecological functions of forests and prevent unsustainable use of softwood resources.

However, the total *number of registered species at risk is increasing* (partly due to increased assessment work) and the status of most of the assessed species at risk is unchanged or has deteriorated. The number of invasive alien species continues to grow; major pathways for aquatic invaders are not regulated or monitored. While 20% of the world's remaining natural areas are in Canada, the *share of total national area protected is less than the OECD average*, and less than the 12% target. This partly reflects the need to respond to Aboriginal land claims and private rights to exploit natural

resources. Much of the protected area is in the North (where human impacts on biodiversity have been less evident); in southern Canada protected areas are often small in size. Wildlife and bird protection areas provide only limited geographic coverage, and this protection is often not stringent. With the world's longest coastline, Canada has *only three small national marine conservation areas* and no marine protected areas (despite 1997 legal provisions). It has one-quarter of the world's *wetlands*, but only 9% are protected. Clear-cutting is still by far the most common forest harvesting practice: the poor design of past clear-cuts has been addressed, but compliance with provincial codes of practice remains largely voluntary. *Forest harvest levels have steadily increased* over the decade; harvest of industrial roundwood is getting very close to annual allowable cut, especially for softwood. There is considerable debate regarding the factors that contribute to this increase, including market conditions, stumpage fees and the forest management regime.

2. Towards Sustainable Development

Integration of environmental concerns in economic decisions

Canada has continued to make progress in *decoupling* environmental pressures from economic growth, achieving reductions in SO_x and NO_x emissions and in water abstractions. Establishment of a *Commissioner* of the Environment and Sustainable Development has played an important role in the auditing of federal sustainable development policies and the implementation of other environmental commitments by the federal government. The experience of this model institution could be usefully reviewed by other countries. The development and adoption of *sustainable development strategies* by all federal departments and various agencies has led to greater co-operation and promoted a culture of horizontality among departments and agencies. Development of strategic environmental assessment has proven useful for integrating environmental concerns into trade policies. There has been a positive trend with respect to reduction of *environmentally harmful direct subsidies* in several sectors (e.g. agriculture, fisheries, coal) but not in others (e.g. mining and some fossil fuel sectors). Measures have been put in place to provide more consistent *tax treatment* across non-renewable energy projects and among the non-renewable and other economic sectors are welcome.

However, in most cases *sustainable development strategies* developed by various federal departments or agencies consist in repackaging current and planned activities and have little bearing on budget allocation. *Fiscal instruments* are generally used as fiscal deductions rather than to internalise externalities, thereby impeding economic efficiency. *Market based instruments* are insufficiently used to foster integration of environmental concerns into sectoral policies; too much emphasis is given to soft instruments like *voluntary guidelines or partnerships*. While *cost-benefit analysis* is becoming more common in policy discussions, it has rarely been a basis for policy decisions. Implementation of *eco-efficiency* is also constrained by inappropriate *market signals*; to provide incentives for eco-efficient projects, instruments such as energy taxes and water charges are required. Despite progress at the federal level in developing a data base related to the environment/economic interface (e.g. with data on pollution abatement and control expenditure), this work is often outdated. Further efforts are needed to *decouple* nitrogenous fertiliser use and municipal waste generation from economic growth.

Recommendations:

- prepare an *integrated federal sustainable development strategy* (including greening of the federal budget); develop and/or implement provincial sustainable development strategies;
- continue to phase out *environmentally harmful subsidies* at both federal and provincial levels, including subsidies in the form of tax incentives for the resource-based economic sectors;
- review existing *environmentally related taxes* (e.g. taxes on transport and on energy products) with a view to restructuring them in a more environmentally effective way, within a neutral fiscal context, at both federal and provincial levels;
- continue to develop and expand the use of *strategic environmental assessment*;
- continue and strengthen efforts to implement *co-ordinated inter-jurisdictional decision-making* that integrates environmental, social and economic policies.

Integration of environmental and social concerns

Scientific and economic research on *pollution and its health impacts* has progressed, contributing significantly to advances related to control of POPs by Canadian and international policy makers. There has been continuing development of Canada-wide standards for key pollutants posing health risks (e.g. benzene, mercury, PM and ozone). The *environmental industry* has grown, generating jobs for qualified environmental professionals; active environmental employment programmes have produced results, including development of environmental expertise in Aboriginal communities. Concerning environmental *public consultations*, creation of the Commissioner of the Environment and Sustainable Development in 1995 further contributed to responding to citizens' environmental queries and requests for investigations using the environmental petition process. The National Pollutant Release Inventory has been improved in terms of coverage and public access. The emergency management system works well with respect to preparation for and response to a range of natural disasters and environmental emergencies (including the 2003 regulations on the latter, requiring commercial and industrial facilities that handle toxic substances to develop an *environmental emergency plan*).

However, parts of Canada continue to experience insufficient air and water quality, leading to significant *health costs*. There are considerable *disparities in access* to safe water supply, including poor water services for Aboriginal people. A number of unsettled land claims have led to *uncertainty about land and resource rights*, hindering investment in resource industries. Areas of the North continue to be exposed to levels of contaminants and potential climate change effects that threaten human health and ecosystems. In particular, the mining industry needs to further improve its environmental and social performance in order to make a sustainable contribution to local economic development. Some *environmental information* is outdated and is not harmonised across federal government departments. Publication of integrated national state of the environment reports ceased in 1996 as a result of budget cuts. While there are some reports (forest, climate change, GEO), further information efforts are needed in the areas of environmental indicators, economic information on the environment, and sustainable development in practice (e.g. environmentally harmful subsidies, cost-effective natural

disaster mitigation measures). Canada has signed but not ratified the 1992 *Helsinki Convention* on transboundary effects of industrial accidents; it has not signed the 1998 *Aarhus Convention* on access to environmental information and public participation in environmental decision making.

Recommendations:

- continue to advance scientific and economic analysis relating to *environmental health*; focus action on pollution affecting human health, including that of vulnerable segments of the population;
- make further progress on *unsettled land claims* in order to remove uncertainties about land and resource rights and foster economic development in Aboriginal communities; continue *devolution of land and resource management* to the northern territorial governments and Aboriginal self-governing communities;
- implement policies to foster economic and social development of *the North* while protecting its natural environment and Aboriginal cultural values; facilitate diversification of economic activities in the North while pursuing implementation of environmentally *sustainable mining*;
- continue efforts to develop and strengthen high-quality and integrated *environmental information* and data and implement the Canadian Information System for the Environment; report periodically on the state of the environment; further develop new natural and human capital indicators.

Sectoral integration: chemicals

The Canadian government has acted to respond to a number of weaknesses highlighted by the report of the Commissioner of the Environment and Sustainable Development to the House of Commons on toxic substances (1999, revisited 2002). To implement the new Environmental Protection Act (CEPA 1999), the government has developed a very comprehensive approach to the *examination and management of existing substances* in commerce. Particular attention is being given to persistent, bioaccumulative and toxic substances, which can affect future generations. By September 2006 approximately 23 000 substances should have undergone the first examination phase and be categorised. The new Pest Control Act, addressing *registration of pesticides*, is planned to come into force in 2004. The *National Pollutant Release Inventory* has advanced significantly. Canada is very active in regional (North America, the Arctic) and *international fora* concerned with chemicals. It participates actively in the OECD programme on chemicals. A policy framework has been developed to make environmental performance agreements effective and credible.

Progress and vigilance are still needed in some areas. Chemicals of major concern are not monitored in the environment on a regular basis. Environment Canada and Health Canada cannot require data on *existing substances* from the chemical industry for their categorisation; there is no time frame for the second phase of identification (i.e. screening-level risk assessment). Even if screening-level risk assessment is less onerous than in-depth risk assessment, adequate resources will be required to reach the ultimate objective of this very ambitious initiative: risk management of all substances of concern (i.e. toxic substances under CEPA). The extent of industry participation in future work has not been clarified. Risks associated with chemicals of

concern are often managed using many *voluntary instruments* without legal back-up; only the greatest risks are managed under CEPA. In the short term, sufficient *resources* have been allocated to implement new legislation on pesticides; in the long term, resources must be secured to ensure continuous implementation. Currently the industry is not charged at the level of the total cost of evaluations, and there is no tax on pesticides. Individual licensing of thousands of emission sources (e.g. in Ontario) does not take into account the *cumulative effects* of exposure to several sources. There is no classification and labelling requirement for *chemicals dangerous to the environment*. Duplication of reporting requirements may result from the lack of coordination between the federal and provincial/territorial governments.

Recommendations:

- continue to improve *monitoring* of toxics in the environment;
- ensure that adequate *resources* are allocated for the examination and management of *existing substances* in commerce; continue to ensure that there are adequate resources to implement the new law on pesticides registration; consider a tax on *pesticides*;
- manage the assessment phase of the review of existing substances of concern in keeping with global timeframes; increase participation by the *chemical industry* in the gathering of information relevant to hazard assessment of chemicals; further strengthen co-operation on (and harmonisation of) *chemicals risk management* through the Canadian Council of Ministers of the Environment; avoid duplication of chemical industry reporting requirements;
- move towards a *classification system for the environment* through implementing the global harmonisation system for classification and labelling of chemicals;
- use an appropriate *mix of regulatory and non-regulatory instruments* to better control chemicals (e.g. regulations, rather than voluntary measures, to address organic or inorganic chemicals of high concern with respect to human health or the environment; voluntary measures, backed up by legal measures, for risk reduction);
- ensure full implementation of the *OECD Council Acts* related to Good Laboratory Practice for new tests (e.g. with respect to new and existing chemicals, including pharmaceuticals).

3. International Commitments

Canada has an *impressive record* regarding international environmental co-operation. It continues to support and pursue a range of agreements, meeting its commitments and obligations. It is an active and responsible party to a wide array of bilateral, regional and multilateral treaties and agreements. Canada provides environmental leadership in *many international bodies* (e.g. UNEP, WMO, WTO, FAO, UN-ECE, the OECD and the UN Commission on Sustainable Development) and is closely identified with important *international initiatives* promoting sound environmental management (e.g. actions related to the ozone layer, climate change, POPs) and sustainable development. This is reflected, for instance, in improved air and watershed conditions in Canadian boundary areas and beyond. At regional level, *Canada-US* environmental co-operation has been close and generally effective; the International

Joint Commission (IJC) is active and is influential on a variety of issues. The fisheries dispute with the US over protection of Pacific salmon has been resolved; long-standing disputes over acid rain have given way to co-operative risk reduction efforts. Growing co-operation with Mexico and the US within the North American Commission on Environmental Co-operation has facilitated a *hemisphere scale* approach to shared air pollution and wildlife management challenges. The eight-nation *Arctic Council* provides a factual basis and opportunities to overcome a previously piecemeal approach to environmental management in that sensitive region.

Recommendations:

- further elaborate and aggressively implement the *Climate Change Plan for Canada*, using a broad array of policy instruments (including emissions trading and other flexibility mechanisms) to ensure that GHG targets are met effectively and efficiently; continue to analyse the costs and benefits of various GHG control measures, including the cost of no action as well as ancillary benefits of taking action; expand co-operation internationally regarding common approaches to greenhouse gas reduction;
- continue *phasing out remaining inventories of ozone-depleting substances* in Canada, and continue efforts to strengthen international compliance with the Montreal Protocol and its amendments, particularly in order to ensure coverage of new ODS and to assist developing countries to comply;
- continue to strengthen *surveillance and enforcement capabilities*, at both federal and provincial levels, with additional staff and expanded investment in technology, to address *marine problems* (e.g. fishing violations, marine oil spills) and *illegal trade* (e.g. in endangered species, ozone-depleting substances and hazardous waste);
- continue progress in improving *water quality in the Great Lakes* and other transboundary waters through co-operation with border country states (e.g. remediation of contaminated sediments, control of invasions by alien species); expand *cross-border water ecosystem management* (e.g. by promoting integrated, ecosystem approaches to transboundary water issues);
- employ, strategically and rigorously, the range of tools available to the government to *promote improved environmental management in developing countries* (e.g. expansion of ODA, CIDA's new policy directions, Canada's membership on the boards of international development banks, the Canadian Export Development Corporation's environmental review requirements);
- review Canada's record in ratifying and implementing *international agreements*.

However, Canada's capacity to translate international commitments into action and results can pose challenges because of its special federal-provincial governmental relationships (implementation is often a shared federal-provincial or a provincial responsibility) and by *budget cuts*. In particular, between 1995 and 1999, such cuts adversely affected staffing levels and programme funding for meeting international obligations (e.g. *enforcement* of laws and regulations) at all levels of government. A number of international agreements should be reviewed for signature and/or ratification (e.g. marine agreements, the Aarhus Convention). Canada (like a number of other OECD countries) failed to meet a year-2000 commitment to *stabilise greenhouse gas emissions*. It accepted and is now pursuing a challenging new Kyoto target. *Marine pollution and resources* issues still need to be addressed. Some commercial fisheries have been closed as a result of over-fishing and environmental changes. Loss of fish and wildlife habitat in riparian and coastal areas due to urban expansion is a growing problem. Water quality in the *Great Lakes* continues to be degraded by PCBs, mercury and other toxic substances released from contaminated sediments and from long-distance atmospheric transport, raising concerns about bioaccumulation in fish and drinking water quality in certain areas. Total ODA declined significantly before a recent commitment and subsequent reversal of this trend. In addition to promising Canadian leadership in environmentally related ODA activities, adequate funding will be required to support follow-up and delivery on national commitments.



CHILE*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR MANAGEMENT**
- 3. WATER MANAGEMENT**
- 4. NATURE CONSERVATION AND BIODIVERSITY**

Part II
SUSTAINABLE DEVELOPMENT

- 5. ENVIRONMENTAL-ECONOMIC INTERFACE**
- 6. SECTORAL INTEGRATION: MINING, FORESTRY, AQUACULTURE**
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Part III
INTERNATIONAL COMMITMENTS

- 8. INTERNATIONAL CO-OPERATION**

REFERENCES

* Also available in Spanish.

CONCLUSIONS AND RECOMMENDATIONS*

Since 1990, Chile has experienced *rapid, increasingly diversified, export-led economic growth*, with a 108% rise in GDP. This economic development was supported by sound macroeconomic and social policies and resulted in significant reductions in poverty. It also put *considerable pressure on some natural resources*, particularly in booming sectors such as mining, forestry and aquaculture. Environmental conditions in Chile should be understood in the context of its rapid pace of development.

Evidence of increasingly severe environmental degradation (e.g. in air quality in the Santiago Metropolitan Region and around copper smelters in northern Chile), together with the restoration of democratic institutions in 1990, led to greater emphasis on environmental protection. Environmental policy has been strongly influenced by concerns over *human health and international trade* (as Chile exports principally to OECD countries). Chile has strengthened its environmental institutions on the basis of a multisectoral environmental co-ordination model. It has also intensified its environmental actions concerning air, water, waste and biodiversity management, with innovative instruments (e.g. trading) and successful reforms (e.g. in water services). *Important challenges remain* in continuing with environmental management progress and integrating environmental concerns in sectoral policies (e.g. concerning agriculture, energy, transport, primary industry, tourism and taxation). Chile is aware of the gap regarding *convergence with environmental standards of OECD countries*, in particular in the context of free trade agreements and multilateral environmental agreements.

To meet these challenges, it will be necessary for Chile to: i) thoroughly and efficiently implement its environmental policies; ii) further integrate environmental concerns into economic, social and sectoral decisions; and iii) strengthen its international environmental co-operation. This report examines progress made by Chile since 1990, and the extent to which the country's *domestic objectives and international commitments* are being met. Fifty-two recommendations are made that could help strengthen Chile's environmental progress in the context of sustainable development.

1. Environmental Management

Implementing environmental policies

During the review period (1990-2004) Chile strengthened its *environmental institutions*, most notably with the 1994 General Environmental Framework Law, which established the National Environment Commission (CONAMA), reporting directly to the President's office through the Ministry General Secretariat of the Presidency. CONAMA is a public body that operates as a decentralised service under a special regime, with a public legal personality and assets. It co-ordinates government environmental policies, prepares environmental regulations and fosters integration of environmental concerns in other policy. Much of Chile's environmental progress over the review period was driven by concerns about pollution's *health impacts* (and related effects on health expenditure

* The Environmental Performance Review of Chile was conducted jointly by the OECD and UNECLAC. The present Conclusions and Recommendations were reviewed and approved by the OECD Working Party on Environmental Performance at its meeting on 24 January 2005.

and labour productivity) and the need for corporate environmental responsibility in *industries largely exporting to OECD countries*. Chile uses a *wide range of instruments* in connection with environmental policy: environmental impact assessment (EIA), other regulatory instruments, economic instruments (including trading mechanisms), voluntary approaches and planning and information instruments. It has put relatively low emphasis on regulation and information and, more recently, increased focus on land use planning and voluntary approaches. As a precautionary tool, the *EIA system* is well established and has proved active and influential. *Chile was a pioneer* in the use of *trading mechanisms* such as tradable particulate emission permits in Santiago, nationwide trading of water rights and individual transferable quotas for some fish species. These programmes have provided invaluable experience and are potential first steps towards wider or more active markets, but at their current scale the economic efficiency benefits are small. A major and successful *reform in water and sanitation service provision* to households led to the restructuring of the water sector, full-cost pricing and rapid infrastructure improvement. This reform reinforced Chile's progress towards fully applying the *polluter pays and user pays principles*. Efforts to ensure that at least half of municipal solid waste is deposited in sanitary landfills were reinforced in 2002, and the target appears to have been reached for the country as a whole. *Voluntary approaches* now involve many firms, accounting for about half of GDP, largely because their export markets are OECD countries where consumers, producers and financial institutions are used to high environmental standards. Total public and private environmental expenditure (including water supply) has reached about 1.25% of GDP in recent years. Most expenditure has gone to water-related infrastructure and reducing copper smelter emissions.

Looking ahead, health issues and export-oriented concerns will continue to drive environmental progress in Chile, including further reductions in air emissions (e.g. from industry, energy production and transport) and continued improvement in water-related infrastructure and domestic and industrial waste management. Nature and biodiversity should increasingly be protected as assets for the domestic and international recreation and tourism industries. As the *road to environmental convergence* with many *OECD countries* will remain long as regards several issues, it will be necessary to strengthen and expand environmental institutions considerably. In particular, stronger actions are needed concerning EIAs; quality and emission standards for air, water, waste and nature management; the use of economic instruments; territorial management policies; and national as well as regional plans and strategies. An *environmental enforcement policy* based on co-ordination of various sectoral enforcement bodies is not the most effective institutional arrangement to assure compliance. Integration of environmental concerns in regional and municipal *land use planning* is needed, and the coverage and implementation of spatial plans should be expanded and strengthened. Economic information and analysis affecting environmental decisions should be strengthened considerably.

Recommendations:

- develop and *strengthen the environmental institutions* at national and regional levels;
- further *develop and strengthen regulatory frameworks* (e.g. standards) to improve environmental health and to achieve Chile's international commitments; review ways to strengthen *compliance and enforcement* capacity, including through institutional reforms, for instance the establishment of an environmental inspectorate;
- review the scope for introducing *new economic instruments* (e.g. product charges on hazardous waste, air emission charges, water pollution charges) and improve trading mechanisms;
- further apply the *polluter pays and user pays principles* through appropriate charges (e.g. on waste management, for access to protected areas, for natural resources), with due regard to social constraints;
- further develop and strengthen *land use plans*: municipal and intermunicipal plans, regional urban development plans and coastline and watershed management plans; survey wetlands and assure their protection through regulations and incentives;
- develop a national set of *indicators* to measure environmental performance with respect to domestic objectives and international commitments.

Air

Changes in *fuel quality* have helped reduce the amount of sulphur from mobile and stationary sources and have eliminated lead from petrol. National *ambient air quality standards* have been made more stringent and, for some air pollutants such as particulate matter, include triggers for alerts, pre-emergencies and emergencies. *New vehicle standards* will be only five years behind the EU and US standards. *Plans for air pollution prevention and control in the Metropolitan Region* (1998 and 2004) have been, respectively, implemented and launched, allowing significant reductions in emissions of criteria pollutants and in the number of pre-emergencies. No emergency levels have been recorded since 2000. The transport plan of Santiago could significantly improve traffic management in the Metropolitan Region. An emission trading programme for particulates was established in 1992 for point sources. *Switching to natural gas* contributed to sizable reductions in PM₁₀ and PM_{2.5} levels. The elimination of coal subsidies was also environmentally beneficial. Sulphur, particulate and arsenic emissions from copper smelters have been considerably reduced.

Chile continues to face *major health and air pollution challenges* in the Metropolitan Region (which accounts for 40% of the country's population and 48% of GDP) and in the mining sector (with major sources of SO_x, particulates and arsenic). *General emission standards are lacking* for industrial processes and for emitters of toxic air contaminants (except arsenic from copper smelters). Air quality is monitored, and emission inventories have been developed, only for a few major cities and for areas surrounding copper smelters. Emissions of SO_x remain very high, mainly because of copper smelter emissions, and should be further reduced. The pollution prevention and control goals for *NO_x emissions* in the Metropolitan Region were not achieved, largely because of traffic growth; new, more stringent goals have been set for 2010. The national *energy efficiency* programme has been discontinued. Little effort has been made to

diversify *energy sources* with a view to reducing emissions of air pollutants and greenhouse gases. Highly polluting solid fuels (e.g. coal and coke) are untaxed. Little attention has been given to the use of fiscal instruments to internalise environmental externalities in the transport and energy sectors.

Recommendations:

- make further progress with the implementation of *air quality programmes*, including those concerning the mining sector and those focusing on PM_{2.5}, PM₁₀ and ozone; monitor progress and the programmes' impact on health through appropriate *indicators*;
- develop nationwide *emission standards* (e.g. for a range of industrial sources and for toxic air pollutants);
- develop *air monitoring* in all major cities and an integrated air data management system;
- develop *energy efficiency* measures for all aspects of energy consumption;
- review the future *energy supply mix* (including contingency plans), taking into account environmental concerns (such as emissions of air pollutants and greenhouse gases);
- implement air, traffic and transport management plans in the Metropolitan Region; develop and implement improved plans to reduce *emissions from transport* in all cities.

Water

Since the late 1990s Chile has *undertaken a major water reform* concerning the delivery of water supply and sanitation services. As a result, provision of *water infrastructure* has dramatically increased in line with the regionalisation and privatisation of water companies. Two-thirds of the urban population is now connected to waste water treatment, and plans call for urban sewage treatment to continue to increase. *Full cost recovery* pricing applies to public water supply and sewage treatment, in the context of price regulation at the regional level and subsidies to the poorest 18-20% of the population. Water prices increase in summer to reflect water scarcity. *Minimum river flow* is included in the 1994 General Environmental Framework Law and is broadly taken into account in the allocation of surface water rights; more specific legal provisions have been proposed for inclusion in the Water Code. A pioneering nationwide system of *tradable water rights* was introduced for surface water and groundwater with the 1981 Water Code, but active trading remains mainly confined to some irrigated areas. There is high compliance with the World Health Organization drinking water quality standards. *Effluent discharge standards* were recently introduced for industry, covering both direct discharges and discharges to sewers.

However, even though most Chilean water bodies are of acceptable quality, *water quality* is poor in some lakes, rivers and coastal waters, mainly due to untreated urban and industrial sewage discharges. There is also pressure from heavy metals from mining in the north, salmon farming inputs in the south and farm inputs in rural areas. A large share of freshwater species is endangered. There are no *water quality objectives* aimed at preserving ecosystems, though they are being discussed. Water quality monitoring and inspection are dispersed among various agencies. Only the Health Code provides authority for enforcement (sanctions), environmental standards having a lower

legal status. *Irrigation subsidies* have contributed to water scarcity problems in the centre-north, though efforts are being made to increase cost recovery. *Flood management* has not received much attention in urban planning and there is a lack of storm water collectors. The concept of *river basin management* is only just being talked about.

Recommendations:

- continue to invest in *sewerage, waste water treatment and other sanitation infrastructure* in urban and rural areas;
- increase the effective treatment of *industrial effluents*, and strengthen water inspection and enforcement capacities;
- reduce the *effects of agriculture* (e.g. those related to irrigation, nutrients, pesticides and salinisation) on water quality and quantity;
- develop an *integrated watershed approach* to improve water and forest resource management and to provide environment-related services more efficiently;
- give greater weight in water management to protection of *aquatic ecosystems*; improve the integration of nature concerns in water management by setting up a *robust regime for minimum ecological flows and biological water quality standards*;
- improve the *information and knowledge base* for water management (e.g. monitoring of ambient water quality, registry of water rights, data on expenditure and financing).

Nature and biodiversity

Since 1990 Chile has enacted several laws with a nature protection dimension, and it adopted a *national biodiversity strategy* in late 2003. More detailed regional biodiversity strategies and a national biodiversity action plan are in preparation. Natural resource laws and regulations incorporate sustainable management provisions, as do the plans for tourism development. Chile has designated for *legal protection* almost one-fifth of its territory, including nine Ramsar sites and seven UNESCO biosphere reserves. In addition, private interests (NGOs, companies and individuals) manage almost 17 000 km² (equivalent to about 12% of state protected areas) for conservation purposes. Agencies operate recovery programmes for *threatened species* such as the Andean deer and the flamingo but not for freshwater species. Progress has been made in recent years in setting up and consolidating a knowledge base about nature and ecosystems.

Nevertheless, the protection of nature has so far not been given enough emphasis and resources to deal with long-term threats to Chile's highly endemic biodiversity. There is *no dedicated nature conservation law*, and *institutional and management structures* make conservation objectives secondary to the wider goals of relevant agencies. Despite improvements over the review period, nature and biodiversity protection and its enforcement are still *underfunded*. The country's species, their conservation status and the functioning of Chile's ecosystems remain *insufficiently known*. Government policies do not adequately acknowledge the value of *nature as a vital asset for the tourism industry* or make the most of tourism's potential to contribute to

the financing of nature management. Despite the high overall protection ratio, many significant ecosystems and habitat types are under-represented, and the *target of protecting 10% of all significant ecosystems* by 2010 will not be met at the present rate of progress. The management of protected areas suffers from a lack of financing and investment. The absence of effective arrangements for spatial planning, other than sectoral planning mechanisms, leaves habitats outside of protected areas vulnerable to destruction. *Native forests* not in protected areas continue to suffer from fires of human origin and illegal cutting of valuable species. Only limited progress has been made so far in integrating biodiversity considerations in *water management*.

Recommendations:

- complete, firmly implement and devote adequate resources to the *national and regional biodiversity strategies and action plans*;
- review *institutional and legislative arrangements* for the management of nature and biodiversity;
- develop a *strategic vision* of the complementary roles of state and private protected areas in order to achieve a *coherent network of core protected areas*, buffer zones and ecological corridors;
- step up *financial efforts* to meet the target of protecting 10% of all significant ecosystems in Chile (including coastal and marine areas) and boost *nature-related enforcement* activities;
- mount a co-ordinated effort by state agencies and academia to build the *scientific knowledge base* (including cataloguing of living species) required for nature management;
- speed up progress towards establishing an *effective land use planning* system capable of taking biodiversity values into account;
- identify and use further mechanisms, including economic instruments, for creating win-win opportunities in *tourism and nature policies*.

2. Towards Sustainable Development

Integration of environmental concerns in economic decisions

From 1990 to 2004 Chile experienced high, diversified, export-led growth supported by sound macroeconomic and social policies, resulting in significant reductions in poverty but also considerable pressure on some natural resources, though certain pressures (e.g. from SO_x) have been reduced. The 1994 General Environmental Framework Law incorporates the *notion of sustainable development* in recognising three clear objectives: i) sustaining equitable improvement in individuals' quality of life without compromising future generations' expectations; ii) ensuring that socio-economic development and environmental sustainability are complementary; and iii) improving social equity and eradicating poverty. Policy coherence for sustainable development is supported by the Sustainable Development Council, established in 1998 as an advisory body to the President. With few production-based or input subsidies, Chile does not have many potentially *environmentally harmful subsidies*; however, there are subsidies for irrigation water and for afforestation projects, mainly oriented towards small-scale farmers. Availability of *natural gas* from Argentina led to the relatively rapid spread of combined-cycle gas turbine generators beginning in 1998, displacing coal and fuel oil; this, together with retrofitting of home heating systems, led to substantial reductions in

emissions of particulate matter from power generation along with lower CO₂ emissions. New public and private investment proposals are subject to EIA, ensuring that some attention is given to environmental considerations at project level. Desire to meet the demands of buyers in Chile's export markets, for instance for *agricultural products*, led to clean production agreements (e.g. with pig producers, winegrowers, fruit and vegetable exporters and cheese producers) and a national certification system for organic products. Implementation of environmental policies does not seem to have diminished the country's *international competitiveness*; in a number of sectors, rigorous compliance with demanding environmental standards is seen as necessary for the penetration of Chilean products on OECD countries' markets.

Recommendations:

- develop *economic analyses of environment-related policies*, expanding both economic information on the environment (e.g. on environmental expenditure, environment-related taxes, health risk assessment, water and energy prices) and cost-benefit analysis of projects and legislation relating to the environment;
- review ways and means of integrating environmental concerns in *fiscal instruments and policies*;
- undertake *strategic environmental assessments* concerning i) Chile's *energy policy framework* and ii) long-term *transport plans* for the Santiago Metropolitan Region, for other urban areas and at national level;
- based on analysis of the social cost and benefits of *energy efficiency* and *non-conventional renewables*, consider providing a positive financial incentive to encourage faster uptake;
- ensure that successors to the *clean production agreements in the agriculture sector* include dated targets for pesticide and nutrient management, expressed as intensity of use, and annual audited progress reports;
- formalise *institutional integration mechanisms* relating to sustainable development.

Overall, Chile has not achieved the strong decoupling between environmental pressures and growth seen in a number of OECD countries (except SO_x and PM₁₀ emissions in the Metropolitan Region). A national investment system is responsible for standards, techniques and procedures to guide public sector investment approvals, but gives little attention to environmental issues. Quantitative *cost-benefit analyses* are carried out for the establishment of environmental standards and decontamination plans; they should be used more extensively to support decisions concerning projects and instruments affecting the environment. In the *annual budgeting process* at national level, most environmental expenditure originates with sectoral ministries, where environmental priorities compete with others. Although the sustainable growth of the *electric power* sector is an explicit goal of Chilean energy policy, little attention is given to environmental concerns as such. No strategic environmental assessment of national energy development and regional or national transport plans has yet been done. In *agriculture*, environmental concerns are only partially integrated through growing awareness regarding water quality, water quantity in several regions, and pesticide use. More analysis of the environmental significance of distorted market signals is needed in some sectors. Regarding *tax policy*, there is no explicit use of taxes for environmental

purposes, and the environment-related taxes in the energy and transport sectors were designed with little attention to their environmental impact. Chile has no national sustainable development strategy. Overall, *integration of environmental concerns into economic and sectoral decision making* should be fostered to improve environmental performance and move towards sustainable development. Such integration is also needed to achieve cost-effective responses to environmental challenges. Economic forces and changes in such sectors as energy, transport, industry, tourism, agriculture and other primary sectors strongly influence environmental conditions and trends, and hence can enhance or diminish the benefits of environmental policies. With its export-led growth, Chile has a considerable chance to capture the economic and environmental benefits of win-win situations.

Sectoral integration: mining, forestry, aquaculture

Mining

The mining sector accounts for *8.2% of GDP and 42% of export value*. Chile is the world's biggest copper producer. Mine output has increased by 265% since 1990. Copper production is capital-intensive and employs 1.2% of the total labour force. An environmental unit was created in the Ministry of Mining in 1991. Chile has reduced copper smelters' *SO_x emissions* by two-thirds, set standards for their arsenic emissions and improved their energy efficiency. Mining was an early user of *EIAs*. The country's 14 largest mining companies, including state-owned CODELCO (the world's largest single producer of copper), have ISO 14001 certification or apply their own systems of *corporate environmental management*. Large mining companies have engaged in a voluntary *clean production agreement*. Progress towards environmentally sustainable mining is well on its way.

Nevertheless, mining activities still cause the bulk of *SO_x emissions* in Chile and *arsenic emissions* in several regions. *Particulate emissions* need to be further reduced and water use efficiency increased in the sector. One-third of abandoned tailing dams are in unacceptable or deficient condition. Nearly half of mining sewage from large companies is not treated. *Small and medium-sized mining companies* often do not comply with regulations. Little is known about soil contamination by heavy metals and toxic contaminants generated by mining activities. Chile has no clean-up plans for *abandoned mines*. The environmental impact of transporting minerals has been evaluated only in the context of the EIA system. Progress towards sustainable mining will require an appropriate balance among its economic, environmental and social dimensions, including mechanisms to support investment in human and social capital, to apply the polluter pays principle and to capture resource rents associated with mineral exploitation.

Forestry

The forestry industry accounts for 3.5% of GDP and 12% of export value. Chile is the world's third-largest exporter of wood chips and sixth-largest of pulp. Planting of trees, a renewable natural resource, has increased dramatically: at 2.2 million hectares, plantations make up 14% of forest cover. Harvest in plantation forests has increased by 180% since 1990, easing pressure for harvest in native forests, whose cover has remained remarkably high at 13.4 million hectares. Chile has adopted standards concerning deforestation, such as compulsory reforestation after forest harvesting, selective thinning on heavy slopes, and soil classification to avoid conversion to farming. Almost one-third of native forests are in *protected areas*. Since 1974, intensive tree planting (mainly Monterey pine) on coastal mountains has aided *restoration of eroded land* abandoned by farmers. A draft law on native forests seeks to introduce payments to farmers who own native forests and adopt sustainable forest management practices while diversifying their income. Progress towards *sustainable forest management* has begun. Pilot projects using sustainable management have been carried out in native forest since 1992. *Forest certification* has spread in recent years.

However, little attention has been given to the environmental effects, both beneficial and harmful, of tree planting (e.g. as regards soil and water conservation, water quality and biodiversity). Any forest harvest of more than 500 hectares a year is supposed to undergo EIA, but owners avoid this by segmenting the area cut; nor is EIA required for new planting. Though timber harvesting in native forest decreased as the use of plantation timber spread, *harvesting for fuel continues*. Tree plantations have *little genetic diversity*, and the growing reliance on clonal eucalypt plantations for pulp production increases the risk of epidemics. *Tree planting subsidies* (USD 225 million since 1974) have created an incentive for conversion of some native forest, though not on a major scale; subsidisation has been redirected to small landowners and soil conservation objectives. Little effort has been made to protect wooded river banks despite legal provisions to this effect. More attention could also be given to grouping forest owners for economies of scale in moving towards sustainable management of native forests.

Aquaculture

The volume of aquaculture production has grown by 825% since 1990, and Chile has become the *world's second-largest producer and exporter of salmonids* (after Norway). Under current plans production will double, particularly in the southern Regions X and XI, where aquaculture has become a capital-intensive industry with direct and indirect benefits for employment. The 2001 *environmental regulation for aquaculture* led to measures to safeguard the environment at cultivation sites and make aquaculture more sustainable. *Preliminary site characterisation* of new fish farms has become compulsory. The first reports on the state of the environment in the aquaculture sector are being prepared. Of about 1 400 aquaculture projects that have undergone EIAs, 60% were approved. In addition, 48 salmon producers (accounting for 80% of salmon exports) have signed a *clean production agreement*.

However, progress towards sustainable aquaculture is recent. Both the government and the fish farming industry have recognised the challenge and started addressing it. *Water pollution* by excess food and faeces can contribute to eutrophication of lakes, fjords and coastal areas. Controlling water quality in aquaculture areas also involves policies for other sectors, such as forestry (since the potential for salmon raising is higher in lakes surrounded by forested watersheds), agriculture (whose nutrient run-off affects water quality) and water services (given the effects of urban and industrial sewage treatment). Effective control of water quality thus requires comprehensive, intersectoral policies. Chilean aquaculture has made extensive use of *antibiotics*; regulations were established in 2003 to start controlling their use. Accidental escapes of adult salmon from sea cages in *aquatic ecosystems* have not been assessed. Particular attention should be paid to the rising demand for fishmeal in salmon farming, which could put pressure on some *sea fish stocks* (e.g. anchovy, mackerel, sardine), even though these stocks are under total allowable catch programmes. Local conflicts have arisen between industrial salmon farming and the tourism industry, though efforts are being made to complete delineation of areas deemed appropriate for aquaculture.

Recommendations:

- further reduce the *environmental impact* of the mining sector (e.g. air pollution by SO₂ and arsenic, water pollution, abandoned sites and tailing dams);
- give special attention to *small and medium-sized mining enterprises* through technological, financial and consultancy assistance and improved relationships with the largest mining firms;
- increase the *financial contribution of the mining sector* to support long-term investment in human and social capital and to apply the polluter pays principle according to the General Environmental Framework Law; consider a mechanism for proper capture of resource rents associated with mineral exploitation;
- promote agreement among stakeholders on *strategic national orientations* concerning forest resources (protection, sustainable management, plantation);
- adopt and implement measures to assure *sustainable management of native forest*, including rewards for environmental services, cross-compliance mechanisms, partnerships and co-operation among stakeholders on overall management;
- strengthen the *enforcement capacities* of the National Forestry Corporation (CONAF);
- improve *environmental and health protection in aquaculture* (e.g. as regards eutrophication, salmon escapes, ecological balance of lakes, antibiotics, epidemiological vigilance, eradication of infectious disease), particularly through *strengthened enforcement capacities*;
- apply the *polluter pays principle* in the aquaculture industry in the context of the General Environmental Framework Law;
- complete a *precise aquaculture coastal zoning plan*; adopt integrated environmental management for coastal areas.

Integration of environmental and social concerns

Chile made *outstanding progress* over the review period in reducing the share of the population living in poverty, from nearly 39% to 19%. More than 50% of the income of the poorest decile is derived from national social policies addressing: i) *basic income* needs, through transfers such as assistance pensions, family subsidies and water subsidies; ii) slums and other *housing* problems, through measures such as the Chile Barrio programme; iii) *education*, by providing primary education for all; iv) *health*, through a universal access plan (AUGE) covering 56 costly and common diseases; v) *labour* issues, by raising the minimum wage and introducing unemployment insurance; and vi) *extreme poverty* affecting people not covered by social networks, notably through the Chile Solidario programme. Although further progress is needed, improvement in these areas is impressive. Poverty indicators are also taken into account in the distribution of regional funds and in municipal financing.

Regarding *environmental democracy*, progress has been made in the provision of environmental information (e.g. production of environmental statistics and publication of state of the environment reports) and legal bases for access to information, along with public participation and access to justice, and actions such as the establishment of a National Environmental Information System (SINIA). The National Statistics Institute has published environmental data each year since 1990. In 2001 it carried out the first survey on firms' environmental management. Improving participation and access to information have been clear goals of environmental policy in Chile. For instance, the General Environmental Framework Law establishes the principle of participation, while legislation on public transparency and integrity establishes the obligation to inform the public. The large number of environmental disputes treated in court shows that access to justice is exercised in practice. *Health concerns* drove many of the environmental improvements made by Chile in the review period. Remarkable results have been achieved in this respect. Air pollution abatement (e.g. of SO_x and particulates in the Metropolitan Region and of arsenic in Antofagasta Region II) and expansion of environmental infrastructure (drinking water supply, waste water treatment, solid waste disposal in sanitary landfills) have helped reduce and prevent ailments such as respiratory diseases, cancers, cholera, typhoid fever and hepatitis A. Some progress has also been made in *environmental education*, e.g. with the introduction of environmental material in primary and high school, the environmental certification of 132 schools and the environmental scout movement.

However, concerning *environmental information*, work on environmental data, environmental reporting and environmental indicators needs to be consolidated and regularly carried out. SINIA is to be further developed to integrate sectoral information, improve the quality of physical environmental information and include economic information on the environment (e.g. environmental expenditure, environmental employment, water prices). Public participation mechanisms and practice, which progressed over the review period, should be made more effective and systematic, both at national and territorial level, particularly in association with project-based EIAs and strategic environmental assessments (SEAs) of public policies, plans and programmes. Despite remarkable *environmental health* progress, much remains to be done. Health problems that have emerged or remain on the health-environment agenda include those related to outdoor air pollution from NO_x, ozone and fine particulates; to indoor pollution, which especially affects the poor; and to lack of access to safe water supply and sanitation services, also for the poor (in line with United Nations goals). For instance,

900 000 people still lack drinking water supply and sanitation. Continuous efforts are needed to combat respiratory diseases (particularly in children), cancer and emerging allergies. Environmental improvements should result in further health progress and related benefits in terms of reduced health costs, improved well-being and increased productivity in the Chilean economy. Regarding *environmental education and awareness*, much remains to be done concerning formal school curricula, as well as in the private sector (e.g. involving staff more in certification and corporate social responsibility, and promoting environmental training through professional associations) and the public sector (e.g. in association with sustainable development initiatives, project-related EIAs and SEAs of *public policies, plans and programmes*, and use of environmental performance indicators). Education and environmental campaigns increase acceptance of environmental policies and help prevent illegal dumping, energy inefficiency, water wastage, overuse of private transport and unhealthy behaviour.

Recommendations:

- consolidate efforts to produce environmental *data, state of the environment reports and environmental indicators* so as to strengthen decision making and public information, taking into account international methodologies;
- continue to develop *public participation* in processes such as project-based environmental impact assessments and strategic environmental assessments of public policies, plans and programmes;
- continue efforts to improve *health* through targeted environmental progress, with special attention to the poor; review the health impacts of *pesticide* use on agricultural workers and rural communities and implement risk reduction strategies and measures;
- strengthen *environmental education and awareness* through a long-term strategy of environmental learning and a national environmental education plan, including: i) further integration of environmental material in primary and secondary school curricula, and ii) development of environmental knowledge through professional associations and environmental management systems within enterprises;
- develop *environmental employment*, with specific attention to the material and cultural heritage as a base for tourism development and to biofood production for agriculture development.

3. Strengthening International Commitments

Over the review period, Chile concluded a number of trade agreements incorporating environmental dimensions and participated in global efforts to address environmental challenges. In the context of *trade agreements*, Chile has taken on significant obligations to promote high standards of environmental protection, to enforce environmental laws effectively and to not derogate such laws to attract investment. It has also promoted corporate social responsibility, with particular attention to environmental management in key export sectors. Chile has been a strong participant in the global environmental agenda as well, signing and ratifying most major *multilateral environmental agreements* and taking an active role in efforts to address ozone layer depletion as well as marine and maritime issues, especially as regards potential oil spills in its southern seaways, which receive heavy international traffic. At *regional level* Chile has been active in work to preserve the Antarctic, to reverse the vicuña's endangered

status (efforts involve Argentina, Bolivia, Ecuador and Peru), to combat desertification of the Altiplano-Puna ecosystem shared with Peru, Argentina and Bolivia, and to preserve Ramsar Convention wetlands.

Chile's *trade and environment* agenda is influenced by market access concerns and treaty negotiating dynamics vis-à-vis its trade partners, as well as efforts to identify and address possible environmental effects of very rapid growth in natural resource-based export sectors. Chilean export companies have made progress in product certification and environmental management, improving Chile's reputation as a reliable supplier and securing access to foreign markets, but this has not always prevented local environmental damage from rapidly expanding export sectors. Regarding *multilateral environmental agreements* ratified by Chile, some lack follow-up implementation: legislation may be pending (e.g. on native forests and persistent organic pollutants), national action plans may not be in place (e.g. on biodiversity) or enforcement may be too weak (e.g. regarding endangered species).

Recommendations:

- continue efforts leading to *ratification and implementation of international agreements* and, as appropriate, OECD legal instruments, and publish periodic reviews of actions taken to meet international environmental commitments;
- continue to promote *mutually supportive trade and environment policies* through effective implementation and strengthening of the environmental regulatory framework and promotion of corporate social responsibility;
- ensure that co-operative activities associated with *trade agreements* are targeted to mitigate any adverse environmental impacts from large-scale natural resource exportation;
- strengthen *chemical and hazardous waste management* according to international agreements, notably the Stockholm, Rotterdam and Basel Conventions; complete and implement national plans for persistent organic pollutants and hazardous waste; strengthen enforcement activities, develop pollutant release and transfer registers and improve the regulatory framework to better manage chemicals throughout their life cycle;
- continue national and bilateral efforts in the areas of research, monitoring and sustainable management of *marine ecosystems* (e.g. sustainable fisheries, prevention of marine pollution); strengthen oil spill prevention and mitigation capacities;
- develop a balanced, scheduled strategy concerning *climate change* issues; strengthen *energy efficiency and greenhouse gas mitigation* policies, including through a cleaner energy mix, and promote the use of clean development mechanisms in the context of the UNFCCC and the Kyoto Protocol;
- develop further *international environmental policies* reflecting potential OECD membership, and an increasing role in Latin America and the world.

CHINA*

1. CONCLUSIONS AND RECOMMENDATIONS

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ENVIRONMENTAL MANAGEMENT

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REFERENCES

* Also available in Chinese.

CONCLUSIONS AND RECOMMENDATIONS*

Since the launch of the “open door” policy in 1978, economic growth has been remarkable. Over the last 15 years, the average rate of *economic growth has been 10.1% per year*. China now has the *fourth largest economy in the world*. Large foreign direct investment and the increased role of market forces have facilitated the *country’s integration into the global economy*. In the process, large numbers of people have escaped extreme poverty. However, while China has about 20% of the world’s population, *GDP per capita is still low* (USD 6 000 for China compared to USD 25 000 for OECD countries at PPP 2000) and is *unevenly distributed* across the country, with wealthier coastal provinces and less-developed western provinces. Large migrations have contributed to rapid urbanisation (now 43% of the population), and *income disparity* between urban and rural areas has increased. *Poverty remains a serious challenge* in rural China.

This rapid economic growth, industrialisation and urbanisation have generated high pressures on the environment, with consequent damage to health and natural resources. Chinese authorities, aware of the deterioration of the environment, are promoting more balanced patterns of development, using concepts such as “*harmonious society*” and “*scientific development*”. Their responses have included planning for national economic and social development (covering environmental management efforts), modern environmental legislation, strengthened environmental institutions, and higher priority to environmental and natural resources management. Nevertheless, air pollution in some Chinese cities reaches levels that are among the worst in the world, energy intensity is about 20% higher than the OECD average, and about a third of the water courses are severely polluted. Challenges with waste management, desertification, and nature and biodiversity protection remain. To achieve a *new economic and social development model* (a resource saving and environmentally friendly society according to the 11th FYP), China will need to i) strengthen the effectiveness and efficiency of the implementation of its environmental policies; and ii) enhance the integration of environmental concerns into economic decisions (e.g. fiscal, energy, agriculture, transport and land-use decisions).

Environmental issues in China have often a strong *international dimension*, reflecting regional environmental interdependencies (e.g. transboundary air and water issues, regional seas pollution, desertification) and *global economic and environmental interdependencies*. The environmental pressures and demand for energy and other resources associated with China’s rapid economic development dramatically underlines questions about the environmental sustainability of current production and consumption patterns globally. Trade as well as financing of development (e.g. official development assistance, foreign direct investment) have important environmental dimensions. China therefore has a *shared interest* with OECD and other countries to address related challenges, and has significantly enhanced its engagement in international environmental co-operation in recent years.

* These Conclusions and Recommendations have been approved by all the Delegations of the OECD Working Party on Environmental Performance, including the Chinese Delegation, at its meeting (Beijing, 8-9 November 2006).

This report examines progress made by China since 1990 and evaluates the extent to which the country's *domestic objectives and international commitments* are being met. Some 51 recommendations are made that could help strengthen China's environmental performance in the context of sustainable development.

1. Environmental Management

Implementing environmental policies more effectively and efficiently

China's comprehensive and modern set of environmental laws, together with its successive Five-Year Plans for National Economic and Social Development (FYPs) and Five-Year Environmental Plans (FYEPs), provide a high-quality framework for pursuing sustainable development and environmental progress. In December 2005, the State Council issued a decision for better implementing environmental policies. In April 2006, the Chinese Premier announced, in the sixth national environmental protection meeting, three new policy directions, including: integrating environmental protection and economic decision-making on an equal footing, further decoupling pollutant emissions from economic growth, applying a mix of instruments to resolve environmental problems. The proposed directions and measures are being implemented and go a long way towards addressing the environmental policy implementation gap. Within their mandates, *departments under the State Council have worked hard to support environmental policy implementation*. A range of regulatory and economic instruments (e.g. pollution charges, user charges, emissions trading) and policy approaches that harness markets and public interest in the environment have been developed. Campaigns and award schemes to support implementation at the local level have been organised; work with non-governmental organisations (NGOs) to develop procedures for public participation in *environmental impact assessment* (EIA) is an important recent example. There is evidence that *local leaders* in some of the richer provinces are responding to demands from the public for better environmental conditions, and are recognising the benefits to the economy and the society. More than 8 000 companies are registered under *ISO 14000*. In 2004, pollution abatement and control (PAC) investment expenditure was 1.2% of GDP.

However, these efforts have not been sufficient to keep pace with the environmental pressures and challenges generated by the very rapid growth of China's developing economy nor to capture the potential economic benefits to be obtained from improved pollution abatement and nature protection. Overall, environmental efforts have lacked effectiveness and efficiency, largely as a result of an *implementation gap*. The weaknesses in the present system are demonstrated by the failure to achieve some of the key objectives of the 10th FYP, and the severity of environmental problems in many parts of China. National environmental legislation and regulations should be *compiled* in an environmental code, to make them more consistent and user-friendly. Environmental policy priorities should be *focused on human health and key natural resources*. Consistent nationwide implementation of environmental regulations for products and industrial/energy facilities should be enhanced and given priority. The biggest obstacles to environmental policy implementation are at the *local level*. The performance objectives of local leaders, the pressures to raise revenues locally to finance un-funded mandates, and the limited accountability to local populations have generally meant that *economic priorities have over-ridden environmental concerns*. There is a need for much stronger *monitoring, inspection and enforcement capabilities* to establish a better mix of incentives and sanctions. In addition, *environmental expenditure* needs to be made more efficiently,

and environmental policy instruments need to be made more effective. Implementation of the polluter pays and user pays principles should be strengthened. Special provisions are needed to integrate environment into the development strategies of the less-developed regions and to ensure the affordability of environmental services for the poor. There is an increase in damages associated with disasters of climatic and industrial origin, requiring improved prevention and mitigation measures.

Recommendations:

- *implement environmental law and regulations nationwide* for products and industrial/energy facilities; strengthen *monitoring, inspection and enforcement capabilities* throughout the country, including through the independence of the enforcement functions of Environmental Protection Bureaus (EPBs);
- consider establishing *SEPA as a ministry*; strengthen SEPA's supervisory capacity of EPBs in local government;
- continue efforts to make *local leaders more accountable* to the higher level government and to local populations for their environmental performance;
- strengthen the *integrated permitting system* and establish it as a more central instrument for pollution prevention and control; strengthen the integration of environmental protection in land-use planning and regulations, as well as in other relevant plans and regulations;
- extend the use of *pollution charges, user charges, emissions trading and other market-based instruments* and their incentive functions, taking social factors into account.

Air

During the review period, China achieved improvements in *ambient air quality* (e.g. lowering the concentration of SO₂ in urban areas and designated control zones) and in decoupling emissions of SO₂, NO₂ and CO₂ from economic growth. The overall emission reduction targets for SO₂, soot and dust from stationary sources set out in the 9th FYP (1996-2000) were met and surpassed; those for *stationary source emissions* of soot (-10%) and industrial dust (-20%) stipulated in the 10th FYP (2001-05) are also likely to have been met. The *legislative and regulatory framework* was updated with the tightening of some emission limits, the introduction of total emission control, and the designation of special control zones (covering 39% of the population). The rate of *emission charges* was trebled. A start was made with flue gas desulphurisation at large emission sources. A nationwide *air quality monitoring* network was put in place. *Energy policy and institutions* (including a renewable energy law) were strengthened, and efforts to diversify energy sources had some success. In the domestic sector, the dependence on coal was reduced from 69% to 30% during 1990-2004. Concerning *transport*, environment-related efforts included the adoption of fuel-efficiency standards for light-duty passenger vehicles in 2004, the adoption of the various EURO standards for vehicle emissions at set dates, and the development of bus rapid transit systems in some cities.

Despite these efforts, air quality in some Chinese cities remains among the worst in the world. About 60% of cities above county level are likely to have met the grade II *ambient air quality* standard by 2005. The SO₂ concentration in urban air, after dropping steadily since the early 1990s, began to climb again in 2002. Nationwide SO₂ emissions from stationary sources increased by 13% during 2000-04, and therefore are

not likely to have reached the 10% reduction target of the FYP. In the special air pollution control zones, SO₂ emissions fell by 2% instead of the targeted 20%. Likewise, the proportion of cities suffering from highly *acid rain* (i.e. pH under 4.5) rose again to 10% in 2004, after a low of 2% in 2000. Current emission reduction targets are not sufficient to meet ambient air quality standards. To date, insufficient attention has been paid to *VOCs and toxic air pollutants*. Air pollution regulations and permit conditions are not well enforced. China's *energy intensity* per unit of GDP is about 20% higher than the OECD average and, after a decline early in the review period, began to grow again in 2001. Reducing the energy intensity of the Chinese economy is rightly seen as a top priority by national authorities, especially in light of estimates that a doubling of total primary energy supply will be needed to satisfy a quadrupled GDP by 2020 (compared to 2000). But reducing energy intensity by 20% during the 2006-10 period will be a major challenge despite the associated potential multiple benefits (e.g. reducing traditional air pollution, reducing greenhouse gas emissions, increasing energy independence and security, and improving the efficiency of the economy). China did not meet its target of *washing 50% of the coal* it burns and the implementation of flue gas desulphurisation has been low to date. Although car ownership is still low, *vehicle numbers* doubled in the five years up to 2000, and motor vehicle traffic already represents the largest source of *urban air pollution*; the efficiency of urban transportation is showing a downward trend. Urban mass transit has not received sufficient emphasis and the use of bicycles has been allowed to decline. The *quality of vehicle fuels* is low (e.g. sulphur content).

Recommendations:

- translate the *energy intensity* improvement target into more ambitious *energy efficiency* targets in all sectors; use a mix of instruments to achieve them, including pricing policies, demand management, introduction of cleaner technologies, and energy-efficient buildings, houses and appliances;
- bolster the adoption of *cleaner fuels* (including cleaner coal technology, coal washing and flue gas desulphurisation) and cleaner fuels for vehicles, as well as cleaner cars;
- implement more ambitious *air emission reduction targets* capable of achieving ambient quality objectives already adopted; manage a *wider range of air pollutants*, including VOCs and toxic substances;
- further improve the quality of *monitoring* data needed for effective air quality management and widen their scope (e.g. sources and pollutants);
- develop and implement a *national transportation strategy* that recognises the environmental externalities of transport and takes an integrated approach to private and public transport; streamline the institutional framework for developing sustainable transport systems; use a mix of regulation and economic instruments (e.g. taxes) to give citizens incentives for rational transport decisions;
- strengthen *mass transport in urban areas*, and take measures to encourage the urban use of cleaner transport modes (e.g. bicycles).

Water

China has a *comprehensive legal framework* for water resource and pollution management, with clear mechanisms to control abstractions and to set water quality objectives. The 2002 Water Law opens the way for integrated river basin management, stakeholder participation and the use of market mechanisms in water management, in other words for a *major reform* of the water sector. Water supply and waste water treatment utilities have already undergone considerable reform: in many areas, companies providing water services have been established. Basic institutions for river basin management are in place. A range of *economic instruments* (user charges for water services, pollution charges for industry, abstraction charges) are used, although often with relatively low rates. Over the period of the 9th and 10th FYPs (1996-2005), *total loads discharged to watercourses* were reduced in some areas, representing a decoupling of pollution discharge from economic growth. Concerning *floods*, very large investment has been made in *infrastructure to protect against flood damage*, flood risks have been reduced in many areas, and communities are more informed about the risks they face. Physical planning laws are being strengthened to prevent further development on flood plains, and there has been some return of reclaimed areas to flood storage functions. In some government departments, the criteria used to assess performance are incorporating water resource use and pollution reduction targets. These are an addition to the economic growth and population control targets commonly set.

However, China's water situation is of high concern. First, many *water courses, lakes and coastal waters are severely polluted* as a result of agricultural, industrial and domestic discharges. The pollution has severely degraded aquatic ecosystems, is a major threat to human health, and may limit economic growth. The use of untreated water affects development especially in the poorer, more disadvantaged regions. Large investment in water services will continue to be necessary: i) in urban areas to address the investment backlog and meet the needs of the large influx of rural migrants; ii) in rural areas, taking into account affordability issues; and iii) in the least developed areas in the form of development assistance and transfers. Secondly, China has *very low water resources per capita* (one quarter of the world average), and they are unevenly distributed (e.g. one tenth in northern and western areas). Among the 600 larger cities, 400 suffer from water shortages. Thirdly, with surface water polluted and scarce, demand for *groundwater* far exceeds the rate of replenishment in many areas in both rural and urban areas. It will be impossible to maintain the high (and inefficient) levels of urban and agricultural water consumption. The country is undertaking a *major project* to transfer more than 40 billion m³ a year from the southern Yangtze basin to the North China plain by 2020. However, this will still not meet the needs for economic growth and ecological recovery, without determined demand management and sustainable use by urban, industrial and agricultural users. Finally, around 70% of water withdrawal in China is for *agriculture*, with 40% of farmland being irrigated. Agriculture and the rural communities (that lack sewer systems) are also major sources of pollution. To make water management more sustainable, the demand for water by agriculture must be reduced and diffuse pollution must be identified and prevented.

Recommendations:

- increase investments and management efforts in *urban water supply and sanitation* (including in new urban development projects) to meet China's long-term objectives (concerning health and ambient water quality); increase user charges and cost recovery (of operating and investment costs); improve the *operational performance* of treatment plants; clearly distinguish the responsibilities of water utilities and local authorities;
- continue efforts to improve water pollution control and efficiency in water use *by industry*; increase the rate of pollution charges and abstraction charges; ensure that treatment plants are efficiently managed; link abstraction and discharge permits to total load planning, while maintaining minimum flows and river quality objectives;
- continue efforts to improve water pollution prevention and water efficiency in *agriculture*, and to establish water user associations responsible for recovering the cost of providing irrigation water; improve monitoring and collection of groundwater abstraction charges; take measures to halt overexploitation of groundwater aquifers; prevent agricultural run-off into aquifers, rivers and lakes (e.g. buffer zones along rivers and lakes, treatment of intensive livestock effluents, efficient application of agro-chemicals); phase out fertiliser subsidies;
- strengthen and further develop an *integrated river basin management approach* to improve water resources and water quality management, and to provide environment-related services more efficiently (e.g. flood and drought prevention, soil and water conservation, biodiversity protection, support for recreation and tourism); give greater weight to the protection of *aquatic ecosystems* (e.g. renaturation of rivers and lakes banks, protection of wetlands); foster stakeholder participation (e.g. representatives of economic sectors, environmental NGOs, experts, administration);
- further encourage *sustainable water use* through: i) *institutional integration* of water quality concerns and of water investments (e.g. at national and other relevant levels of government); ii) *market-based integration* with further progress in the transition towards full cost pricing of water services, while giving attention to the special needs of the poor and of the West; and iii) clarifying and securing the *rights* to extract, allocate and use water, in the context of water legislation and land tenure reform;
- pursue efforts to provide the *rural population* with safe water supply and sanitation to meet domestic objectives and international commitments (e.g. Millennium Declaration and WSSD); continue to install meters and collect user charges, taking account of social factor.

Waste

During the review period, China significantly decoupled the generation of municipal and, to a lesser extent, industrial waste from economic growth. Concerning *industrial solid waste*, the country met and surpassed the targets set out in the 9th and 10th FYPs with respect to recovery, reuse of waste material and safe disposal in landfills. China also stepped up its efforts to put in place an adequate *legal framework for modern waste management* by adopting a cleaner production law in 2003 and updating its 1995 waste law in 2004. A series of more specific regulations and standards for various types of waste, such as medical waste, were adopted. A national programme ("Construction

Programme of Hazardous Waste and Medical Waste Disposal Facilities”) was put in place in 2003 to significantly increase capacity for treating *hazardous and medical waste*, and good progress was made consequently with the treatment of medical waste. Considerable amounts of materials are recycled through informal activities (e.g. by freelancers). The opening of the market to foreign waste management technology is a positive signal for further improvement. Chinese authorities wish to curb the generation of all types of waste by fostering a high quality, *low material intensity economic growth model*. Indeed, given the rapid growth of its economy and of its imports, China’s drive to reduce its material intensity parallels the drive to reduce its energy intensity. The concepts of the “3Rs” (*reduce, reuse, recycle*) and of the “circular economy” are part of the 11th FYP.

Recommendations:

- foster the move *towards a circular economy* by focusing on waste reduction, reuse of waste material and waste recycling, and related targets; require provincial and local governments to adopt and implement comprehensive *waste management plans* (including accurate verification of volumes of waste – municipal, industrial and hazardous – generated and treated) covering elements of the waste hierarchy;
- accelerate the pace of extending *waste treatment capacity* by building treatment infrastructure and establishing systems for the collection, reuse and recycling of waste (e.g. separate collection of household waste), including in rural areas;
- formulate *enforcement plans* for different sectors (e.g. households, large industry, small and medium-sized enterprises) and types of waste;
- streamline the allocation of *responsibility for the management* of different types of waste; ensure that waste facilities operate efficiently and comply with standards; further develop workable regulations and policy instruments for waste management; improve the collection of *waste data* and develop tools to evaluate the effectiveness of waste management policies at national and provincial levels;
- establish *financing mechanisms* with a mix of public and private financing, and move to charging for waste services more progressively in less developed areas; improve the collection rate of waste charges and set them at a level consistent with the government’s aim to achieve a circular economy;
- provide the *informal sector* (freelancers) with equipment, organisational assistance and training to continue collection and recycling under improved hygienic and environmental conditions, as part of waste management plans;
- *raise awareness* of waste management and efficient resource use among the public, small and medium-sized enterprises, and industry.

Nevertheless, the amounts of municipal waste, industrial waste and hazardous waste far exceed what can safely be treated and disposed of. Some of those waste are stored waiting for treatment (e.g. close to 50% of municipal waste) or *are dumped in an uncontrolled fashion*. Human health and the environment are put at risk through a proliferation of uncontrolled dumps surrounding the cities. The 10th FYP target of increasing the capacity of *municipal landfills* to 150 kt/day was not achieved. Total *waste generation* increased by as much as 80% during the review period. Waste management is still the “poor cousin”, compared to air and water management, in its share of national

government *funding* of investments. Local bodies have trouble collecting waste charges, which remain too low to cover the operational cost of waste management. Overall, the emphasis remains *too heavily on landfilling* (the destination of 44% of municipal waste), and few local governments implement separate collection and recycling. Incineration and composting account only for 3% and 5%, respectively of municipal waste treatment. *Responsibility for waste management* is fragmented across too many agencies. *Enforcement* is inadequate and does not distinguish sufficiently between large industries and small and medium-sized enterprises.

Nature

China has established a comprehensive *legal framework* for managing nature and biodiversity, which includes wildlife and marine protection as well as terrestrial and marine protected areas. China actively reports on its international commitments and also publishes annual state of the environment reports related to its internal goals and targets. *Protected areas* at the national, provincial, prefecture and county levels have been dramatically increased over the review period, and China has received international recognition for its wetlands, biosphere reserves, and natural and cultural heritage preservation programmes. Outside of protected areas, ecological considerations have led to *afforestation* of large areas. New forestry initiatives have been taken to further develop shelter forests in arid, mountainous and coastal areas, to streamline forest management (e.g. more stringent harvest quotas) and to promote farm forestry on land sensitive to soil erosion (e.g. grain for green policy). Various environmental protection programmes within the country have begun to recognise the value of environmental outreach (alien species, endangered wildlife). China has been proactive in developing bilateral and regional co-operation in the area of nature conservation. There has been a regular increase in the number of world heritage sites and Ramsar wetlands.

However, there is a need for more *institutional co-ordination* and integration of efforts to assess and protect nature and biodiversity inside and outside of protected areas, given the number of agencies and stakeholders involved. There is insufficient monitoring to assess trends and evaluate the *protection status of nature reserves*. The main targets for species and habitat protection are in terms of percentage of land area. There is a need to ensure that the key natural habitat types and ecosystems are adequately protected and that they support species recovery plans. Although China has a relatively high percentage of total area classified as protected, *marine habitats and species* are not sufficiently represented and are subject to land-based sources of pollution and habitat alteration, in addition to exploitation pressures. Management level of reserves needs to be improved and attention should be paid to integrated habitats protection to minimise fragmentation and to *enhance habitats continuity through biodiversity corridors*. There is a need to integrate nature protection concerns into *development plans* especially in impoverished central and western regions with abundant biodiversity. Little has been done to promote biodiversity protection on forestland and to tailor payments to forest owners to the provision of forest ecosystem services. China has not yet ratified the Bonn Convention on migratory species, although it is active in regional co-operation on migratory waterbirds.

Recommendations:

- modernise and implement *legislation on nature protection*, in particular adopt a law on the protection and management of Nature Reserves, notably favouring an increase of marine protected areas and of protected areas with higher protection status; consider ratification of the Bonn Convention;
- enhance the *capacity of national, provincial, prefecture and county level agencies* to manage biodiversity protection of existing reserves and integrate nature conservation within economic and social development projects outside protected areas;
- increase the *financial and human resources* for nature and biodiversity protection and further involve local residents in patrolling, monitoring and habitat enhancement, in the context of poverty alleviation; diversify the sources of financing of nature conservation;
- develop the use of *economic instruments related to nature and biodiversity protection*, not only as income supporting measures, but to reward the provision of environmental services;
- integrate long-term plans for rehabilitating and maintaining species and protected areas (including managing alien species) with *land-use and river basin management plans*, and any subordinate provincial, prefecture and country plans;
- integrate the economic and social values of protecting habitats and species (e.g. ecological services, tourism development) within *development decision-making*, in particular as part of EIAs;
- promote *sustainable forest management* through issuance of forest management plans, certification of foresting practices, and labelling of forest products in China; expand co-operation with supplying countries in the *forestry sector*, to ensure that imported wood and wood products are sourced from forests that are managed on a sound, sustainable basis.

2. Towards “Harmonious Society” and Environmentally Sustainable Development

Integration of environmental concerns in economic decisions

China’s two digit average economic growth was accompanied by some *decoupling of pollution from economic growth* in the period 1990-2005. This was the case, in particular, for SO₂ and recently NO_x emissions. Energy intensity has improved by about a half since 1990, though the decrease has levelled off. Water withdrawal and municipal waste have also been significantly decoupled from the economic growth. Successive *Five-Year Plans for National Economic and Social Development* (FYPs) have provided an important means for identifying and addressing priority environmental problems: they are underpinned by solid analysis, they establish quantitative targets, and they frame investment programming and budgeting. The Chinese leadership has announced its intention to place environmental protection in a more strategic position. In this perspective, the 11th FYP advocates a *new economic model in which growth is guided by resource conservation* rather than by continued expansion of resource use. Improved energy intensity and the concept of the “circular economy” are recognised as key to help reduce the pollution and resources intensity of the Chinese economy. Various measures have been taken to better *integrate environmental and economic decision-*

making: provision has been made in the 2003 EIA law to assess the potential environmental impacts of sectoral programmes. Some energy prices have been deregulated (e.g. some coal prices). The use of environment-related taxes has expanded, but accounts only for about 3% of total tax revenues.

Recommendations:

- review *price levels* for energy, water and other natural resources so as to better reflect their scarcity value and internalise externalities; consider mechanisms to compensate or mitigate their impact on poorer sections of the population and regions that would be adversely affected by such price increases;
- consider establishing an inter-ministerial group to examine how *environment-related taxes* might be restructured to help better achieve environmental policy objectives;
- *increase and diversify the sources of environmental finance* by fuller implementation of the polluter pays and user pays principles, and increase the effectiveness and efficiency of allocating public environmental expenditure;
- strengthen the institutional mechanisms for *better integrating environment into economic and sectoral policies*, possibly by establishing a Leading Group on environment or on sustainable development; fully implement the provisions in the EIAs law for assessing the potential environmental impacts of sectoral programmes;
- continue to establish *national targets* to achieve key environmental objectives, taking into account scientific, economic and social analysis.

However, the pollution, energy and material intensities of the Chinese economy remain high, as well as its water use intensity, and *pollution remains very serious in many locations*. China generates more pollution and consumes more resources per unit of GDP than OECD averages. There is a high rate of environmentally significant accidents, and resource degradation is constraining economic development. *Health costs and ecological damages of present development are high*. The target of quadrupling GDP between 2000 and 2020 requires *commensurate strengthening of environmental management and finance*, so that economic growth is environmentally sustainable. It is not sure that present policies, although going in the right direction, are *sufficiently ambitious* to meet the strategic environmental objectives identified by Chinese leaders. The *under-pricing of energy, water and other resources* needs to be addressed. More effective arrangements at the level of the State Council are needed to better integrate environment into economic and sectoral decision-making, including a *strengthened role for SEPA*.

Integration of environmental and social decisions

China's economic growth has helped raise living standards and has contributed to significantly reduce poverty. In recent years, government policies have emphasised *economic growth with due attention to social and environmental concerns*: environmental issues associated with rapid urbanisation and development of coastal regions, with poverty, and with development challenges in less-advanced western parts of the country are being addressed. Considerable progress has been made since the

mid-1990s in the development of *environmental information*, access to this information, and participation on environmental issues. China produces each year comprehensive environmental statistics and environmental reports. The media and the rise of committed and outspoken environmental NGOs reinforce the demand for environmental progress. Progress can also be seen in environmental education and awareness-raising through primary education.

Recommendations:

- further improve health and living standards, particularly in less developed areas, by reducing the share of people without *access to sound environmental services* (safe water, basic sanitation, electricity); taking account of affordability constraints, give higher priority to water infrastructure in development strategies (e.g. for the poorer central and western China);
- consolidate and strengthen information on health and the environment and develop a *national health-environment plan* of action; implement the most cost-effective measures; promote pollution release and transfer reporting by enterprises; build capacity to report on exposures of specific population groups to environmental health risks (e.g. occupational health, health impacts near polluting facilities, children's health);
- continue to improve environmental information by developing and using *indicators of environmental performance*, environment-related *economic information* and analysis, and environmental accounting tools such as *material flows accounts*; expand the coverage of environmental information (e.g. to diffuse pollution, toxic substances, hazardous waste); continue to improve consumer protection and public *access to environmental information*;
- further expand *environmental education* and awareness, particularly among young people;
- continue efforts to work with *NGOs and the public* to achieve environmental policy goals; strengthen co-operation and partnerships with *enterprises* and corporate social responsibility.

However, the rapid economic growth has led to *very wide and increasing disparities* between the rich and the poor, urban and rural communities, and coastal and inland provinces. While some aspects of the urban environment have improved in China's mega and large cities, additional *demands for environmental services* (e.g. water supply, water sanitation, solid waste management) are resulting from the large population migration from western and central China to coastal China. At the same time, the needs for environmental services of the expanding towns and townships and of the rural poor, particularly in the central and western regions, are also growing. To reduce industry relocation and environment-related distortions to competitiveness and trade within China, *national environmental standards* (i.e. product, emission and quality standards) should be implemented by all provinces effectively and efficiently, minimising transition periods when transitions are necessary. Concerning *health*, pollution is contributing to an increase in *respiratory diseases*, cancer and birth defects. Environmental and health information should be strengthened to support priority setting and to generate related economic and health benefits. Concerning *environmental information*, improvements could be made with respect to indicators of environmental performance, environment-related economic information, environmental and material flows accounts, the coverage of environmental information, and monitoring.

Environmental education should be further strengthened (e.g. at university level) and expanded, particularly for young people. Environmental awareness should be increased in Chinese enterprises.

3. International Co-operation

The last decade has seen a *dramatic increase in China's engagement with other countries* in addressing environmental challenges. This reflects a growing recognition across the spectrum of Chinese institutions of the important economic, social and ecological stakes that China has in meeting these challenges, and also of its shared interests with the international community. China is now an active, constructive participant in a broad array of regional and global environmental conventions, institutions and programmes, and is *drawing heavily on international financial institutions and special mechanisms* (e.g. the Montreal Protocol's Multilateral Fund) to augment its own resources and ensure that China's international commitments are met. Since 1995, it has reduced its production and consumption of ozone-depleting substances more than any other country; established comprehensive and ambitious policies and legal regimes in the areas of marine pollution and fisheries management; provided international leadership in efforts to control transboundary movement of hazardous waste; recognised and taken initial steps to confront its emissions of greenhouse gases; and undertaken a detailed examination of how its *trade and investment policies* can work to support environmental management goals.

China, however, remains the *second largest contributor of greenhouse gases*, and is still the world's largest producer and consumer of ozone-depleting substances. Its largely coal-fired economy is a major source of acid rain and other transboundary air pollutants in Northeast Asia, and is a significant contributor to global-scale air pollution, including mercury. Its *coastal waters and regional seas* are suffering from an increasing burden of land-based pollution in many areas; and the environmental management and food-sanitation regimes for China's rapidly expanding marine aquaculture industry need strengthening. A lack of strong *monitoring, inspection and enforcement capabilities* and associated penalties are limiting the effectiveness of otherwise sound policies, laws and regulations established to further China's domestic objectives and international commitments in the areas of marine fisheries, coastal water quality, hazardous waste transport, and the control of *illegal trade in endangered species, forest products and ozone-depleting chemicals*. Stronger efforts are needed by the government to ensure that *Chinese corporations operating overseas*, particularly in such environmentally-sensitive industries as forest products and mining, are positive contributors to China's stated goal of building an international reputation for sound environmental management and sustainable development. *Funding limitations* and *inadequate institutional co-ordination* are constraining the pace at which China is able to carry out an ambitious international environmental agenda that includes a range of difficult challenges (e.g. desertification control, greenhouse gas reduction, marine management). To achieve success, increased financial efforts from China as well as major technical support and targeted financial assistance to China from *OECD countries and international financial institutions* will be required.

Recommendations:

- continue China's *active engagement in international environmental co-operation*, seeking to improve the effective and efficient use of i) domestic resources, and ii) international support mechanisms (e.g. the World Bank's Clean Development Fund, the Multilateral Fund under the Montreal Protocol, and the Global Environment Facility);
- strengthen *monitoring, inspection and enforcement capabilities* in support of the implementation of international commitments (e.g. on trade in endangered species, in forest products, in hazardous waste and in ozone-depleting substances, as well as on sound chemicals management, ocean dumping and fisheries management);
- improve governmental oversight and environmental performance in the *overseas operations of Chinese corporations* (in the spirit of the OECD guidelines for multinational enterprises);
- develop *partnerships with foreign enterprises* to contribute to environmental progress through provision of training, technical support and cleaner technology; ensure environmental requirements are not relaxed to attract *foreign direct investments*;
- continue to assign high priority to domestic and regional *anti-desertification efforts*;
- intensify domestic and international co-operation to reduce *transboundary air pollution* in Northeast Asia by, inter alia, introducing cleaner coal technology, improving energy efficiency and fuel switching;
- ensure that the interim and final targets for the phase-out of *ozone-depleting substances* under the Montreal Protocol continue to be achieved on schedule;
- prepare a *coherent national plan on climate change* which draws together the array of climate-related activities currently underway and planned to improve their collective efficiency and impact;
- strengthen efforts to protect and improve *water quality in coastal waters and adjacent regional seas* from land-based pollution sources, and upgrade environmental management regulations and government oversight in the aquaculture industry;
- integrate environmental considerations systematically into China's growing *development co-operation* programme.

CZECH REPUBLIC*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

2. POLLUTION MANAGEMENT

3. NATURE AND BIODIVERSITY MANAGEMENT

Part II
SUSTAINABLE DEVELOPMENT

4. ENVIRONMENTAL-ECONOMIC INTERFACE

5. ENVIRONMENTAL-SOCIAL INTERFACE

Part III
INTERNATIONAL COMMITMENTS

6. INTERNATIONAL CO-OPERATION

REFERENCES

* Also available in Czech.

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 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*

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

** 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).

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.

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.

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.

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.

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*.

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.

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*.

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.

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*.

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.

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.

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).

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.

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.

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.

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).

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 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.

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.

DENMARK*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR
- 3. WATER
- 4. NATURE AND BIODIVERSITY MANAGEMENT

Part II
SUSTAINABLE DEVELOPMENT

- 5. ENVIRONMENTAL-ECONOMIC INTERFACE
- 6. ENVIRONMENTAL-SOCIAL INTERFACE

Part III
INTERNATIONAL COMMITMENTS

7. INTERNATIONAL CO-OPERATION

REFERENCES

* Also available in Danish.

CONCLUSIONS AND RECOMMENDATIONS*

This report examines Denmark's progress since the previous OECD Environmental Performance Review in 1999, and the extent to which the country has met its *domestic objectives and honoured its international commitments*. The report also reviews Denmark's progress in the context of the OECD *Environmental Strategy for the First Decade of the 21st Century*.** Some 37 recommendations are made that could contribute to further environmental progress in Denmark.

Denmark's *economic progress* provides the country with high average income per capita and extensive welfare benefits. Its open economy thrives on trade in the EU and globally. It is largely driven by intensive *agriculture* and *fisheries*, which support a large agro-food industry and have a large environmental impact. Other severe environmental pressures stem from its *transport* sector and from its *energy* supply structure, which continues to rely mainly on fossil fuels. Environmental issues in Denmark also have a strong international dimension due to regional economic and environmental interdependencies (e.g. EU co-operation, North Sea and Baltic Sea pollution, transfrontier air pollution). Denmark is strongly involved in European and global environmental issues and environmental aid.

Over the review period, economic growth and implementation of European Union legislation provided the context for economic and environmental decision-making in Denmark, together with a tax freeze and a major territorial government reform. The implementation of environmental policies is being further devolved to municipal authorities. *Environmental policies* currently focus on: air pollution, the aquatic environment (nutrient discharges and groundwater contamination), biodiversity, chemical substances, environmental health, and global issues such as climate change. Measures to address these issues rely on a range of diverse, well-established and in some cases innovative policy instruments.

1. Environmental Management

Building on solid environmental legislation largely harmonised with and derived from EU environmental directives, and benefiting from experienced environmental administrations at national and territorial level, environmental management in Denmark is going through a *reform period*, marked by further devolution of environmental responsibilities to municipalities as well as the creation of regional environmental centres within the Ministry of Environment. This is taking place in the context of an overall *territorial government reform*, which included the elimination of counties and aggregation of the 271 municipalities into 98, on 1 January 2007.

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 26 June 2007.

** The objectives of the Strategy are covered in the following sections of these Conclusions and Recommendations: maintaining the integrity of ecosystems is covered in Section 1; decoupling of environmental pressures from economic growth, in Sections 2.1 and 2.2; and global environmental interdependence, in Section 3.

Strengthening the implementation of environmental policies

Environmental regulations continue to play a major role in Danish environmental policies. Land-use regulations, particularly those applicable to rural and coastal areas, are rigorous, and spatial planning contributes effectively to protection of the environment, nature, landscapes and coastal areas. Stringent waste incineration regulation has been a driving force for the development of cogeneration and district heating. The concept of producer responsibility was embodied in Danish waste legislation (further to EU directives on end-of-life vehicles and on waste electrical and electronic equipment). More generally, Denmark performs very well in transposing and implementing *EU environmental legislation*. Policy making continues to be *open and consultative*. Denmark uses *economic instruments* (environmental charges, environmental taxes, other economic instruments) extensively. The *full cost-recovery principle* has been tacitly applied in water management for some time and was included in the 2001 Environmental Protection Law. *Green taxes* apply to air, water and waste management policies. The tax on sulphur emissions (1996) contributed to drastic decreases in SO₂ emissions. The waste water tax (1997) led to a significant reduction of nitrogen, phosphorus and organic matter in waste water. Since the 1999 review, Denmark has introduced several new environmental taxes (e.g. CO₂ tax on gasoline, tax on ozone-depleting greenhouse gases, taxes on PVC and phthalates, tax on mineral phosphorus added to feed). Increasing emphasis is placed on the use of *cost-effectiveness analysis* in ex-ante evaluations of environmental actions to optimise the mix of instruments applied. Overall, public environmental expenditures are covered by environmental charges or taxes, and the *polluter pays principle applies to households and, to a lesser extent, industry*.

Despite these excellent environmental policies and many positive trends, Denmark's environmental performance is not always high by OECD standards except for a few indicators (i.e. SO_x emission intensity, public waste water treatment, energy intensity). The actual results are in the middle range for some indicators (e.g. pesticide use, NO_x emission intensity), and below OECD standards for others (municipal waste per capita, nitrogenous fertiliser use). Some health indicators are also of concern. This suggests that Denmark's environmental policies have not always been strong enough to counter the pressures exerted on the environment from transport, agriculture, fisheries and other economic activities, as well as from consumption patterns. The *effectiveness of economic instruments* has been hindered by a series of factors. First, tax concessions should be eliminated (e.g. the very low energy tax paid by industry on electricity consumption, the industry exemption from the water supply tax). Second, their incentive effect should be increased: for example, since 2001, most tax rates have not been adjusted for inflation. Third, their scope could be further extended, although this has become difficult following the *tax freeze* introduced in 2001. Further, there is uncertainty about the extent to which the full cost-recovery principle (enshrined in the 2001 Environmental Protection Act) is applied to municipal waste collection. It is not clear whether the territorial government reform will allow improvement in enforcement of environmental legislation. The *number of environmental inspections* has decreased drastically to focus on IPPC facilities. Finally, Denmark's sustainable development strategy has not always been used as a platform to develop environmental strategies, though individual environmental action plans do exist (e.g. National Action Plan for the Aquatic Environment, National Action Plan on Chemicals).

Recommendations:

- further develop the *environmental strategic and planning framework* with specific environmental quality objectives as well as targets and deadlines, in the context of the sustainable development strategy; pursue efforts to use cost-benefit and cost-effectiveness analyses in policy setting and implementation;
- set up capacity building mechanisms to *help municipalities carry out new environmental management tasks* resulting from the territorial government reform; foster exchange of expertise among municipalities;
- adjust the *rates of green taxes* to internalise externalities; reduce tax concessions and the associated administrative cost of their implementation;
- adopt a *national action plan for promoting environmental technology* based on appropriate economic analysis, and implement it;
- prioritise *monitoring* of national environmental action plans.

Air

Denmark has continued to register progress in managing air pollution and meeting its national and international objectives. *Emissions* of SO_x, NO_x and VOCs were strongly decoupled from economic growth during the review period. SO₂ emission intensity (emissions per unit of GDP) is the lowest in the OECD area, partly due to the tax on SO₂ emission introduced in 1996. CO₂ emissions also were strongly decoupled from economic growth, and CO₂ emission intensity is below the OECD-Europe average. Ammonia emissions from the agricultural sector have also decreased. As a result, Denmark successfully reduced emissions of acid substances in recent years. On the whole, *ambient concentrations* of criteria air pollutants decreased during the review period. New NO₂ ambient standards were adopted in 1999. Other ambient air quality standards were reviewed and new limit values set (applying in 2005 or 2010 depending on the substance). Denmark adopted a *strategy and action plan to protect public health* against, inter alia, air pollution in 2003. Monitoring of PM₁₀ (in cities and urban background) began in 2001. The government is aiming to reduce particulate emissions from traffic in towns by 50% by 2010, notably by introducing low emission zones in city centres. The *energy intensity* of the Danish economy was improved over the review period and is one of the lowest among OECD countries. Renewable energy represents 25% of total electricity generation. A long-term energy strategy, Energy Strategy 2025, was launched in 2005. Registration tax reductions were introduced for very energy-efficient cars (1999) and for diesel cars equipped with particulate filters (2006).

However, several challenges remain, mainly concerning *NO_x and PM* emissions and concentrations. One fifth of the Danish population is exposed to unacceptable air quality. In Copenhagen, PM₁₀ concentrations exceed the limit value. Emissions of PAHs (polycyclic aromatic hydrocarbons) increased during the review period as a result of increased wood combustion for residential heating. Higher priority should be given to monitoring of *hazardous air pollutants*. There is a need to know more about the health effects of fine particulates (PM_{2.5}). Although private car ownership is low by OECD standards (35 vehicles per 100 persons), the number of diesel-powered cars increased over the review period. Despite investment in public transport infrastructure projects (e.g. the Copenhagen metro, the Copenhagen Circle Line Project), *public transport* is still losing out to private cars. Background ozone levels are on the rise, and more should be done to reduce NO_x and VOC domestic emissions and their

transboundary transport. Although Copenhagen has the highest rate of cycling of any major European city, Denmark did not have a national policy to develop cycling as a mode of transportation until recently.

Recommendations:

- continue to reduce emissions of *NO_x and VOCs from mobile sources*, including through the use of economic instruments in the most cost-effective way;
- strengthen the *management of particulate matter*, including the monitoring of PM₁₀ and PM_{2.5} concentrations and emissions; develop emission standards for residential *wood burning stoves*; implement and enforce *low emission zones* in cities;
- continue to encourage the provision of economically and environmentally attractive *public transport systems* in urban areas; strengthen transport demand management to limit passenger car use in congested areas (e.g. road pricing, parking fees, spatial planning, intelligent transport systems); implement the Bicycle Strategy 2007; address air pollutant emissions from ships;
- integrate *transport and environmental policies*; set quantitative targets, further use demand-side management, and facilitate co-operation among state and territorial authorities and concerned parties;
- continue to *improve energy efficiency* (e.g. transport and building sectors, public sector, distribution companies); review *energy taxation* to establish appropriate price signals.

Water

Use of farm inputs (nitrogen and phosphorus) was decoupled from agricultural production during the review period, following implementation of an instrument mix (economic incentives, voluntary and regulatory measures) under the second Action Plan for the Aquatic Environment 1998-2004 (VMP II). The target of reducing *nitrogen leaching* by half from 1985 levels was met (in 2003 rather than 1993, the initial deadline). Denmark now complies with requirements of the EU Nitrates Directive. *Pesticide use* was also decoupled from agricultural production, due to the switch to low-dose agents and to the pesticide tax introduced in the mid-1990s (whose rate has since been increased). *Water pricing* covers the cost of providing services (user charges) plus some environmental costs (taxes) for both public water supply and waste water treatment. The increase in water prices brought a significant reduction in household water consumption over the review period, but not in industry or agriculture where tax exemptions still apply. *Municipal waste water treatment* is widely available (89% of the Danish population is connected) and most treatment is advanced (tertiary). Available evidence suggests that *drinking water quality* was kept high, although monitoring should be further improved, particularly for small waterworks. The pressure on water resources from industry has been reduced, mostly due to delocalisation of industrial production.

Recommendations:

- carry out a comprehensive assessment of the *economic efficiency and environmental effectiveness* of water pollution abatement measures in different sectors (municipal, industrial, agricultural), in the context of implementation of the EU Water Framework Directive;
- consider the further use of *economic instruments to address diffuse pollution*; target fiscal incentives to environmental outcomes and improve cost-effectiveness;
- speed up identification of *areas at high risk of nutrient and pesticide contamination* and take measures to protect them, including establishing groundwater protection zones, 10-metre buffer zones along rivers, and buffer zones around lakes;
- reinforce the *interface between water management and nature protection*, in the wake of local government reform and pursuant to VMP III objectives; in particular, speed up creation of new wetlands and define ecological quality objectives for rivers;
- move toward *river basin management* according to the new water districts; in particular, prepare water plans as required by the EU Water Framework Directive;
- increase the *efficiency of public water supply and waste water management*, in particular by exploiting economies of scale in the wake of local government reform and pursuant to the proposed water reform objectives.

However, Denmark *still has water quality problems*, particularly in lakes and coastal areas (fjords), but also in rivers and groundwater. The new Action Plan for the Aquatic Environment 2005-15 (VMP III) aims to further reduce nitrogen leaching by 13% and to address phosphorus pollution (through a tax on phosphorus added to animal feed). Reduction targets have been set countrywide, but without looking at *cost-effectiveness* in meeting site-specific water quality objectives; indeed the whole of Denmark's land area is classified as vulnerable under the EU Nitrates Directive, and all Danish waters are sensitive under the EU Urban Waste Water Treatment Directive. There is a need for a holistic (river-basin) approach when addressing water quality and quantity issues, and efforts are needed to compare the cost-effectiveness of measures among households, industry and agriculture sectors. This is the source of major inefficiency in addressing nitrogen pollution. The setting of *water quality objectives* has been put on hold, pending implementation of the EU Water Framework Directive in 2009. Little has been done to renew sewerage networks and allow separate collection of stormwater, due to the low efficiency in providing water services resulting from the present water pricing regime. Efficiency gains are expected from a *water sector reform* under preparation, through benchmarking of water utilities and price regulation. There is considerable scope for further efforts on restoration of Danish watercourses, only 2% of which follow a naturally meandering course. Contaminants other than nitrogen, phosphorus and pesticides have been given too little attention (e.g. heavy metals, toxic chemicals, endocrine disrupters).

Nature and biodiversity

After the OECD Environmental Performance Review in 1999, Denmark took several steps to emphasise the conservation of biodiversity. It adopted the National Strategy on Biological Diversity (2004) and the *Action Plan for Biodiversity and Nature Conservation* (2004-09). It prevented housing construction in a widened *coastal and dune protection zone* (from 100 to 300 metres). In the context of *Natura 2000*, Denmark has designated 254 special conservation areas and 113 special protection areas, including 27 Ramsar sites, covering 8.4% of its terrestrial areas (i.e. 3 600 km²) and 12.3% of its marine areas (i.e. 13 050 km²). Environmental monitoring was extended to nature conservation through the creation of the National Monitoring and Assessment Programme for the Aquatic and Terrestrial Environments (NOVANA). A number of *species*, like the white-tailed eagle, peregrine falcon, common crane, Eurasian spoonbill and corncrake, are starting to return to Denmark. Roe deer and red deer are increasing, as are grey seal populations in the seas. Denmark has initiated seven pilot projects in support of the creation of national parks, although none has been created yet.

Recommendations:

- establish *national parks* in priority conservation areas and clarify their role in relation to other protected areas; complete *management plans for all protected areas* including the Natura 2000 areas, incorporating biodiversity objectives and ecological integrity indicators, and establish a network of corridors linking them; develop and adopt *ecosystem quality objectives* for terrestrial and aquatic habitats, including as part of implementation of the EU Habitats and Water Framework Directives;
- develop time-bound objectives for the *national nature and biodiversity conservation action plan*, including with regard to integration of biodiversity considerations in *agriculture, fisheries* and other sectoral policies; develop and implement a *comprehensive planning system*, with a sea use planning component and with cumulative impact assessment and climate change impact scenarios;
- adjust the *levels of economic incentives* and revise the land use legal framework, so as to enhance biodiversity conservation, production of ecological services (e.g. reduction of nitrogen and phosphorus leaching) and groundwater protection (e.g. in priority contaminated areas) on private land;
- expand *restoration projects for major ecosystems*, including major rivers and future national parks, to re-establish their capacity to produce ecological services and to support biodiversity;
- accelerate the rate of *environmental certification* of fish farms.

However, agriculture (including aquaculture and intensive livestock farming), urbanisation and increased infrastructure development continue to exert negative impacts on nature and biodiversity. The Danish fish catch represents a major part of the total catch from the North Sea. Depleted fish stocks (due to overfishing), recurring fish kills in the Baltic (due to water pollution), and finding of deformed fish and snails changing sex, of fish unfit for human consumption, and of invasive species (some as a result of climate change) all point towards an *impoverished and degraded aquatic environment*. Further efforts are needed to follow up on several of the 1999 OECD recommendations. The national Action Plan for Nature and Biodiversity Conservation

lacks clear time-bound objectives. It has yet to integrate comprehensive biodiversity conservation targets in *fisheries and agricultural policies*. The management plans for protected areas are incomplete and the goal of increasing the forest cover is behind schedule. Despite NOVANA, Denmark has not fully developed indicators and a monitoring system to evaluate progress toward the 2001 Gothenburg EU Summit objective of halting the decline of biodiversity by 2010. Denmark's next challenge will be to move towards ecosystem-specific quality objectives. This will require cross-sectoral co-ordination, particularly among landscape and seascape planning, agriculture and fisheries, and urbanisation and infrastructure development. It will also require improved institutional integration, enhanced use of economic instruments and the application of a risk management approach, particularly with regard to climate change impacts. In 2006, the European Commission launched infringement procedures against Denmark over violations of both the Birds and the Habitats Directives.

2. Towards Sustainable Development

Integration of environmental concerns into economic decisions

Denmark gives importance to *sustainable development* nationally and internationally. In 2002 it adopted a national sustainable development strategy which is to be presented to Parliament every four years and followed up through sectoral plans and a set of indicators published in principle every year. Implementation also takes place at the local level through Local Agenda 21. Over the review period, Denmark successfully *decoupled* environmental pressures from economic growth in several areas, including SO_x emissions, NO_x emissions, water abstraction, nitrogen fertiliser use and pesticide use. Energy intensity also decreased during the review period. *Institutional integration* of environmental concerns into sectoral policies progressed *in agriculture* (e.g. agri-environmental measures, increase in organic production) and *energy policies* (e.g. emphasis on climate change, energy efficiency, renewable energy). Three quarters of government bills underwent *strategic environmental assessment*. At project level, regulations on environmental impact assessment were updated to include an EIA-permit and extended public information. *Market-based integration* relies on a wide range of economic instruments (i.e. charges, taxes, other instruments), although significant subsidies remain (in agriculture, fisheries, tax concessions to industry).

However, Denmark is faced with numerous environmental challenges resulting from unsustainable consumption patterns (e.g. in waste generation, transport, land use). The generation of household waste is growing nearly twice as fast as the economy, and has reached one of the highest generation rates in the OECD. Greenhouse gas emissions have not been decoupled from private car use. High mobility associated with longer commuting distances generates pressure on peri-urban areas otherwise needed for agricultural or recreational purposes. With the adoption of the national sustainable development strategy, Denmark no longer has a white paper on environment, and environmental efforts are scattered throughout a large number of programmes, policies and ministries. The *environmental strategic and planning framework* and associated objectives should be linked to the sustainable development strategy. *Little progress* has been made in integrating environmental concerns into *transport policy* at the strategic level. Although the transport sector accounts for a third of final energy consumption in Denmark and is showing the fastest energy growth, it is explicitly excluded from the (June 2005) political agreement on greater energy efficiency. Transport policy mainly aims at increasing or upgrading road infrastructure supply; insufficient effort is made to

modernise and increase the efficiency of the Danish railway. Little consideration is given to transport demand management.

Recommendations:

- continue to rely on and, where relevant, expand the use of *environmental taxes* to *internalise externalities*; adjust tax rates for inflation;
- continue to examine the existing support schemes from the point of view of their *environmental effectiveness and economic efficiency*;
- develop a *sustainable transport plan*, as a follow-up to the forthcoming national sustainable development strategy;
- review existing *transport taxes* with a view to restructuring them in a more environmentally friendly way (e.g. taxing both car use and ownership; removing the tax break for commuting); consider the introduction of *road pricing* as a means to halt congestion;
- step up efforts to promote *more sustainable consumption patterns* (e.g. concerning waste, transportation, land use) by adopting appropriate regulatory and economic instruments, and by focusing on demand management.

Integration of environmental and social decisions

Environmental health has received increased attention through the 2003 strategy and action plan on environment and health, as well as through targeted research (e.g. on allergenic substances, endocrine disrupters, impact of traffic on human health). To accelerate their replacement by less dangerous substances, all professional uses of hazardous substances must be registered in the national product register. Cost-benefit analysis and economic valuation methods have been used in several health-related studies and strategies (e.g. on noise, cycling, health effects of air pollution). Concerning *environmental democracy*, Denmark ratified the *Aarhus Convention* in 2000. Pursuant to the related EU directives on environmental information, it has harmonised its practices concerning provision of information, public access to information, public participation and access to courts. A wide range of environmental information (data, indicators, state of the environment reports, targeted information brochures) is publicly available and frequently updated. Most Danish municipalities have adopted a *Local Agenda 21*, and amendments to the Planning Act in 2000 require them to report on implementation every four years. A nationwide Local Agenda 21 network has been created, involving some 200 contact persons. *Environmental awareness* is enhanced through local and national campaigns, as well as through environmental education at all levels of the education system. In 2006, *environmental employment* accounted for some 2.2% of total civilian employment in Denmark.

Despite the high level of wealth and living standards in Denmark, several *health* indicators are of concern: for example, life expectancy is relatively low, the country has some of the OECD's highest rates of mortality from certain forms of cancer, and allergy and respiratory diseases affect about 20% of the population. Some of these problems might relate to environmental factors. Denmark has no explicit targets for fine particles (PM_{2.5}), which are known to be dangerous for human health. Little attention has been given to *disparities in pollution exposure*, and further attention should be given to promoting *access to nature* and outdoor recreation and the related health benefits. In

2003 the ambitious targets (set up in 1993) for reducing the number of people exposed to noise were postponed from 2010 to 2020 (as part of the 2003 Road Noise Strategy) due to benefits and costs distribution considerations. Despite the goal of issuing an updated set of sustainable development indicators every year, these indicators were not updated during the last two years. The 1999 OECD recommendation to collect data on *private pollution abatement and control expenditure* has not been followed up.

Recommendations:

- set up additional *targets* concerning environmental factors related to health with related indicators; continue to understand better through research and studies the potential links between environmental pollution and chronic illness or child health issues; take action where there is knowledge (e.g. particulate pollution);
- continue to make use of *cost-benefit analysis* and economic valuation in environmental health policy making; and derive relevant priorities for action;
- include the public health benefits of *access to nature* and outdoor recreation as an integral part of national environment and health action plans;
- continue to promote *environmental democracy* through access to environmental information, public participation, and access to courts for citizens and associations (e.g. environmental NGOs);
- assess and reduce *disparities* in exposure to pollution.

3. International Co-operation

Denmark's proactive stance on protecting the environment through international co-operation has played an influential role in a number of international negotiations, particularly in the EU context. Denmark has met or is well on the way to meeting many of its *international commitments* (e.g. reduced discharges of phosphorous and heavy metals into the Baltic and the North Seas, reduced atmospheric emissions of SO₂ and VOCs). Denmark has phased out or reduced its emissions of ozone-depleting substances ahead of internationally agreed deadlines. Denmark continues to provide a relatively high level of *official development assistance* (0.81% of GNI in 2005). Environmental management is mainstreamed into a substantial part of bilateral and multilateral regional assistance programmes. Danish export credits are well managed and the environmental risk assessment follows the rules agreed within the OECD. Concerning *marine issues*, Denmark (recently) ratified the 1978 UN Convention on the Law of the Sea and shows progress in implementing conventions such as MARPOL, London and OSPAR. Illegal oil spills in the Baltic and the North Seas were reduced by half during the review period. Finally, the Greenland Dialogue on climate is welcome.

However, there is room for progress. Concerning *climate change*, in 2004, Denmark's greenhouse gas emissions had decreased by only 2% compared to 1990 (the base year). This is far from its challenging CO₂ emission reduction target (-21% for 2008-12) under the EU burden sharing agreement. The CO₂ reduction target of the 1990 Energy Plan was not met. Although good progress has been made in reducing greenhouse gas emissions from agriculture, households and the waste sector, much remains to be done and is in progress in the energy, transport and industrial sectors. This is despite the low energy intensity of the Danish economy. Review and revision of energy and transport prices and taxation should be considered. Denmark is one of the few

OECD countries that have a carbon tax on energy products, but the CO₂ tax rate was reduced in 2005 to ensure a neutral overall energy tax burden. Further cost-effective domestic efforts will be necessary, given the anticipated allowances under the EU Emission Trading Scheme for the period 2008-12 and the limited scope for expanding the use of the Kyoto Protocol's *flexible mechanisms*. Afforestation projects are behind schedule with respect to the objective of doubling the forest area by 2040. Concerning *marine issues*, although Denmark has been active in many international and regional marine protection fora, fish kills (due mainly to oxygen depletion associated with nutrient discharges) have been reported annually for a long time in Danish coastal areas. The risk of oil spills and maritime accidents along the Danish coast, the Belt and the Øresund is high, with the heavy traffic from shipping and fishing activities. Inappropriate dismantling of Danish end-of-life ships in India became an issue in 2005. Concerning *transboundary air pollution*, while Denmark has met the 1998 Sofia Declaration target for NO_x emissions, achieving the Gothenburg target (55% reduction by 2010 from the 1990 level) will require further action.

Recommendations:

- ensure that *cost-effective domestic measures* will contribute to meet the Kyoto Protocol's *greenhouse gas emission reduction target*, especially in sectors *not covered by the EU Emission Trading Scheme*; accelerate *afforestation*;
- place higher priority on *marine protection*, including marine ecosystem protection; take further steps to reduce the discharge of *toxic substances and nutrients*; ensure that Denmark's international commitments are achieved; continue efforts towards appropriate *dismantling* of Danish end-of-life *ships*;
- pursue efforts towards the sustainable management of *commercial fisheries and aquaculture*;
- continue to play an exemplary role in international environmental protection including through *development aid*; continue to contribute to sustainable development and capacity building in developing countries through environmental technology exports and other measures (e.g. support for environmental education and awareness programmes);
- continue efforts to ensure appropriate implementation of multilateral environmental agreements involving *trade* (ozone-depleting substances, hazardous substances, chemicals, endangered species);
- *accelerate the ratification* of international environmental agreements already signed.

FINLAND*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR**
- 3. NOISE**
- 4. WASTE**
- 5. NATURE AND BIODIVERSITY**

Part II
SUSTAINABLE DEVELOPMENT

- 5. ENVIRONMENT-ECONOMY INTERFACE**
- 6. ENVIRONMENTAL-SOCIAL INTERFACE**
- 7. SECTORAL INTEGRATION: ENERGY**

Part III
INTERNATIONAL COMMITMENTS

- 8. INTERNATIONAL CO-OPERATION**

REFERENCES

* Also available in Finnish and in Swedish.

CONCLUSIONS AND RECOMMENDATIONS*

This report examines Finland's progress since the previous OECD Environmental Performance Review in 1997, and the extent to which the country has met its *domestic objectives and honoured its international commitments*. The report also reviews Finland's progress in the context of the OECD *Environmental Strategy for the First Decade of the 21st Century*.** Some 43 recommendations are made that should contribute to further environmental progress in Finland.

Over the review period (1997-2008), Finland has sustained the *economic growth* initiated just before it acceded to the European Union in 1995; the Finnish economy has grown at a higher rate than the OECD average and Finland now ranks in the first half of OECD member countries in regard to its GDP per capita. The economic activity is expected to fall to 0.6% in 2009, as recession takes hold across OECD, before rising slowly to 1.8% in 2010. The current economic crisis could be seen as an opportunity to promote environmentally-friendly investment (e.g. in energy efficiency and cleaner energy) in the context of Finland's efforts to stimulate its economy. Openness to international trade and foreign direct investment, a high education level of the population, and a strong innovation record also place Finland in a good position to benefit from the opportunities of globalisation.

Finland has promoted *sustainable development* as part of its diplomacy, including in its relations with the east, with Nordic countries and as part of the European Union. The review period saw consolidation of progress and further alignment with EU environmental acquis. But despite its low population density, Finland has experienced great pressures on its sensitive environment, as expressed by high energy and material intensities. Environmental policy priorities include addressing climate change, fostering co-operation to improve water quality of the Baltic Sea, enhancing biodiversity in forests, and improving waste management and material efficiency.

To meet these *challenges*, Finland will need to: i) strengthen its environmental management efforts (e.g. for waste and nature protection); ii) further integrate environmental concerns into economic decisions; and iii) reinforce international co-operation on environmental issues.

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 18 February 2009.

** The objectives of the OECD Environmental Strategy 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).

1. Environmental Management

Strengthening the implementation of environmental policies

Environmental legislation has been significantly enhanced over the review period: the 2000 Land Use and Building Act, the 2000 Environmental Protection Act, including subsequent amendments, and media specific legislation are consistent with the EU acquis. Introduced in 2000 and covering a larger number of installations than required by the EU IPPC Directive, *integrated permitting* has resulted in increased compliance rates. Better *compliance monitoring*, through regular inspections, advanced information database (Hertta) and inspection database (Vahti), has helped to swiftly prosecute non-compliance cases. A wide range of *economic instruments*, introduced over the review period, have provided incentives to industry and consumers to reduce environmental impacts. The *PPP and UPP* have been implemented further and cost recovery of waste and wastewater services has increased. Industry has entered into *energy efficiency agreements* and increasingly relies on environmental management certification. Finland has set up an efficient financing scheme for *eco-innovation*. Active involvement of *municipalities* (staff arrangements, funding, policy instruments) has strengthened the implementation of environmental policies. The 1995 National environmental policy programme (with the 2005 horizon) established consensus-based targets and stimulated the preparation of various environmental policies and programmes.

Recommendations:

- strengthen *environmental efforts* (e.g. investments, technological innovation), in the context of Finland's efforts to stimulate its economy;
- review the *linkages and possible synergies among environmental policy programmes*, including time-bound targets and objectives, within the framework of Finland's sustainable development strategy;
- pursue the reform of *environmental permitting* to streamline and simplify procedures while enhancing the consistency and effectiveness of enforcement actions;
- review the use of *economic instruments* to increase their environmental effectiveness and economic efficiency;
- further promote *eco-innovation* through green procurement, environmental labeling and the active involvement of businesses and other stakeholders, and consider how environmental policy instruments could be designed to better promote innovation;
- extend the scope of *energy efficiency agreements* to include material efficiency;
- strengthen coordination of *land use planning* between municipalities and state authorities; ensure effective enforcement of land use plans in coastal areas.

However, nationally established environmental targets have often a guiding nature and are not sufficiently taken into account in *sectoral programming* (e.g. transport, agriculture) and at the municipal level to balance short-term economic considerations. *Cost-effectiveness* of plans and policy instruments is rarely assessed. Integrated permitting has not been accompanied by sufficient efforts to ensure *consistency of enforcement across the country*. There is a need to streamline environmental permitting and reduce related administrative burden, further using *notifications and General Binding*

Rules for regulating industrial operations. The institutional reform of the permitting system should be accompanied by a strengthened *enforcement capacity*. Meeting environmental objectives in *land use planning* is hampered by lax enforcement of construction permits. This has led to an increasing urban sprawl that raises energy consumption and generates various forms of pollution. Reducing *material intensities* should require more attention from industry and public authorities and be part of public procurement policies. Overall, environmental expenditure have decreased as a share of GDP over the review period from some 1.2% to less than 0.9%.

Air

Finland has met its policy objectives to reduce *emissions* of traditional air pollutants (for SO₂, heavy metals, POPs) or is on track to meet them (for VOCs, NH₃). Emissions of many heavy metals (arsenic, chrome, lead and nickel) have decreased in recent years as well as emissions of most persistent organic pollutants (POPs). Finnish incinerators for hazardous waste all comply with the EU air emission limit values. Integrated assessment models are being developed to find cost-effective solutions for reducing air pollutant emissions, including fine particles. Urban *air quality* is generally high. For example, urban population exposures to air pollution by ozone and PM₁₀ have remained low by EU standards. Finnish lakes are recovering well from serious acidification problems. Concerning *transport*, emissions have decreased and are expected to further decrease, despite an increase in road traffic volume. Tax differentiation was successfully used to have only sulphur-free diesel and gasoline used on the Finnish market in 2005, ahead of the EU deadline. Efforts have been made to increase the market share of public transport in major urban areas, including through targeted subsidies and tax concessions. Transport system plans have been drawn up to better manage urban traffic congestion. Transport operators have entered into voluntary agreements to improve energy efficiency.

Recommendations:

- pursue efforts to *reduce NO_x emissions*, to meet the NO_x reduction objectives for large combustion plants, and be prepared to respond to more stringent limit values by 2020, as part of the forthcoming EU Emissions Ceilings Directive;
- explore the potential of *economic instruments*, such as emission trading, nitrogen emission taxation and road pricing; ensure that they are consistent with existing instruments, such as road fuel taxes and vehicle taxes, so as to improve economic efficiency and environmental effectiveness;
- explore the potential *ancillary benefits of the new climate and energy policies*, particularly on NO_x and particles;
- ensure coherence of recent and forthcoming *transport system plans* with land use plans, at regional and local levels, with a view to improving traffic management and promoting environment-friendly transport;
- implement EU environmental sustainability criteria for the *production of biofuels*; carry out a cost-benefit analysis to determine the relative value of biofuels, fossil and other alternative fuels.

However, curbing *NO_x and particle emissions* remains challenging for Finland, which has not met its policy objective of reducing NO_x emissions. There is also no target for reducing particulates emissions, which fluctuate from year to year. Increased use of wood in domestic combustion remains a challenge for particle pollution. Emissions of *copper, mercury and zinc* have increased in recent years, as well as emissions of hexachlorobenzene (HCB). Fine particles remain a serious urban air quality problem. Daily PM₁₀ concentrations exceed the limit values in the most polluted areas, and it may be difficult for Finland to comply in time (by 2010) with EU's annual limit value for NO₂. The exceedance of critical loads of eutrophication affects nearly half of the ecosystems. Not enough has been made to improve the situation in the *Kola peninsula* in north-west Russia, close to the Finnish border, where emissions from industrial complexes comprise extremely high levels of SO₂, dust copper and nickel. While *road transport* is increasing for both passengers and freight, there is no road pricing per se in Finland and the end-use price of diesel is lower than the OECD-Europe average. There is a tax incentive to promote the use of biofuels (as allowed by the EU energy tax directive) for which blending with road fuels has become mandatory in 2008.

Noise

Efforts to reduce noise have a long history in Finland, as a *low-noise environment* is considered part of healthy and pleasant living conditions. Attention given to noise problems by Parliament and Government has led to *quantitative objectives* in the 2004 Noise Abatement Action Plan and the 2006 Government Resolution on Noise Abatement. *Regulations* (e.g. speed limit in city centres, noise emission and immission thresholds, regulations of aircraft take-off and landing) and *investments* (e.g. low-noise pavements, noise barriers, renewal of rail fleet and rail maintenance) have been implemented. The first *economic incentives* (air traffic noise charge, introduction of noise criteria in public procurement) have been recently introduced. Their objective is to *reduce exposure to noise* from city traffic and from night-time air traffic. In response to the 2002 EU Directive on Environmental Noise, national road and railway authorities, and the City of Helsinki, started producing noise maps and noise action plans. *Municipalities* also started to integrate noise issues in their air pollution reduction, public transport and green procurement programmes. A noise abatement database is currently being established.

Even though large areas of Finland are still free from noise problems, *one sixth of the population* is exposed to daytime noise levels exceeding 55dB from motorways, railways and industry, and this share is likely to increase. The *increase of traffic volumes* has offset progress made in reducing exposure to excessive noise by noise abatement measures. Daytime noise levels of 65 dB are common in urban areas; noise levels up to 70 dB, with potential significant adverse effects on human health, are reached in the busiest urban areas. Noise maps and *noise abatement action plans*, as required by the European Union, are still to be drawn up for many municipalities. *Implementation of national land use objectives* is not sufficient, and land use planners should work to prevent the harmful effects of noise and to reduce annoyance and disruption of activities from noise. Efforts to *reduce noise at source* (e.g. low noise road pavements, low-noise equipment) have been limited; focus has been on (less cost-effective) noise mitigation through noise barriers. Noise thresholds are not binding and noise peak levels for industry are not sufficiently regulated. *Financial resources devoted to noise management* (including by the road administration and municipalities) are not commensurate with the quantitative objectives adopted. The *use of studded tyres* should be restricted to reduce both noise levels and small particulate emissions. An up-to-date

and comprehensive information programme is to be developed to help monitor noise levels.

Recommendations:

- further specify *noise regulations* (e.g. obligatory excessive noise thresholds, thresholds for peak levels, thresholds in urban areas) and enforce their application by national, regional and local authorities; designate and manage quiet areas;
- fund *noise abatement projects* with priority given to reducing noise at source and to areas with daytime noise exceeding 65 dB, areas with large numbers of people exposed, recreational areas, and areas with educational and healthcare institutions;
- *integrate noise concerns within other policies* (e.g. zoning in land use planning, road and congestion pricing, “green” procurement in public transport, tourism policies, nature conservation);
- develop further noise *monitoring* (e.g. along rail and roads, combined with air quality monitoring in the Helsinki area, for hotspots action programmes according to the EU Environmental Noise Directive);
- further expand research on the adverse effects of noise on *human health* and well-being; including the *economic assessment* of noise measures.

Waste

Waste generation from the *manufacturing industry* has been decoupled from economic growth, with waste minimisation targets being met by oil, chemical, and base metals industries. Waste recovery is high in pulp and paper, wood and food industries. *Municipal waste generation* has decreased more rapidly than planned under the National Waste Plan (NWP) and is low compared to OECD average. Recovery rates for glass, plastic, paper, fibreboard, metal and end-of-life vehicles exceed the targets set in Extended Producer Responsibility schemes. Progress has been supported by a number of laws adopted or amended during the review period, which promoted waste reduction and aligned Finland waste regulatory framework with that of the EU. Several instruments are now in place to curb waste generation and to stimulate waste recovery; these include a tax for waste landfilling, municipal waste charges, and Extended Producer Responsibility schemes for several waste streams. Municipal waste services have been reorganised at the regional level and are self-financed. Instruments and facilities have been developed for the management of *construction and hazardous waste* and to address land contamination. A new *National Waste Plan to 2016*, adopted in 2008 after wide consultation with stakeholders, sets ambitious and innovative targets and promotes increased material efficiency in consumption and production.

However, the *1998 National Waste Plan (NWP)* objectives have only been partly achieved. Waste volumes have increased in *some manufacturing sectors*, in particular in pulp and paper, as waste prevention is not sufficiently integrated in environmental permitting. The total volume of waste generated by manufacturing industries per unit of GDP is still more than twice the OECD average. Waste recovery remains below targets in oil, chemical and base metal industries, as well as in the construction and energy sectors. *Hazardous waste* generation has increased, partly reflecting changes in waste classification and better reporting, and far exceeds the NWP

target. Recovery targets have not been met and most hazardous waste is still landfilled. *Municipal waste recovery rate* is low; it represents only half of the set target. Sorting at source is insufficient to ensure proper recycling. Recovery of biowaste is particularly lagging, as alternatives to landfilling are underdeveloped and waste disposal in landfills remains prevalent. Even though several waste landfill sites were closed in 2007, one currently operating landfill does not fully comply with the 1999 EU Landfill Directive. Waste-related infrastructures and capacities are lacking to ensure adequate recovery of waste (sorting at source, combined heat and power recovery). *Waste monitoring* remains a concern. Specific waste streams (e.g. hazardous waste disposed of in private landfills, hazardous waste produced by households) are not adequately monitored.

Recommendations:

- ensure proper implementation of the new *National Waste Plan to 2016*; measure progress through improved waste statistics, at national, local and firm levels;
- fully use environmental permitting procedures to promote *waste prevention*, including better definitions of waste prevention measures and the development of guidelines for site inspections;
- promote *market mechanisms for waste sorting and recovery*; in particular, adjust the waste tax to respond to the National Waste Plan priorities; extend the tax to cover private industrial landfills;
- further reduce material intensity through “cradle to cradle” and 3R approaches, and systematically promote *Extended Producer Responsibility schemes* for separate waste collection and recovery;
- improve *waste management infrastructure*; in particular, develop the capacity for recovery of biowaste, carry out further studies and build consensus on waste incineration with combined heat and power recovery.

Nature and biodiversity

A new National Biodiversity Strategy covers the period 2006-16. The integration of nature and biodiversity conservation concerns in national legislation has been strengthened. Finland has ratified most international agreements in the field of nature and biodiversity conservation. Concerning *species*, the third Red List of threatened species was published in 2000. There have been positive developments in the protection of species including for migratory species and aquatic wildlife. Management plans have been established for several game species. A national strategy on *invasive alien species* is under preparation to *prevent their spread*. Concerning *habitats*, the first Red List of habitat types in Finland was published in 2008. Nearly all Finnish *forests* are certified. Wood harvesting is below maximum sustainable removal. Some 300 000 hectares of private land have been protected for nature conservation purposes. The Forest Biodiversity Programme for Southern Finland for the period 2008-16 (METSO) was launched, including targets to extend protected forests. Site selection criteria to protect the most valuable forest sites were improved. Nature *tourism* accounts for a quarter of the overall tourism activity and is rapidly growing; an Action Programme for Developing Recreational Use of Nature and Nature Travel was adopted.

However, the National Biodiversity Strategy 2006-16 does not set quantitative targets. *Biodiversity* continues to decline; for instance, five new species of birds have

become threatened since the previous Red List evaluation in the early 1990s. Little progress has been achieved in expanding the *protected areas* since the OECD Environmental Performance Review of 1997. There are gaps in the national protected areas network, particularly in regard to forests and shore habitats in the South, and ecological connectivity. Drafting a proposal for the Natura 2000 network proved to be a difficult task. Most of the Natura 2000 sites were already included in protected national areas or programmes. Many peatlands have been degraded over time; only 13% of remaining Finnish mires are protected. A national strategy on mires and peatlands is under preparation. Eutrophication remains a significant challenge in the Gulf of Finland and in the Archipelago Sea. Many rare Finnish *forest habitats* are threatened and not sufficiently protected. Support to private forest owners under the 1997 Act on Financing of Sustainable Forestry is based on expected timber sale revenues instead of environmental outcomes. Though increasing, government support to environmental management is a small part of total government support to private forestry. There is a need to streamline the institutional framework for nature and biodiversity conservation.

Recommendations:

- set up long and short-term, quantitative and outcome-oriented, national and regional targets to guide implementation of the *National Biodiversity Strategy and Action Plan*; periodically assess achievements;
- set up a *national peatland strategy* to guide efforts for their conservation and management, including peatland exploitation for energy use; complete management plans for all Ramsar sites;
- enhance *protection of marine areas* in the Baltic Sea; finalise the ongoing inventory of marine biodiversity, develop EIA, and conduct risk assessments for ship routes in the Baltic Sea;
- enhance *protection of rare and threatened forest habitats*; link any support to private forest owners to otherwise unremunerated but beneficial public services;
- increase the *financial contribution of the tourism industry* towards nature conservation, for example through public private partnerships and user fees on recreation services.

2. Towards Sustainable Development

Integrating environmental concerns into economic decisions

Finland made progress over the review period in *decoupling* environmental pressures from economic growth for some conventional pollutants (e.g. SO_x and NO_x emissions) and for water abstractions. *Sustainable development* has been brought into mainstream policies with the Finnish National Commission on Sustainable Development working continuously since 1993 and led by the Prime Minister for 14 years, now presided over by the Minister of Labour in the Ministry of Employment and the Economy. National sustainable development strategies have been developed and followed up with evaluation and monitoring procedures; links have been established with the regional level. In the field of taxation, the *restructuring of the car registration tax and annual circulation tax* on the basis of CO₂ emissions is a very positive step. SEA has been introduced and implemented in sectoral strategies.

However, there is still a need to *decouple* CO₂ emissions from energy production and consumption, and pesticide use has increased. Finland should redouble efforts to reduce its *high energy and material intensity indicators*, in line with its domestic and international general policy orientations. The lack of *quantitative targets* in the Finnish national strategy for sustainable development, together with the search for a consensual approach among all stakeholders, makes the delivery of concrete or tangible results uncertain. There is a need to *further integrate environmental concerns and sustainable development principles* into sectoral policies and practices (e.g. industry, energy, agriculture, transport), particularly at the implementation level. There is scope to eliminate *environmentally harmful subsidies* (e.g. various energy tax exemptions, tax exemptions for industrial landfills). Although *energy intensity* (total primary energy supply per unit of GDP) has declined over the review period, it remains quite high in comparison with other European and OECD countries. Improvements in energy efficiency (e.g. in the building, transport and industry sectors) should bring multiple benefits (in economic efficiency, security of supply, GHG emissions, and air pollution and related health costs). This is appropriate in the context of Finland's efforts to stimulate its economy. Energy and transport taxes, prices and related subsidies may usefully be reviewed.

Recommendations:

- undertake an “*ecological tax reform*”, as indicated in the government 2003-07 policy documents, to review and revise prices, taxes and subsidies in the relevant sectors (e.g. energy, transport, agriculture, industry);
- continue to aim at internalising externalities and implementing the *polluter pays and user pays principles* to integrate further environmental concerns into energy, agriculture, industry and transport policies;
- give special attention to the use of specific *economic instruments* (e.g. green certificates to promote renewable energy, tax on NO_x emissions, road pricing);
- strengthen *energy efficiency efforts* with particular emphasis on the building sector, and capture the *multiple related benefits*.

Integration of environmental and social decisions

Progress in reducing *health effects* of traditional pollutants (e.g. heavy metals, dioxins) has been supported by policy and institutional actions by environment and health authorities. Reducing *children's exposure to pollution has become a priority*. Concerning *environmental democracy*, state of the environment reports, based on comprehensive databases, are published regularly,. Environment and national sustainable development indicators have been used to report on progress to the public. Emergency situation warning systems have also been developed. *Provisions of the Aarhus Convention* and the EU related Directive have been integrated into the Finnish legal framework, including the EIA and land use planning frameworks. Access to courts has been freely exercised by individual citizens and NGOs, backed by well developed *environmental damage liability and compensation* schemes. *Environmental education* has been extended through new learning curricula, teachers' training, and networking. It has been supplemented by teaching in nature and environmental schools.

However, *health impact* of particulate emission from *wood burning*, especially in combination with traffic pollution, is still a concern. Greater emphasis needs also to be placed on addressing incidents of waterborne diseases from insufficient

drinking water treatment, as well as health impacts from noise and non-conventional pollutants, such as radon. A wider and better use of analysis of the health impact of pollution would help set targets at regional and local levels. *Environmental information* systems, especially environmental compliance information, should be made more accessible to the public on a sectoral and geographical basis. *Environmental education* could be further developed. *Employment* in environmental goods and services has not been growing; a wider application of “green” public procurements can provide new business opportunities, especially for SMEs. *Tourism*, associated with nature and biodiversity in rural areas, should be promoted, thus offering multiple benefits, such as health, employment and environmental awareness.

Recommendations:

- further integrate *environmental health issues into policy making in other sectors*, focusing on sectors where the most important health benefits can be achieved, and on the most cost-effective measures;
- reduce the health impact of particulate emissions from *road transport and small-scale wood combustion in urban areas*; strengthen *water supply management* of small water companies, co-operatives and private wells to reduce incidents of waterborne diseases; promote further efforts to reduce *exposure to radon*;
- promote *corporate environmental reporting*, including from small and medium-sized enterprises;
- further improve access of the general public to *pollution and compliance information* on a geographical and sectoral basis;
- further develop high quality teaching material and learning methods in *environmental education*; establish specialised courses on the environment and sustainable development at all education levels with stronger links to environmental research and innovation; enhance co-operation between different actors in formal and non-formal education for the coherent implementation of national strategies on education for sustainable development;
- promote policies that enhance *employment opportunities* associated to environmental goods and services, including “green” procurement, nature conservation and environment-related tourism.

3. International Co-operation

Finland attaches importance to environmental and sustainable development issues in its overall diplomacy. It has been a proactive partner in *multilateral environmental co-operation* and has contributed to raising international awareness concerning responses to climate change, biodiversity degradation, and material intensity issues associated with consumption and production patterns. Finland considers that environment and trade should be at an equal level in international law. It continues to encourage *regional environmental co-operation* within *Nordic, Baltic, Arctic and European frameworks*. As a member of the *European Union* since 1995, Finland has implemented or is implementing EU directives and is involved in the EU environmental action (particularly in the Baltic region and in co-operation with Russia). Finland has done its part to reduce the pollution load of the *Baltic Sea*, and to help control industrial and municipal point sources of pollution in the Gulf of Finland. Prosecution has been strengthened to address deliberate illegal discharges of bilge oil associated with the increase of shipping in the Baltic Sea. *Bilateral co-operation with Russia* has focused on

specific environmental issues and tangible results (e.g. creation of a Green Belt of protected natural areas on both sides of the border, wastewater treatment in Saint Petersburg).

However, there is a need to strengthen efforts to address *climate change* mitigation concerns. A new, long-term, climate and energy strategy has been submitted to Parliament (following those of 2001 and 2005) in the framework of the new EU energy and climate change package. In 2006 Finland's GHG emissions had increased by 13% compared to 1990, well above the Kyoto commitment of 0%. The CO₂ emission per unit of GDP and the energy intensity of Finland are high among OECD countries. Meeting the Kyoto target will have to be achieved with the aid of further national measures, emission trading and the Kyoto mechanisms. Concerning the *Baltic Sea*, domestic measures are needed to further reduce nutrient loading from Finnish agriculture. The heavy presence of dioxine in the Baltic has led to an exception to EU directives for Finland (and Sweden). There is also a need to strengthen pollution prevention from ships (e.g. oil pollution, pollution from hazardous and noxious substances, waste dumping). Finland should further promote bilateral co-operation on *sustainable forest management* in north-west Russia so as to facilitate timber trade (Russia recently imposed an export tariff on its timber) while addressing illegal logging, in the EU and WTO contexts. Although identified as a key horizontal issue in Finland's development co-operation, environmental concerns should be better addressed and monitored in Finland's *official development assistance*.

Recommendations:

- *review and revise the taxation of energy products*, as part of the preparation and implementation of the new Climate Strategy;
- take measures in the farming sector to *reduce nutrient loading in coastal waters* in the context of the Common Agricultural Policy reform, the Nitrates Directive and the HELCOM Baltic Sea Action Plan; in particular, consider introducing more targeted agri-environmental measures;
- extend to *hazardous and noxious substances* the measures taken to prevent, control and respond to oil pollution from ships ;
- strengthen efforts to develop *sustainable forest management in north-west Russia* in the context of EU-Russia environment dialogue;
- increase the level of *official development assistance* (with UN target of 0.7% of GNI in mind) and its share devoted to environment; contribute to strengthening the capacity of recipient countries to absorb possible increases in financial flows (e.g. through CDM projects);
- ratify and implement global and regional environmental agreements; continue to promote synergies between *Multilateral Environmental Agreements*; in particular, pursue efforts towards setting up an international chemical strategy.

FRANCE

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR MANAGEMENT**
- 3. WATER MANAGEMENT**
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Part II
SUSTAINABLE DEVELOPMENT

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CONCLUSIONS AND RECOMMENDATIONS*

In France, environmental and natural resource issues arise not only in the national framework, but also in the context of *European and global interdependencies*. The country's environmental policy has influenced, and been influenced by, EU environmental policy making. Beyond metropolitan France, its overseas départements give the country a wider environmental responsibility. Moreover, these European and global interdependencies have aspects that are *physical* (e.g. transboundary pollution and joint stewardship of common resources) as well as *economic* (e.g. EU market integration and world trade). France is thus engaged in bilateral, regional and global environmental co-operation.

Over the review period (1996-2004), environmental management in France benefited from *institutional* strengthening, increased public and private *expenditure* and consideration of *sustainable development* in policy choices. Attention to environmental issues has reinforced economic development through the conservation of resources such as water and energy, the creation of environmental jobs, lower spending on public health and protection of the urban and natural heritage and landscape. *Major concerns* remain as regards pollution from agriculture and transport, the development of energy policy, improvement of environmental health and management of natural and technological risk. Other key concerns include pressures from urbanisation and the need to protect natural spaces, coastal areas and mountains, which are assets for tourism. International environmental issues, such as implementation of multilateral environmental agreements, marine conservation and the environment-development interface, are also at the top of the environmental agenda.

To meet these challenges, France will have to: i) strengthen environmental policy implementation, ii) integrate environmental concerns into sectoral and fiscal policies and iii) pursue international co-operation. This review examines progress made by France *since the previous OECD Environmental Performance Review*, and the extent to which the country's *national objectives* and *international commitments* are being met. It also reviews progress in the context of the *OECD Environmental Strategy*.^{**} Forty-nine recommendations are put forward that could help strengthen France's environmental performance in a context of sustainable development.

1. Environmental Management

Implementing more efficient environmental policies

France has a vast, coherent body of environmental legislation that is consistent with the principle of subsidiarity. The *Environmental Charter* approved in 2004,

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 25 January 2005. The OECD report concerns the metropolitan France and the overseas départements.

** Objectives of the 2001 OECD Environmental Strategy covered in these Conclusions and Recommendations are maintaining integrity of ecosystems (Section 1), decoupling environmental pressures from economic growth (Sections 2.1 and 2.3), the social and environmental interface (Section 2.2) and global environmental interdependence (Section 3).

was incorporated into the Constitution in February 2005. The 2000 *Environment Code* provided an opportunity to clarify France's environmental legislation, which has both influenced and been influenced by EU environment law (e.g. as concerns integrated pollution prevention and control for France's 68 000 classified installations). The *new law on risk* permits better economic assessment of natural and technological risk in spatial planning. Environmental policy implementation is carried out through a *balanced package of instruments* including regulation, economic instruments, planning and voluntary approaches. Enforcement of environmental regulations has benefited from a strengthened inspection system. A wide range of *economic instruments* is used. Charges for water services and waste management, and some other economic instruments, are used effectively. Several environmental taxes (as part of the general tax on polluting activities) were created. New instruments, such as trading in greenhouse gas emission permits, are being developed. Planning tools (e.g. state-regional contractual plans, climate plan, health and environment plan) and the system of land use planning play their part. Better institutional integration of economic concerns within environmental policies has been made possible by remarkable progress on *economic studies* and environmental assessments within the *Ministry of Ecology and Sustainable Development*. *Environmental protection expenditure* has risen to 1.9% of GDP and total environment-related expenditure (including water services and material recycling and recovery) to 2.8% of GDP. There is no indication that environmental action has affected the competitiveness of the French economy as a whole.

Nevertheless, local implementation of *laws and regulations* relating to the environment and land use should be improved, including the laws concerning risk, coastal areas and mountains. Some EU directives, such as those on nitrates, urban waste water, birds and habitats, pose problems. Much work is still needed to address water pollution from urban and agricultural run-off. Possibilities for co-operative efforts on nature and biodiversity protection could be further explored. For some *economic instruments*, rates need to be adjusted so as to better internalise positive and negative externalities. The major drive for *environmental tax reform* begun in 1999 did not come to fruition. An in-depth examination of the environmental effects of taxes and subsidies should be done, and requires the establishment of a green tax commission.

Recommendations:

- establish a *green tax commission*, attached to the Prime Minister;
- increase *rates of environmental taxes and charges*, thereby increasing their incentive effect and reducing the budgetary cost of government environmental policies;
- ensure that economic instruments are introduced to address *externalities associated with agriculture*;
- in water management, maintain the *basin-wide approach* and setting of charges by the river basin authorities in a context of overall control by the Parliament;
- continue to strengthen *enforcement of environmental regulations*; improve their integration in land use planning documents, including at local level; strictly apply the laws on risk, mountains and coastal areas, including at local level;
- continue to carry out *economic studies* necessary for efficient action on the environment.

Air

Since 1990, France has made progress in *reducing emissions* of most conventional pollutants, heavy metals and organic compounds and in decoupling them from economic growth. Emissions per unit of GDP are generally significantly lower than OECD averages, and in some cases (e.g. CO₂) among the lowest. This performance reflects not only the structure of the country's economy and energy resources but also environmental action through legislation (e.g. the 1996 Law on Air and Energy Efficiency), regulation (e.g. of classified installations) and economic instruments (e.g. taxes on polluting activities). France is a *determined player* on the international stage, complying with and sometimes exceeding its many commitments. For *vehicle emissions*, EU standards enable fleet improvement. Measures have been taken to promote use of cleaner fuels, for example by reducing the tax on *liquefied natural gas*. New transport and planning policies at municipal and regional levels (e.g. *urban development plans*) involve measures such as widespread imposition of parking fees, more efficient public transport and increased use of natural gas. In *structural terms*, the transport sector includes a high-speed train network for passenger transport, a toll trunk motorway network and urban public transport largely financed by companies.

Recommendations:

- step up measures to reduce *NO_x emissions* from transport (e.g. diesel vehicles), agriculture (diesel fuel and waste combustion), industry (chemicals, ferrous metals and food processing) and energy (thermal power generation);
- strengthen measures to limit *particulate* emissions (e.g. from wood, biomass and diesel combustion) and consider introducing ambient quality standards for *fine and ultrafine particulates* (PM_{2.5} and PM_{1.0});
- increase the *use of rail* for passenger and goods transport and the use of combined goods transport, in the context of a modal shift framework policy based on improved internalisation of road transport externalities;
- implement *urban mobility plans*, increase the use of *economic instruments* in urban transport (notably as regards private vehicle parking and use) and introduce measures to improve emissions from heavy vehicles (e.g. bus traffic, transport of goods and waste);
- examine the impacts of *maritime, inland waterway and air transport* (including emissions from international journeys) on regional air quality and consider national or international measures to reduce them.

This progress notwithstanding, several challenges remain, mainly concerning ozone, NO_x and fine particulates, which adversely affect health. A great deal remains to be done to reduce particulate emissions from diesel vehicles and wood heating, and NO_x emissions from transport, to solve urban air quality problems and meet emission reduction targets for 2010. In addition, dioxin emission levels must be further decreased, and steps must be taken to prevent any increase in emissions of *ammonia* from farming and to control emissions of *hexachlorobenzene*. Integration of environmental and air quality concerns in the transport sector remains a major challenge. Improvements to the *road vehicle fleet* must continue and accelerate, for instance through technological improvements to diesel vehicles, two-wheeled motor vehicles and goods vehicles. Local and regional *urban and transport management plans* must be put into effect. Greater use could be made of *economic instruments* (e.g. parking fees, congestion charges, taxation

of vehicles and vehicle use, fuel taxes), in an EU framework where appropriate. In *structural terms*, the externalities associated with road transport need to be internalised, especially as regards transport of goods and of waste. Higher priority should be given to rail and combined goods transport. Greater attention should be paid to emissions from maritime, inland waterway and air transport. More generally, air quality concerns need to be better integrated into energy, agriculture and tourism policies.

Water

The role of the river basin authorities, which were established in 1964 and buttressed by the 1992 Water Law, has expanded from purely financial tasks (collecting abstraction and pollution charges and distributing the revenue for investment) to assessment of the state of aquatic environments and to planning. The integrated management at major basin level, which is partnership-based and multi-annual, has proved highly effective, especially in dealing with industrial and municipal pollution problems by applying the polluter pays and user pays principles. *Industrial pollution* of watercourses has continued to decrease. Meters have been installed to improve *management of water resources*, especially for irrigation. A drought plan was introduced following the 2003 heatwave. Flood prevention plans were introduced in 2003 and are binding on third parties. Operating and investment costs are *financed* by cost-recovery charges and Water Agency charges, respectively. This approach should give France favourable conditions for meeting its forthcoming obligations under the EU Water Framework Directive. *Taxes* have been introduced on pesticides, on phosphate detergents and on aggregates extraction; the scope of a more recent levy on nitrates should be extended. With floods and flood damage becoming more frequent, much has been done in terms of legislation, regulation and planning to prevent floods and their consequences.

Recommendations:

- reduce *pollution of agricultural origin* (from both crop and livestock farming) by continuing to reform farm subsidies (to decrease incentives for pollution-prone intensive farming), by implementing cross-compliance in agricultural support and by introducing efficient, targeted measures to reduce excessive nitrogen use at individual farm level;
- improve the balance between Water Agencies' outlays on and income from *agriculture*;
- continue to develop *flood risk prevention plans* and establish a monitoring mechanism to ensure that they are effectively put into practice;
- consolidate *water policing* powers in each département and assure stricter control of compliance with water-related provisions of the Environment Code;
- take a more holistic approach to *basin-based management* by extending the Water Agencies' role, in particular as regards wetland protection;
- review the *Water Agencies' procedures for financial allocations* so as to make them more economically and environmentally effective; make economic analysis of projects systematic.

Over the last ten years or so, however, weaknesses in water policy have become apparent, relating to such *emerging issues* as chronic pollution by newer products such as endocrine disrupters and antibiotics, whose effects are still poorly

understood. *Agricultural pollution* of watercourses with nitrates and pesticides continues despite the measures taken. Insufficient attention is paid to ecosystems such as riverbanks. *Drinking water quality* continues to be a concern in places, notably where supply sources are insufficiently protected. *Enforcement efforts*, despite progress, are dispersed among various services, reducing effectiveness. The Water Agencies do not base their *financing decisions* on economic analysis of proposed projects, and cross-subsidisation from households to farmers often occurs. The level of *waste water treatment* has not improved sufficiently, and France is under threat by the European Commission of having to pay a penalty for its shortcomings on this point.

Nature and biodiversity

France has exceptionally rich biological resources and therefore great *responsibility* both within Europe and, through its presence in three oceans, worldwide. It has *recognised knowledge* in most aspects of biodiversity, from microbiology to ecosystem processes, through institutions (e.g. Natural History Museum, French Research Institute for Exploitation of the Sea) that lead their fields in the development and dissemination of scientific knowledge. During the review period, France carried out an inventory of nearly 15 000 natural areas of interest for their ecology, fauna and flora in metropolitan France and one of landscapes in 52 départements. The country has a comprehensive *body of laws* relating to the protection of nature, biodiversity and landscapes. During the review period, laws on fishing, hunting and forests were added to the principal laws on nature, mountains, coastal areas and landscapes. Today *13.3% of metropolitan France* is under protection, compared with 9.5% in 1996. Excellent progress is being made on regional nature parks and projects to enhance major sites. The joint involvement of public institutions, technical and financial partners, local authorities and volunteers in implementing natural heritage conservation projects should be noted. *Forest management* is developing more of an ecosystem approach, and eco-certification of woodland is accelerating. A more environment-friendly approach is also being taken in agriculture, for example with the conclusion of 40 000 sustainable farming contracts covering 3 million hectares. France is fulfilling its *international global nature conservation commitments* (e.g. Convention on Biological Diversity, CITES, Ramsar Convention) and contributes to progress in this area with initiatives such as IFRECOR on coral reefs. Following the French President's declaration at the Johannesburg Summit, a national sustainable development strategy was adopted in 2003 and a *national biodiversity strategy* was introduced in 2004 to help meet national, European and global challenges. In 2003, France created an ecological protection zone in the Mediterranean, extending more than 100 km off the coast.

However, major challenges remain. First, ratification of the biodiversity convention requires the introduction of mechanisms for the conservation of species, ecosystems and genetic characteristics. Several measures for the conservation of *species* and *habitats* exist, but relatively few for ecosystems and genetic diversity. Second, despite significant progress, application of the *EU directives* on birds and habitats is still patchy. Implementation of the *Natura 2000* network is lagging even after a decision against France by the European Court of Justice. The scientific, budgetary and institutional resources devoted to conserving *biodiversity in the overseas départements* are not proportionate to the exceptional wealth of that biodiversity. The Guadeloupe National Park, created in 1989, is still the only overseas national park, though other projects have been put forward. Conservation mechanisms cannot cope with the great pressure on *coasts and mountains*. For example, the Coastal Conservatory needs to

step up its programme of land acquisitions (it now holds 12% of the coastline) and the law on coastal development needs to be consolidated and strictly enforced. The integration of biodiversity concerns into farming, forestry and tourism policies needs to continue. Intensive farming remains a source of considerable stress on biodiversity: farmland ecosystems contain France's largest number of endangered species. Greater recognition should be given to the *economically important ecological services* that biodiversity offers, especially as regards land use and prevention of environmental risks such as flooding and climate change.

Recommendations:

- integrate *biodiversity concerns into sectoral policies* (dealing with farming, forestry, tourism and land use planning) in accordance with the national biodiversity strategy, and periodically evaluate progress on action plans;
- increase the integration of biodiversity concerns into *local decisions* relating to economic development, land use planning, infrastructure and tourism activities;
- continue to expand *protected areas*, especially through extension of: i) the network of protected areas under Natura 2000 to 15% of metropolitan France, ii) marine areas and iii) protected areas in overseas départements;
- seek out and improve partnerships to build consensus regarding the issues at stake in connection with the EU *directives on habitats and birds* and the *Bern Convention*;
- enforce the *coastal law* more strictly and speed up the *Coastal Conservatory's* land acquisitions by significantly increasing its budget to achieve the targets for the metropolitan coastline (200 000 hectares in 30 years); give the Conservatory an objective and resources that match the scale of the coastline challenges in overseas départements; continue to draw up and implement *marine enhancement plans* for the main coastal regions, in particular by introducing monitoring mechanisms;
- take *landscape* protection into account in sectoral policies and sectoral decisions at national and local level, and increase government assistance for the management of major sites;
- organise and increase the *resources for studies* on biodiversity (e.g. at the Natural History Museum, at the French Institute for the Environment, and in the overseas départements); increase *funding for nature conservation*, including by adjusting local taxation and finance.

2. Towards Sustainable Development

The integration of environmental concerns into economic, social and sectoral decision making is essential to improving environmental performance and moving towards sustainable development. Such integration, whether effected through institutions or through market mechanisms, is also needed to achieve *cost-effective responses* to environmental challenges. Economic forces and changes in such major sectors as energy, industry, agriculture, transport and tourism strongly influence environmental conditions and trends, and hence can either enhance or diminish the benefits of environmental policy.

Integration of environmental concerns in economic decisions

France has successfully *decoupled* several environmental pressures from economic growth, including SO_x and NO_x emissions, freshwater abstraction and pesticide and nitrogenous fertiliser use. Several major *institutional and legislative reforms* have been made since 1996 to assure better integration of economic and environmental objectives and to promote sustainable development. The national sustainable development strategy was approved in 2003. The authorities apply the polluter pays and user pays principles, so both direct and indirect subsidies for environmental protection are generally minimal. The new EU directive on *strategic environmental assessment*, together with better environmental impact assessment procedures, should help improve integration in programmes and plans as well as projects. The National Health and Environment Plan is a major step forward, as is the integrated risk management policy. Other progress includes the elimination of environmentally harmful *subsidies* (with the end of coal support) and the introduction of cross-compliance in farm support. The recent reforms of the EU's Common Agricultural Policy have also tended to dissociate farm subsidies from environmental pressures. Environmental decision making has been made more coherent through various *consultation mechanisms* (e.g. the National Commission for Public Debate, the 2003 national sustainable development strategy and preparation of the water development and management master plans) and through joint management mechanisms (e.g. territorial contracts on coastal areas and Natura 2000 sites).

Recommendations:

- continue to reform existing *environmental taxes* to take better account of environmental externalities and eliminate the environmentally harmful aspects of *energy and transport taxation*;
- continue efforts to *reduce environmentally harmful subsidies*, and systematically examine all types of *support programme* from the standpoint of their net impact on environmental effectiveness and economic efficiency;
- ensure that national and EU policies relating to *environmental impact assessment and strategic environmental assessment procedures* are fully implemented, including at subnational level;
- more explicitly integrate an economic dimension when implementing the *national sustainable development strategy*, and promote integration of environmental concerns into sectoral policies (e.g. for agriculture, transport and energy);
- strengthen the role of *indicators* in measuring environmental and sustainable development progress and in policy formulation;
- set up a network of regional and national environmental authorities to manage EU *structural funds* with the aim of better integrating the environment and sustainable development into regional policies and programmes.

The implementation of the *national sustainable development strategy* could usefully focus more on market-led integration of environmental concerns in such economic sectors as agriculture, transport, energy and tourism. Many *price signals* are inadequate, given, for example, the long-term decline in real fuel prices, the continued tax advantage of diesel over petrol (to the benefit of road hauliers) and reduced prices for water used in agriculture. Radioactive waste management (e.g. in the very long term) should be fully built into the cost of nuclear power so as to reflect relative costs. In the

current state of knowledge, the nuclear sector's external costs (e.g. radioactive waste management) are only known in their broad outline. In this context, the major service providers have taken steps to meet those costs that are presently known and measurable. Most decisions about *subsidies* are still based on availability of financial resources rather than expected environmental or economic outcomes. *Taxes* take little account of environmental externalities, and some aspects of transport and energy taxation are harmful to the environment. Problems remain, especially at *local level*, with integrating environmental concerns into economic decisions and with achieving economic efficiency in implementing environment policies. Growth in *road transport of goods* continues to be a major cause for concern.

Integration of environmental and social concerns

Concerning *employment*, the "New Services, Youth Employment" programme introduced in 1997 encouraged the creation and contributed to the viability of environmental jobs, especially with local authorities and NGOs. France has also made great efforts to ensure that the most disadvantaged people have *access to essential goods like water and electricity*, and to this end is reorganising various solidarity funds and has introduced social tariffs that do not significantly distort price signals. Concerning *health*, the establishment of the French Agency for Environmental Health Safety (AFSSE) in 2001 and a review of links between the environment and health paved the way for the *National Health and Environment Plan* in 2004. It aims to reduce and prevent health risks connected with the environment in the broadest sense (including the outdoor and indoor environment and the work environment). Long experience with environmental *information* (e.g. state of the environment reports, publication of economic data on the environment, environmental indicators) and effective and improved monitoring ensure that information is actively disseminated. The *right of access to environmental information* is enshrined in French law and can be invoked in court; the Environmental Charter will give it constitutional force. Under the 2001 Law on New Economic Regulations, listed companies are required to account in their annual reports for the social and environmental consequences of their activities. The *National Commission for Public Debate*, set up in 1997 as a tripartite, independent administrative body, conducts public consultation at an early stage of proposed infrastructure projects and land use change. Several times in recent years, public consultation has been extended to draft legislation and policy formulation, for instance on energy, climate and water.

Nevertheless, the solidarity funds designed to *give disadvantaged people access to essential goods* like water and energy do not have enough money to provide long-term support. Despite the creation of AFSSE, expertise remains too limited to cover a remit as extensive as environmental health. Primary and secondary schools have lacked ambition and organisation in *environmental education*, though the situation is improving. There is a *mismatch between types of environmental training* and actual environmental employment. Although most legal rules relating to environmental information are consistent with the corresponding international texts, transposing the related new EU directive into French law will require fresh *compliance* efforts. Implementing this directive and the Aarhus Convention will require better-organised access to information and improved responsiveness to public requests. The public still needs to be better informed about its *right of access to information*. Web sites are often unclear to inexperienced users; a national environmental information portal could improve the effectiveness, efficiency and use of the information available. More extensive

environmental information on subjects such as industrial waste and biodiversity would be helpful.

Recommendations:

- continue to promote environmental protection through proactive *employment* policies involving measures such as job creation and assuring a better match between training and employment;
- continue to improve solidarity funds for *access to essential goods* (water, energy, housing) by encouraging effective, long-term personal support; ensure that the planned water law favours access to water;
- continue to strengthen the *environmental health* sector by reinforcing expertise (e.g. develop training and research);
- free up the necessary resources to implement the *National Health and Environment Plan*, including the assessment of risks related to chemical products;
- pursue efforts to ensure that legislation on *access to environmental information* complies with recent EU directives, and take the necessary steps to implement the directives and the Aarhus Convention; better inform the public about its right of access to environmental information;
- continue to improve the co-ordination of information systems and the coverage and *quality of environmental data*, and increase the accessibility and use of such data in the development and monitoring of public policies;
- increase *environmental education* in primary and secondary schools.

Sectoral integration: energy

France's *energy intensity* has continued to decrease steadily since the previous OECD review, especially in industry. The decrease is due to productivity gains and improved energy efficiency, stimulated since 1998 by incentives, regulation and information. A particular effort has been made in the case of small and medium-sized enterprises, through the Environment and Energy Management Agency. In addition, emissions of the *main air pollutants* have declined significantly in energy generation, which is all the more remarkable as the electricity supply is 90% non-thermal (78% nuclear, 12% hydroelectric and other renewable sources). France's *energy policy* objectives have not changed since 1996. The national debate in 2003 revealed a quasi-consensus on the main energy concerns (security of supply, energy competitiveness, respect for the environment, solidarity between regions and with the disadvantaged), culminating in a white paper and a framework energy bill currently before the Parliament. The main thrusts of the bill are a policy of energy conservation and efficiency, diversification of energy sources and the preservation from 2020 of all energy options, including that of nuclear power. In institutional terms, in 2002 the supervisory aspects of *nuclear safety and radiological protection* were combined in a single body, the Nuclear Safety Authority, and the corresponding expertise was concentrated in the Radiological Protection and Nuclear Safety Institute. This marks a step forward in the consideration given to risks related to nuclear power stations for those who work in them and for the general public. France has a long tradition of planning in energy and in the *framing and evaluation of government policy*. The energy outlooks and assessments prepared during the review period by bodies like the Directorate-General for Energy and Raw Materials of the Ministry of Economy, Finance and Industry, the Planning Commissariat, the

Economic Analysis Council and the Parliamentary Office for the Evaluation of Scientific and Technological Choices provided a very useful contribution to decision making.

Despite this progress, the energy intensity of the French economy remains slightly higher than the OECD Europe average. The situation in the *transport* sector gives particular cause for concern because of the increases in overall consumption and numbers of vehicles. Not enough is being done to *save energy*, given the many benefits that can be expected from energy conservation. Energy saving is not a research and development priority and few measures are designed to limit demand growth. Very few external costs are internalised in energy prices, as the rationale of energy *taxation* is not based on integrating environmental concerns into energy policies. Internalising these costs could substantially change the choice of energy sources. Renewable energy sources offer many benefits to society, but factors such as the number of administrative permits needed, delays in issuing them and the absence of a one-stop subsidy-granting body hinder the penetration of *renewable energy sources* such as solar power. Some NGOs charge that *consultation* in the public debate preceding the drafting of the framework energy bill was insufficient and biased.

Recommendations:

- increase efforts to make an *economic valuation of environmental damage* caused by the energy sector so as to better internalise external costs in energy prices;
- step up efforts to *save energy*, with due attention to the cost-effectiveness of the measures taken;
- undertake economic analysis of government policies to promote *renewable energy sources* so as to minimise the cost to society;
- reform *energy taxation* to better integrate environmental concerns (e.g. continue moving towards balanced taxation on diesel and petrol, abolish the tax on hydroelectricity); set up a green tax commission;
- assess the potential environmental consequences of *liberalising the gas and electricity* markets; introduce safeguards if necessary;
- continue to make the *nuclear sector* more transparent, including through greater access to information.

3. International Commitments

Since 1996 France has continued to play an active role in the preparation of *global agreements* on environmental protection and sustainable development, in the development of international environmental law and, more generally, in the strengthening of international environmental governance. Climate change, biodiversity, water and the marine environment are explicit priorities. Regarding *climate change*, France has stabilised its greenhouse gas emissions in accordance with the UNFCCC. It has partly decoupled CO₂ emissions from GDP growth, mainly through emission reductions in the industry and energy sectors and the growing share of services in the economy. CO₂ emissions per unit of GDP are low. France is on its way towards meeting its Kyoto Protocol targets. Concerning *transboundary pollution*, France has more than met its objectives under the Convention on Long-range Transboundary Air Pollution and its Oslo, Sofia and Geneva Protocols, considerably reducing its emissions of NO_x, SO_x and NMVOCs. It has helped strengthen European and global *agreements on maritime safety*

and regularly monitors its exclusive economic zone, devoting significant institutional and material resources to combating accidental marine pollution. France is engaged in a proactive policy to eliminate illicit discharges from ships. An innovative protection zone for cetaceans, partly in the open sea, has been created in the Mediterranean, as well as an ecological protection zone. France ranks eighth among OECD countries and first among the G7 countries in terms of *official development assistance* as a proportion of GNI (0.41%). It seeks to integrate environmental considerations into its aid projects and is a leading contributor to multilateral environment funds. It has taken several practical steps since 2000 to better integrate environmental considerations into decisions on applications for *export credits and credit guarantees*.

However, France could improve its results with regard to the fulfilment of several *international environmental commitments*. Measures in connection with the greenhouse effect must be strengthened; the efficiency of the measures could be reviewed, especially as regards the contribution of the transport sector and the balance between internal measures such as taxation and external measures such as emission permit trading in Europe and other flexible mechanisms. Between 1996 and 2002 France did not meet its international commitments as a *port state*: fewer than 25% of foreign vessels were inspected in French ports to verify compliance with IMO standards, though this was corrected in 2003. French *ports* do not have sufficient facilities for receiving ships' waste and cargo residues. Some *fish stocks* are below safe biological limits, notably in the North Sea; recovery plans (e.g. for cod and hake) are in place. Recent objectives for transboundary air pollution under the Gothenburg Protocol and the EU directive setting national emission ceilings will require new domestic measures. Reductions of *nitrogen emissions* from agriculture will have to be stepped up if France is to meet its commitments with regard to the North Sea and the EU nitrates directive. While France generally manages to reconcile its *international trade with its environmental commitments*, progress is needed as regards border controls.

Recommendations:

- implement measures (e.g. taxation, emission permit trading, other flexibility mechanisms) to enable fulfilment of *Kyoto Protocol commitments*, paying particular attention to the transport sector;
- continue to increase *inspections to assure compliance with IMO standards* in vessels calling at French ports;
- pursue the establishment of port plans for *processing ships' waste* and cargo residues by assuring their co-ordination at the national level, including through better co-operation among ports and use of existing equipment, as well as harmonising charges and identifying additional facilities needed;
- encourage the preparation of management and recovery plans, in the context of EU negotiations, and continue adjusting the *fishing fleet capacity* to take account of fishery resources;
- ensure that environmental assessment of projects supported by *export credits and credit guarantees* is consistent with recommended practices (international standards or equivalent standards set by the host country);
- continue to increase the level of *official development assistance* and the emphasis placed on environmental projects.

GERMANY*

1. CONCLUSIONS AND RECOMMENDATIONS

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REFERENCES

* Also available in German and in Chinese.

CONCLUSIONS AND RECOMMENDATIONS*

In Germany, environmental protection continues to be a major public concern and a high policy priority. This is largely due to *pressures on the environment* resulting from its high population density, level of industrialisation and strong dependence on fossil fuels. Transport and agriculture also continue to generate diffuse pressures on the environment. Economic and social changes in the New Länder (representing 30% of Germany's land, 20% of its population and 10% of GDP) have led to the alleviation of some environmental pressures, but they also present new sustainable development challenges.

The decoupling of economic growth from emissions of several major pollutants during the 1990s is indicative of Germany's achievement and its continuing efforts to reconcile economic growth and environmental objectives. However, important *environment related challenges* remain (e.g. waste treatment and disposal, strengthening of the waste water infrastructure, combating nitrate pollution and transport pollution, nature conservation, progressive phasing out of nuclear energy, further implementation and development of the ecological tax reform and climate change related commitments).

It is all the more necessary, therefore, for Germany to: i) further implement environmental policies and strengthen their cost-effectiveness; ii) better integrate environmental concerns in economic and sectoral decisions; and iii) continue international environmental co-operation.

This report examines progress made since the previous OECD environmental performance review of Germany, and the extent to which its environmental *domestic objectives and international commitments* are being met. A number of recommendations are put forward that could contribute to strengthening the country's environmental performance, and to its progress towards sustainable development.

1. Environmental Management

Implementing environment policies

Achievements

Overall, Germany has met most of its national environmental objectives and international environmental commitments. In the 1990s, its *progress in decoupling* economic growth from emissions to air (e.g. SO_x, NO_x, VOCs, CO), water pollution (e.g. BOD) and use of resources (e.g. water, energy) was impressive. Significant progress was also achieved in regard to waste management. In the Old Länder, these improvements have resulted mostly from environmental investment and management efforts; in the New Länder, economic contraction and restructuring and changes in energy supply have also played a major role. Nonetheless, Germany has established further ambitious objectives and is exploring new approaches to reach them.

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting in November 2000.

German *environmental legislation* has continued to develop, influencing and being influenced by EU legislation. Cross-media approaches have gained importance (e.g. environmental impact assessment, environmental liability, environmental audits). *Enforcement and compliance are generally effective*, based on good monitoring and institutional capacities. An Environmental Code, aiming at harmonising, simplifying and integrating environmental legislation, is at an advanced stage of preparation.

German environmental policy is guided by *three principles (polluter-pays, precaution, and co-operation)*, expressed in regulations and economic instruments, pro-active initiatives addressing new challenges, and increasing participation and involvement of stakeholders. The PPP is well established and implemented, particularly for traditional air pollutants; those benefiting from waste and water management are increasingly covering the full costs of environmental services. *A range of economic instruments* are used to internalise costs and contribute to economic efficiency.

Emphasis on best available technology (BAT) and related work to introduce clean technology has triggered innovations upstream and presented new research, development and marketing perspectives. Many industries and individual firms have recognised the benefits of *voluntary agreements* and good environmental management (with high rates of participation in ISO and EMAS schemes), often accompanied by savings in energy and resource use and export benefits. Germany is a leading exporter of environmental technology, goods and services.

Strengthening the cost-effectiveness of environmental policies

However, there is *scope for further improvement* in regard to some challenging national and international commitments (e.g. CO₂ and GHGs, nitrates, transport related pollution) and the relatively limited results of nature conservation policies. Given the environmental progress and economic and energy changes achieved in both the New and Old Länder, *marginal pollution abatement costs at point sources* are increasing substantially. Moreover, environmental pressures of a diffuse nature (e.g. those deriving from patterns of consumption, transport and agriculture) require more determined and cost-effective actions.

Further progress will depend on *more cost-effective environmental policies*, as well as *improved integration* of environmental concerns in sectoral and economic policies. Transposition of the EU Directives on integrated pollution prevention and control (IPPC) and on environmental impact assessment should contribute to progress in this regard. As stressed in the 1993 OECD environmental performance review of Germany, use of measures differentiated according to ecosystem characteristics should be increased (e.g. varying deadlines for the introduction of BAT in existing installations). Use of economic instruments should be expanded, taking into account their wider economic and social implications. In turn, it is essential to better ensure that economic policy incentives are consistent with basic environmental objectives and do not encourage environmentally unsustainable production and consumption modes. The effectiveness and efficiency of *voluntary agreements* should be reviewed. Alternative measures should be considered if the targets of these agreements are not reached.

Although in the 1990s Germany's annual *expenditure on pollution abatement and control* (PAC) remained one of the highest among OECD countries (around 1.5% of GDP), a continued investment effort will be needed particularly, but not only, in the New Länder for waste water and waste infrastructure and clean-up of contaminated sites.

Recommendations:

- further pursue *efforts to decouple* economic growth and employment creation from pollution pressures and energy and resource use;
- extend environmental policy attention to *unsolved or new challenges*, including nature conservation and diffuse pollution from agriculture and transport;
- continue efforts to harmonise, streamline and further develop *environmental legislation* within an integrated Environmental Code;
- strengthen and extend use of *economic instruments* to internalise external costs, and to progress towards sustainable production and consumption;
- improve the efficiency and transparency (e.g. accounting practices) of water and waste related *services provided at municipal level*;
- ensure that *voluntary agreements* become more effective and efficient (e.g. clear targets, reliable monitoring, improved transparency and third party participation);
- increase *economic analyses* of environmental policy measures, with the aim of achieving environmental objectives more cost-effectively.

Air

Since 1990, Germany has achieved *large reductions in emissions* of a number of air pollutants (e.g. 76% for SO_x, 34% for NO_x, 47% for NMVOCs, 52% for CO). The intensity of SO_x and NO_x emissions (kg/unit GDP) is 65% and 50% below the OECD averages, a performance surpassed by only a few countries. In the Old Länder, these reductions have mainly resulted from effective environmental management focusing on regulatory measures and their enforcement, pollution control techniques at stationary sources, and mandatory fuel quality and efficiency improvements in the transport sector. In the New Länder, emission reductions have largely been driven by economic contraction, energy supply switching from lignite to natural gas, and the upgrading of many polluting installations. State-of-the-art flue gas control equipment is now installed at the majority of large combustion facilities, with high removal efficiencies for criteria air pollutants. Concerning dioxins and other POPs, control measures have been taken and progress made. Good progress has also been made in reducing ambient levels of criteria air pollutants.

Nonetheless, the intensity of CO₂ emissions is close to the OECD average and *ground-level ozone* remains a problem in western and southern Germany. The transport sector's CO₂ emissions have increased in recent years. Control of NO_x and CO₂ emissions remains a challenge. There is a need to strengthen the cost-effectiveness of air management policies, and to better use economic analysis in designing and assessing air quality regulations and management measures. Progress needs to be made in regard to integration of air quality concerns in energy and transport policies. The *trend towards larger cars* tends to increase fuel consumption per passenger-kilometre and, together with an increase in kilometres driven, erodes the benefits of emissions control. Although

the 1999 ecological tax reform was a step in the right direction, and some fiscal measures have been taken to better *internalise the environmental costs of energy use*, domestic coal production continues to be subsidised and coal is exempt from the recent eco-tax. Differential taxation also favours air over rail on long distance routes.

Recommendations:

- reduce or eliminate *environmentally harmful subsidies* in the energy and transport sectors;
- reinforce measures to *limit NO_x and CO₂ emissions from motor vehicle use and emissions of NMVOCs from solvent use*;
- develop more *rational transport pricing and taxation* to further internalise associated environmental costs, and to encourage more fuel efficient and less polluting modes;
- develop mechanisms to evaluate the *cost-effectiveness of control policy options*, and make broader use of economic incentives for achieving air quality objectives;
- take further *measures to reduce total final energy consumption* in the residential sector.

Water

During the 1990s, the *quality of surface waters* (rivers and lakes) continued to improve. The coverage and level of *municipal and industrial waste water treatment* also continued to increase, particularly in the New Länder. Major improvements to the quality of the Elbe were partly due to declining industrial activity in the New Länder. *Full cost recovery* of public water services is well implemented in the case of both households and industry, although further exemptions from water effluent charges were introduced in 1994 and some investment in municipal water infrastructure benefits from financial transfers. *Monitoring of water quality* has been expanded to the New Länder, including for toxic contaminants. Germany has set the *very ambitious policy objective* of having 100% of its rivers in quality class II by 2010.

Significant steps towards achieving the quality class II target have nonetheless been made for organic pollution only. In the case of nutrients, heavy metals and toxic contaminants, there is a general need for progress in the New Länder, while problems persist in the Old Länder. The 1993 OECD environmental performance review of Germany identified water pollution from diffuse agricultural sources as an environmental challenge facing the country. The 1996 fertiliser ordinance was enacted to harmonise German legislation with the EU's 1991 Nitrate Directive. However, there are still regions with very high nitrogen surpluses from farming. *Diffuse pollution* of rivers and groundwater by nitrates persists, and international commitments related to releases in the North Sea have not been met. Progress has been made in reducing concentrations of heavy metals and other toxic contaminants in water, but there is still room for improvement. The incentive function of *water effluent charges* has been weakened. *Flood damage* has increased, resulting from lack of integration between water management, transport policy and nature conservation objectives. There is a need to revitalise river banks, especially those of the Rhine and Danube. The EU Water Framework Directive reinforces the need to meet water quality standards, within defined time horizons and through river basin management, which should facilitate dialogue and co-operation among stakeholders.

Recommendations:

- develop a *comprehensive strategy to address diffuse pollution* of surface and groundwater, including a mix of measures to further reduce nutrient surpluses from agriculture and to implement specific, more stringent requirements for farmers in vulnerable areas;
- further reduce *point source pollution* of water through further investments in advanced treatment facilities, and through increasing the incentive function of water effluent charges;
- address *diffuse water pollution by heavy metals* in a comprehensive manner, through extension of charging for rainwater collection and treatment;
- enhance *flood prevention* in the main river basins by developing partnership approaches among stakeholders, and by including flood plain areas in regional land use planning and nature conservation;
- pursue efforts to develop *water quality monitoring*, particularly for pesticides and nutrients in groundwater and lakes;
- take further steps towards implementation of *water resource management using a river basin approach*.

Waste

Germany has a *comprehensive set of laws and regulations* to address solid waste management, particularly hazardous waste management. The Closed Substance Cycle and Waste Management Act (1996) introduced a new principle in waste management policy, assigning *manufacturers and distributors* extensive responsibility for waste generated in association with their products. The Packaging Ordinance, which entered into force in 1991, has also played a pioneering role in reducing the amount of *packaging material* in marketed products and increasing the proportion of material recovered from packaging waste. Apart from packaging, *separate collection and recycling schemes* are now applied successfully to a large number of waste types including bio-waste, used oil, construction waste, batteries, end-of-life vehicles and electronic scrap. Registration of *abandoned waste disposal sites* is almost complete, and remediation measures have been taken in the most urgent cases under the responsibility of the Länder.

Although these policies have been successful and effective in reducing waste arisings and increasing recovery rates, their *cost-effectiveness should be improved*. Implementation of the Packaging Ordinance has been criticised, on the grounds that it is not sufficiently open to competition and is too focused on recycling quotas at the expense of efficient environmental protection. The Duale System should be subject to a comprehensive economic analysis of its cost-effectiveness. The costs of high levels of material recycling may become disproportionate, compared to those of other means of waste disposal ensuring similar environmental benefits. The present system for *recovery and disposal of household waste*, which remains the responsibility of public authorities, is rather costly and suffers from diseconomies of scale. How Germany will achieve the stated objective of allowing only stabilised waste in landfills after 2005 is unclear, given its limited treatment capacity and present lack of investment in additional treatment capacity. Existing *thermal treatment capacity* at the national level is notably insufficient, and siting of new facilities has encountered strong opposition. Considerable efforts are still needed, especially in the New Länder, to upgrade *existing landfills* to meet current

legal requirements and to apply remediation measures to closed dump sites that threaten groundwater quality.

Recommendations:

- improve *efficiency of household waste management* by opening the disposal market to competition, with monitoring and control by public authorities;
- conduct *an analysis of the cost-effectiveness of the Duale System* for recycling packaging material, and of material recycling schemes in general; assess their environmental benefits compared with other forms of treatment and disposal;
- further develop implementation of the *principle of extended producer responsibility* in the industrial sector, possibly expanding the use of economic incentives;
- elaborate plans to ensure that *treatment and disposal of waste (e.g. hazardous waste, household waste) which is unsuitable for recycling* are organised efficiently, building on *enhanced co-operation* between federal and regional authorities and better identifying future infrastructure needs;
- continue efforts aimed at *upgrading landfill sites* to meet legal requirements, and at *remediating closed dump sites* and contaminated sites, especially in the New Länder;
- take measures to *improve the availability and timeliness of data* pertaining to waste generation, treatment and disposal at the national level.

Nature conservation and biodiversity

Germany's efforts to conserve nature and biodiversity have produced several successes. For example, the salmon is back in the Rhine and the beaver in the Elbe basin; aquatic species have increased in these and other large rivers. The white-tailed sea eagle, still classified in 1984 as critically endangered, has increased in number and range and is now accorded the less critical "vulnerable" status. About one-quarter of Germany's territory has been designated as *protected landscape*. In the late 1980s and 1990s, Germany kept up the momentum in creating new national parks (of which there are now 13, seven in the New Länder) and UNESCO Biosphere Reserves (of which there are now 14). Implementation of *agri-environmental measures* is showing some good results. A national forest programme, including a strategy to maintain biodiversity in forests, is under public consultation.

Yet the fact remains that Germany's high population density and economic activity continue to generate such strong pressures that nature is not holding its own. *Fragmentation* of the landscape by transport routes and urban and industrial settlement, and the effects of contaminants and nutrients, are the main causes. *Loss of biodiversity* has not been halted. Germany is among the cluster of central European countries with the highest shares of red-listed species for several classes. Only 6% of biotope types are classified as currently not threatened. Overall, nature conservation does not appear to have been given the thrust or resources commensurate with its status as one of the five priority themes of environmental policy. Notwithstanding the large area of protected landscape, less than 3% of total land area is more strictly protected, and IUCN Categories I, II or III are not represented at all; only three national parks meet the IUCN Category IV criteria. Most existing protected areas are very small in size. As a whole, they are not representative of the German ecosystem types. *Designation of Natura 2000*

sites is behind schedule and thus far inadequate. There is no national biodiversity strategy. Neither the Federal Government nor any of the Länder has formally adopted or published a nature conservation plan with more detailed or quantified objectives in terms of desired results. Most important, *national objectives* are mainly informal and are not supported by political commitment on the part of the government or Parliament.

Recommendations:

- formally adopt a *set of specific national objectives* for nature conservation, and develop specific *nature conservation plans* at the level of the Länder;
- increase understanding and awareness of nature conservation and biodiversity issues among decision-makers and the general public; in particular, develop and adopt a *national biodiversity strategy*;
- strengthen efforts and set targets for creating *new protected areas* (including Natura 2000 sites) and improve the representativeness of the network of protected areas;
- obtain agreement and transposition, at the Länder and local levels, of the federal objective of reducing the *rate at which land is urbanised* to 30 hectares per day by 2020;
- establish a performance assessment system to increase the transparency and effectiveness of *spatial and landscape planning decisions*;
- extend the role of *landscape protection groups* in stakeholder mediation procedures concerning extension and management of protected areas;
- further improve the effectiveness of voluntary *agri-environmental measures* by ensuring that they are applied on an ecologically appropriate scale;
- encourage *private landowners* to conserve nature and biodiversity on their land, e.g. through a wider range of economic instruments.

2. Towards Sustainable Development

Integrating environmental and economic concerns

Germany's Basic Law, amended in 1994, now provides a *constitutional basis* for promoting environmental management and sustainable development. A number of quantitative environmental objectives have been adopted nationally or as a result of international commitments. Some are monitored through the *Environment Barometer*, which is included in the Federal Government's annual economic report. Efforts to firmly establish and refine this scheme (e.g. to cover biodiversity) should continue. As part of a wider reform, Germany has strengthened the *environment related components of its tax system*. The *ecological tax reform* is an important step in the right direction, although its steering capacity is limited. It is revenue neutral. Revenue is used to lower ancillary labour costs. The reform aims at producing a double dividend: improved environmental performance and stimulation of employment. Increases in energy prices are likely to bring about reductions in energy intensity and better resource efficiency in general. The environmental guidance function of eco-taxes should be strengthened, particularly by reviewing the concessions made. Exemptions motivated by competition concerns should be modulated. The recently adopted climate protection programme is a positive example of an integrated, cross-sectoral approach.

Progress in developing a *national sustainable development strategy* has been very slow. At all levels of government Germany still faces significant problems that hamper better integration of economic, social and environmental concerns. The new Council for Sustainable Development will serve as a forum for exploring common ground, organising consensus and mediating conflicts. The newly established Green Cabinet should strengthen institutional mechanisms for *horizontal policy co-ordination* and oblige the ministries concerned to develop sector-specific sustainable development strategies, including commitments to act and timelines. *Vertical co-operation* also needs to be improved among different levels of government. Co-operation among environmental administrations should be strengthened, both among Länder and between the federal and Länder level. For example, a Länder working party or Bund-Länder task force could be established to improve environmental policy integration and co-ordination of sustainable development initiatives. Efforts to *green the budget* should be intensified. As stressed in the 1993 OECD environmental performance review of Germany, integration of environmental concerns in sectoral decisions should be increased. Sectoral policies need to be reviewed in regard to their funding schemes and economic incentive mechanisms. Eco-responsibility ought to imply that support is to be linked to compliance with basic environmental standards. Subsidies with environmentally harmful effects should be phased out in a number of sectors (e.g. agriculture, energy, transport).

Recommendations:

- define and implement a *national sustainable development strategy* with targets, timelines, and commitments by the key actors;
- improve co-operation and *co-ordination among Länder environmental administrations*, and with the federal level, in regard to environmental integration and sustainable development;
- better *integrate environmental concerns* in transport, agriculture, energy and regional policies;
- further use the *Environment Barometer* and other tools to contribute to environmental and economic policy formulation, implementation, monitoring and assessment; in particular, extend its coverage to biodiversity;
- continue to integrate environmental concerns in *fiscal policies* (e.g. ecological tax reform) and, in particular, review concessions leading to major distortions and disincentives;
- review the environmental significance of *subsidies* (e.g. in the federal biannual subsidy report), in order to phase out those which are environmentally harmful, and provide incentives for sustainable development, environmental management and innovation.

Integrating environmental and social concerns

Ecological modernisation and job creation are among Germany's top policy priorities. Emphasis is placed on exploiting win-win situations and positive synergies. Major policy initiatives, such as the eco-tax reform, are aimed explicitly at achieving a double dividend: improving the environment while generating employment. Close to 3% of the total workforce (1 million people) is estimated to be directly or indirectly involved in environmental protection activities. With stable environmental investment, and parallel gains in productivity, direct *environmental employment* is unlikely to increase. In particular, in the New Länder a significant number of environmental jobs created in the

context of short-term labour market programmes will be lost. The environmental dialogue among government, business organisations and trade unions launched in the context of the German Alliance for Jobs (Bündnis für Arbeit) should explore how potential synergies among environmental protection, nature conservation and job creation could best be exploited.

Overall, the *distributive effects of the ecological tax reform* are limited. In almost all branches of industry the net effect of increased energy taxes and lower contributions to the statutory pension scheme is positive. Households shoulder the main tax burden, but even in low-income households the change in disposable income will rarely exceed 1%. The distributional implications of the ecological tax reform will depend primarily on the employment effects of the reform. The reform's long-term impact on employment is expected to be clearly positive.

Environmental education has been successfully established in school curricula, teacher training courses and vocational training. However, *public concern about environmental protection* decreased significantly during the 1990s, reflecting improved environmental quality and persistent economic concerns. Discrepancies have increasingly been observed between general environmental awareness and actual practice (particularly among younger people). Nonetheless, waste separation and recycling, energy-saving and water-saving continue to progress.

The German public is generally well informed about environmental matters, deriving information from a number of different sources: e.g. media, publications and the internet; governmental and non-governmental sources. But, the German *Environmental Information Act* still does not meet all the requirements of the 1990 EU Directive on freedom of *access to information on the environment*. There is also a *lack of adequate, coherent and up-to-date data*. For example, those on national waste volumes are out of date. The data collection, aggregation and provision process is often too slow. The 1993 OECD environmental performance review of Germany already highlighted the need for improved data exchange between the Länder and federal levels. Although *citizen participation* in environmental matters is generally accepted, and is considered a positive contribution to permitting and administrative licensing procedures, several acceleration and simplification laws adopted in the early 1990s reduced options for participation and presentation of objections. The Federal Nature Conservation Act establishes participation rights for recognised environmental NGOs, but does not foresee *NGO standing in lawsuits*. At sub-national level, a majority of Länder give NGOs legal access to the courts; however, some important Länder such as Baden-Württemberg, Bavaria and North Rhine-Westphalia have no such provisions.

Recommendations:

- further examine *disparities in environmental quality* and their impacts on health and living conditions in different parts of society;
- further review the *distributional implications* of major environmental policy measures and ensure discussion of the results;
- further implement the joint action programme on *environment and health*;
- build on successful local initiatives (e.g. *Local Agenda 21*) to foster environmental and sustainable development progress;
- improve the availability and timeliness of *data and indicators* on environmental quality, environmental pressures and related responses;
- improve *public access* to environmental information and access to justice for environmental stakeholders;
- strengthen *public participation* in the design, implementation and assessment of environmentally relevant projects and policies;
- broaden *environmental education* and encourage behavioural changes towards more sustainable consumption patterns.

Environmental convergence in the New Länder

Environmental progress in the New Länder has generally been impressive. The environmental situation in these Länder has undergone lasting improvement, becoming closer in many respects to that in the Old Länder. Economic contraction, investments in new establishments and in best available technology, together with improvements in environmental infrastructure, have brought about a significant reduction of air emissions and concentrations. River water quality has improved, and many contaminated sites have been cleaned up. These improvements are reflected in a significant change in the public's perception of environmental quality in the New Länder.

However, *more needs to be done* to reach the "uniformity of ecological conditions at a high level" anticipated for 2000 in the Unification Treaty. Concerning "industrial" air pollutants, water infrastructure (water supply, sewerage and waste water treatment) and waste management, there is still a performance gap between the New and Old Länder. Environmental convergence will take longer than initially estimated. In areas like transport emissions or nature conservation, new challenges have emerged. Pressures from urban sprawl and road traffic have increased. Diffuse pollution from nutrients used in agriculture persists. In many areas of high natural value, satisfactory land use management solutions have not yet been found. Despite massive transfers (in the order of 33% of New Länder GDP in 1998) from the federal level, the Old Länder and the EU, the New Länder are *not yet on a sustainable development path*. The *integration of economic, social and environmental concerns* in a coherent development strategy, and the effectiveness and efficiency of support schemes, need to be improved. Environmental monitoring and evaluation based on proper data and indicators are indispensable. National co-funding schemes for EU support provide limited scope for environmental measures. Innovative sustainable development approaches at the local and regional levels should be encouraged, and experiences better shared through effective communication and networking.

Recommendations:

- accelerate connection to *sewerage and waste water treatment* facilities, and explore more cost-effective ways of financing, building and operating such facilities;
- continue remediation of *contaminated sites* and abandoned landfills, setting priorities with the use of risk assessment and cost-benefit analysis;
- review land privatisation and land use practices in areas with high natural value, to guarantee effective management of *protected areas*;
- improve *integration of environmental concerns* in policies, plans and programmes for the New Länder, particularly with respect to transport, agriculture and regional development;
- ensure *better monitoring and assessment* of development plans, programmes and projects, and improve data bases for systematic indicator analyses;
- *facilitate participation of environmental NGOs and other stakeholders* in the design, implementation and evaluation of structural policies and other development initiatives;
- launch sustainable development *partnerships at the local and regional level*, using innovative mechanisms for granting support, and encourage networking of these initiatives.

3. International Co-operation

International commitments and co-operation

In the 1990s, Germany carried out a very *wide-ranging and successful programme of international co-operation* on environmental protection, particularly with the nine neighbouring countries, its EU partners, the Central and Eastern European countries and developing countries. It has played a *leading role* at the EU and pan-European levels in combating transfrontier pollution and enhancing environmental co-operation. Germany has considerably decreased its emissions of pollutants to international *rivers* and has met nearly all its commitments concerning pollution of the North Sea and Baltic Sea by *land based sources*. It has implemented all its international commitments in regard to *transfrontier air pollution* by reducing ahead of time its emissions of SO₂, NO_x and VOCs. In particular, all large sources of atmospheric pollution in the New Länder have been eliminated, considerably reducing air pollution problems in the Black Triangle area. During the 1990s, Germany reinforced co-operation with its *two eastern neighbours* (Poland and the Czech Republic). It has implemented new bilateral and trilateral agreements, provided know-how and financial support, and been *the leading country in terms of bilateral aid to Central and Eastern European countries*. Germany supports global co-operation on *climate change* and biodiversity. It has *phased out halons and CFCs* and halted production of equipment using HCFCs. The Secretariats of the Climate Change Convention and Desertification Convention are located in Bonn. Germany is *one of the main donors of environmental funds in many international settings*.

Despite these achievements, there are a few areas in which commitments or expectations have not been met. Regarding *pollution of the North Sea and Baltic Sea* from land based sources, Germany (like other countries concerned) did not achieve the intended 50% reduction of *anthropogenic nitrogen inputs* between 1985/87 and 1995.

The reduction achieved during that period was in the order of 25% only. This reflects the limited progress in abating these releases from diffuse sources, particularly in the agricultural sector. Germany has so far eliminated only half the hot spots on its territory identified as significant sources of Baltic Sea pollution. Progress in implementing the EU Urban Waste Water Directive in the New Länder has been behind schedule. Because the EU Habitat Directive was implemented in Germany with some delay, the European Commission has notified Germany of a possible delay in releasing Structural Funds. Although Germany supports sustainable development, as agreed at Rio, it has not yet developed a *national sustainable development strategy* in consultation with all stakeholders. Neither has it increased *official development aid* as foreseen at Rio. On the contrary, Germany has reduced aid in relative terms. Its ODA (expressed as a percentage of GNP) ranks 16th among DAC countries. The considerable expenditure Germany has devoted to ensuring rapid transition in the New Länder and in countries formerly behind the Iron Curtain is now being reduced; this could increase its capacity to provide official development aid.

Recommendations:

- develop internal procedures further in order to speed up *implementation of EU Directives* requiring action by the Länder;
- further address international environmental issues related to the *agricultural sector*, such as releases of nitrates to rivers and ammonia to air;
- implement action plans to cope with *flooding in international river basins*;
- continue international environmental co-operation with *Central and Eastern European countries*, with a view to facilitating early accession of EU candidate countries;
- increase the level of *official development aid*, particularly so as to facilitate the solution of global environmental problems.

Climate protection

Germany has established an *ambitious national CO₂ emissions target* for 2005. It is committed to an *ambitious international GHG emissions target* for 2008-12. Having reduced CO₂ emissions by 15.5% in 1999 compared with 1990 levels, Germany is one of the few countries likely to achieve the emissions goals set out in the Framework Convention on Climate Change and its Kyoto Protocol, i.e. to return CO₂ emissions by the year 2000 to levels in 1990, and to significantly reduce GHG emissions by 2008-12. Emissions of GHGs such as CH₄ and N₂O decreased rapidly in the same period. Germany has adopted a number of *important measures to reduce CO₂ emissions*. The 1999 *ecological tax reform* was a major step towards energy efficiency improvements, as well as energy saving, without increasing the overall tax burden. The recent Renewable Energy Act offers financial support for *renewable energy*, such as wind and solar power. Germany has effective bodies to advise on climate change policies, such as two independent Councils to the Federal Government and a Parliamentary Inquest Commission, which have been effective in incorporating expert scientific and technical opinion in decision-making by the Federal Government.

Although Germany has succeeded in reducing CO₂ emissions significantly, this is largely due to economic decline and a changed energy mix in the New Länder following unification. To achieve its national as well as international emission targets (the

Kyoto Protocol and associated EU burden-sharing agreement), Germany will need to *pursue the measures taken so far more effectively* and to *implement those adopted in the recent climate protection programme*. Eco-tax concessions should be reviewed. In the energy sector, it has not been able to reduce sufficiently the subsidies provided to maintain coal production. The decision to phase out nuclear energy progressively will make CO₂ emissions reduction even more challenging. *Transport emissions have increased* continuously since 1990, but few mandatory measures have been taken. Economic and other quantitative analysis concerning climate policies has not been fully reflected in the implementation of policies and measures. Little analysis has been carried out of policies related to enhancement of *carbon sinks* and to reducing emissions of GHGs other than CO₂.

Recommendations:

- *implement agreed measures* concerning climate change, taking into account the phase-out of nuclear energy, and specify related schedules;
- speed up the ongoing gradual *elimination of subsidies for domestic coal* production;
- further encourage development of *renewable energy* and *greater energy savings*;
- more vigorously address issues related to CO₂ emissions from *the transport sector*, going beyond voluntary agreements; encourage use of *public transport*;
- develop measures to enhance *carbon sinks* and to reduce emissions of *non-CO₂ GHGs*;
- develop and implement *additional policies and measures* to enable national and international emissions targets to be met and energy efficiency to be increased;
- make *greater use of cost-effectiveness analysis* in determining the components of climate policies.

GREECE*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR**
- 3. WATER**
- 4. BIODIVERSITY AND NATURE CONSERVATION**

Part II
SUSTAINABLE DEVELOPMENT

- 5. ENVIRONMENTAL AND ECONOMIC POLICIES**
- 6. ENVIRONMENTAL-SOCIAL INTERFACE**
- 7. LAND USE AND SPATIAL PLANNING**

Part III
INTERNATIONAL COMMITMENTS

- 8. INTERNATIONAL CO-OPERATION**

REFERENCES

* Also available in Greek.

CONCLUSIONS AND RECOMMENDATIONS*

Since 2000, *Greece's economy continued to grow rapidly*, on average by more than 4% per year. Per capita GDP has risen and is now close to the OECD-Europe average. The adoption of the euro in 2001 and the public works associated to the *Athens 2004 Olympics*, are among the major drivers of this economic growth. Greece has also been a major beneficiary of *EU funds*, which have contributed to modernise and develop infrastructure networks (e.g. transport, energy, water), to upgrade competitiveness and human resources and to address regional disparities. Greece has an open economy, with a relatively small industrial base and a stable industrial production. The *tourism and construction* sectors play an important and increasing role, contributing to 18% and 8.5% of GDP respectively. Greece has a longstanding tradition of *maritime transport*.

An almost untouched natural environment and a unique and rich cultural heritage characterise wide areas of the country. The present decade saw consolidation of the *environmental achievements* of the previous one, progress in the implementation of national and EU environmental legislation, as well as enhanced participation in international co-operation activities. However, economic growth has often led to *increased pressures on the environment*, including unplanned construction, degradation of some coastal zones and some islands, increasing air emissions from electricity generation, high material intensity and excessive use of irrigation water. Overall, further efforts are needed to achieve environmental convergence within the OECD and the EU. To meet these *challenges*, Greece will need to: i) thoroughly implement its environmental and land-use policies; ii) further integrate environmental concerns into sectoral policies and iii) reinforce its international co-operation on environmental issues.

This report examines Greece's progress since the previous OECD Environmental Performance Review in 2000, and the extent to which the country has met its *domestic objectives and its international commitments*. The report also reviews Greece's progress in the context of the OECD Environmental Strategy for the First Decade of the 21st Century.** Some 44 recommendations are made that should contribute to further environmental progress in Greece.

1. Environmental Management

Strengthening the implementation of environmental policies

The Greek environmental policy is largely based on environmental regulations, and on EU directives. During the review period, Greece passed important *environmental legislation* and transposed recent EU directives. Positive developments in the review period include the creation of the *ombudsman* with, inter alia, environmental responsibilities and of an operational *environmental inspectorate*, as well as positive

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 17 February 2009.

** The objectives of the OECD Environmental Strategy 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 (Section 2) and global environmental interdependence (Section 3).

results of surveillance and enforcement concerning marine pollution. Greece also made significant progress in constructing *urban wastewater treatment* infrastructure (with large financial transfers from the EU funds); all major wastewater infrastructure projects are scheduled to be completed by 2013. Considerable progress was achieved in *water pricing*, with recovery rates reaching 95% in large cities like Athens. This positive development is largely driven by the EU Water Framework Directive, which requires the implementation of water-pricing policies towards the recovery of water service costs by 2010. Greece made important strides in closing down many illegal landfills by the end of 2008. *Waste management* and recycling improved during the review period.

Lack of *enforcement* remains the Achilles heel of *environmental and land use* policy implementation, weakening the effectiveness of regulations and permitting. Despite the establishment of the new environmental inspectorate and its good start, further efforts are needed to provide it with the capacity and instruments that it requires to fulfil its mandate. Greece needs to persist in its efforts to close the remaining illegal *landfills*. In many parts of the country, local authorities have experienced difficulties in opening legal/sanitary landfills due to opposition by local communities. Overall, better understanding and implementation of the polluter pays principle (PPP) and user pays principle (UPP) should be fostered, and environmental awareness further promoted. The use of economic analysis and instruments should be expanded. Although Greece has progressively stepped up its pollution abatement and control (PAC) expenditure to 0.7% of GDP, its *environmental expenditure* represents less than 1% of GDP. This is a limited effort compared to OECD countries in a comparable development stage despite considerable EU support. The road to environmental convergence in the EU remains challenging for some issues (e.g. air pollution abatement from fixed and mobile sources, waste infrastructure and management). It is suggested that Greece increases significantly its *environmental financial efforts*, i) looking beyond 2013 and possible decreases in EU support, and ii) moving towards the full implementation of the PPP and UPP, thereby decreasing public support from national and EU sources. The *environmental administration*, which is significant part of the Ministry for the Environment, Spatial Planning and Public Works (YPEHODE), needs to be further strengthened.

Recommendations:

- further strengthen the visibility, human and financial resources, and influence of the *environmental administration* at all levels;
- strengthen overall *environmental financial efforts*, moving progressively towards full implementation of the polluter pays and user pays principles;
- implement plans to strengthen the financial and human resources devoted to the new environmental inspectorate; continue to promote *compliance with and enforcement of environmental and land use regulations*;
- review and revise prices, taxes and subsidies, with the aim of internalising environmental externalities; expand the use of *economic instruments* to serve environmental objectives;
- strengthen the analytical basis for decision-making, including *environmental data*, and *economic information* on the environment (e.g. environmental expenditure, environment-related taxes, resource prices, employment).

Air

Greece has considerably reduced *air pollutant emission intensities* since 2000, showing a relative decoupling from economic growth. Emissions of nitrogen oxides (NO_x) have remained below the ceiling set at European level and NO_x emission intensity is now in line with OECD average. Improvements in vehicle fleet and fuel quality have helped reduce emissions of volatile organic compounds (VOCs), carbon monoxide (CO) and particulate matters (PM) from the transport sector. *Concentrations of pollutants in ambient air* tended to decline or stabilise. During the review period, concentrations of sulphur dioxide (SO₂) and CO were kept below their limits throughout the country, and peak values of NO₂ steadily decreased. Greece has *strengthened its inspection system*, and emissions from stationary sources and fuel quality are regularly controlled. Greek installations participate in the EU *emission trading scheme for greenhouse gases* (GHGs); this led some large sources to invest in emission reduction measures. Greece's *GHG emissions* are currently below the Kyoto Protocol target. According to the 2008 reports from the European Commission and the European Environment Agency, Greece is expected to meet its Kyoto target using existing policies and measures. Greece will need to continue to monitor its programmes to ensure that they are sufficient to meet the more ambitious EU targets to 2020. Concerning *energy*, the *energy intensity* of the economy has been reduced, and is now among the lowest in OECD. Greece has implemented regulatory and financial measures to promote the uptake of natural gas and to improve efficiency in energy end-use and electricity generation; progress has been made in opening energy markets. The share of renewables in both total primary energy supply and electricity output has increased, following the introduction of a feed-in tariff in 2001 and other support schemes. Concerning *transport*, Greece has heavily invested in extending *transport infrastructures*, using the opportunities given by the EU funds and the 2004 Olympic Games. The urban public transport system in Greater Athens was expanded and upgraded, as were pedestrian areas.

Although SO₂ emissions have started to slightly decrease in recent years, SO₂ *emission intensity* remains higher than the OECD average and among the highest in Europe, due to the dominance of domestic lignite (with very low calorific value) and oil in the fuel mix. Greece needs to strengthen its efforts in reducing SO_x and VOC emissions to reach their targets in 2010. Emissions of PM (especially from the residential and commercial sectors) and heavy metals remain of concern. Strengthened efforts are also needed to reach EU limit values for *ambient air quality* in major cities (e.g. NO_x, fine particles and ground-level ozone) and to mitigate related health risks. The *ambient air monitoring network* appears to be undersized and not fully efficient. Information on national emissions is not always adequate, especially for fine particles, persistent organic pollutants and heavy metals. *Economic instruments are limited* to energy and vehicle taxation; compliance with licensing regulations and financial support remain the main drivers for improving environmental performance at stationary sources. Concerning *energy*, *electricity generation* is a major source of air emissions, and there is much scope for improving its efficiency and environmental performance: while major electricity operators have undertaken investment programmes, Greece is home to some of the most polluting power plants in the EU; electricity generation from *renewables* is still far from the 2010 EU indicative target. Relatively low *energy end-use prices* and special discounts for some consumer categories may discourage rational use of energy. Concerning *transport*, road largely dominates the modal split for both freight and passenger transport. The share of *taxes* in fuel prices has decreased, road tolls are not adequately adjusted to inflation, and vehicle taxes do not satisfactorily take account of vehicle fuel efficiency. *Navigation* is a growing source of emissions; measures are

needed to improve vessel performance and shipping fuel quality, taking into account the regulatory framework developed at international level.

Recommendations:

- further *reduce air emissions*, especially SO₂ emissions from electricity generation (e.g. lignite fired power plants) and VOCs emissions from transport, so as to meet national emission ceilings; strengthen the *monitoring and management of particulate matter* (including PM_{2.5}) and ground level ozone;
- strengthen efforts on *energy demand-side management* and on market-oriented instruments to achieve more effective and efficient energy use: review the *energy price* levels and structure, and assess the impact of exemptions and subsidies;
- continue *the shift towards cleaner fuels* (e.g. natural gas, low sulphur oil) and *renewables* for electricity generation and end-use;
- continue to invest in *efficient and reliable public transport systems*, including in cities other than Athens; further develop transport demand management in urban areas;
- review *transport prices and taxes*, to better internalise environmental impacts and reflect vehicle environmental performance and fuel efficiency (e.g. linking vehicle taxes to EU CO₂ vehicle labelling);
- address *air pollutant emissions from ships*, e.g. taking measures to improve vessel performance and fuel quality.

Water

The state of Greece's *freshwater bodies* is generally good. Water quality is commonly fit for various uses (irrigation, industry, production of drinking water). Greece has an especially good record in terms of water quality at the more than 2 000 *coastal sites* designated under the EU Bathing Water Directive: virtually all sites comply with mandatory values and 96-98% also comply with the more stringent guide values. Price structure for *urban water services* encourages the prudent use of water, and price levels increased to allow a greater degree of cost recovery. Good progress was made during the review period with the construction of *urban wastewater treatment* stations: about 65% of the total population is connected to public wastewater treatment plants, up from the 45% in the late 1990s. The Athens Metropolitan Area is now equipped with a state-of-the-art sludge drying facility. After growing significantly during the 1990s, the rate of water abstraction was stabilised in the review period. Action plans were put in place in all areas vulnerable to *nitrate pollution* from agriculture and the use of agricultural inputs of nitrogenous fertilisers and pesticides has been reduced since the end of the last decade. Greece transposed the *EU Water Framework Directive* (WFD) into domestic law in 2003; to implement the directive, it created 13 Regional Water Directorates and a specialised Central Water Agency, a governmental authority under the aegis of YPEHODE, in charge of definition and oversight of national water policy.

However, Greece still faces serious water challenges, in particular in terms of its *agricultural water use*, which represents about 85% of overall abstraction. Excessive pumping of *groundwater* has caused water levels to fall dramatically in some rural areas, as well as salt water intrusion in some coastal aquifers. *Illegal abstractions and discharges* pose a hurdle to improving water management. Enforcement of regulations

and water permit conditions has not sufficiently improved. *Water losses* in urban and, in particular, irrigation water conveyance systems are too high. *Agricultural water prices* neither cover the cost of supply nor provide sufficient conservation incentives. Little attention has been paid so far to *ecological aspects of water quality*. Efforts to clean up longstanding pollution hot spots should be reinforced as a matter of priority. Implementation of a plan to control discharges of *dangerous substances*, first drawn up early in the review period, has only recently begun. None of the deadlines of the *EU Urban Waste Water Directive* were met and it will take until 2013 to fully meet the directive's targets, notably for smaller agglomerations. While there are on-going efforts to improve the monitoring systems, it is still proving difficult to produce national statistics useful for water management.

Recommendations:

- continue efforts to fully comply with the *EU Water Framework Directive*;
- formulate and implement a *national irrigation policy*, integrating agronomic, water and environmental policy objectives, which promotes the rational use of water, aims to reduce groundwater abstractions and to improve irrigation efficiency and practices in both communal and private irrigation networks, and ensures that all water abstractions are properly licensed;
- further *improve wastewater management*, in compliance with the EU Urban Waste Water Directive, and consider the wastewater treatment needs of smaller settlements; encourage utilities to improve water quality assurance (e.g. through participation in international benchmarking);
- intensify efforts to *reduce water pollution* by dangerous substances, to prevent illegal discharges of wastewater, and clean up pollution hot spots;
- introduce new measures to improve the *allocation of water* to ensure water flows to the highest-value uses;
- raise greater *public awareness and understanding*, particularly among farmers, of the economic, social and environmental aspects of water management.

Nature and biodiversity

Greece has an exceptionally *rich biodiversity*; an almost untouched natural environment characterises wide areas of the country. Greek policy documents (including the 2002 National Strategy for Sustainable Development) explicitly refer to the *international and EU commitment* of reducing the current rate of biodiversity loss. During the review period, a number of *new protected areas* were designated, including ten national parks; the list of Sites of Community Importance and Special Protection Areas was extended; the *Natura 2000 network* was designated to cover 21% of the land surface and 5.5% of the territorial waters. Greece improved and updated the *legislative framework* for nature conservation, moving from a strict protection approach to a more integrated and participatory management. Twenty-seven independent and multi-stakeholder *Management Bodies* were given management responsibilities over some 1.7 million hectares of protected areas. Information on the status of habitats and species is improving, for instance through the *Biodiversity Clearing House Mechanism* website. The number of *threatened species* covered through protection projects considerably increased, with significant involvement of environmental NGOs and research institutes (e.g. loggerhead sea turtle, Mediterranean monk seal). Stricter measures were

implemented to control international trade of species. *Organic farming* has developed rapidly. There is no GMO cultivation in Greece. The renewed *forest legislation* adopts the principles of biodiversity conservation and multiple uses of forest lands. Further steps have been taken to promote more eco-friendly *tourism*, and the Specific Framework Plan for Tourism sets restrictions on construction of tourist facilities. Greece participates actively in *international activities* to preserve the biodiversity of the Mediterranean area and to control marine pollution.

Recommendations:

- adopt and implement the *National Biodiversity Strategy and Action Plan*, as a comprehensive action-oriented framework for ecosystem and species conservation at both national and local levels; set time-bound objectives and periodically evaluate progress;
- continue to extend *protected areas*, particularly including coastal areas and marine ecosystems; complete the implementation of the *Natura 2000 network*; ensure that all protected areas are provided with management plans and adequate conservation measures;
- further improve the *human and financial capacity* for nature conservation and the management of protected areas; review the future evolution of the funding system of biodiversity management, with substitutes to EU contributions (e.g. increased use of economic instruments; contribution of national and local public and private funding);
- increase and disseminate *knowledge on the conservation status of species*; carry out systematic monitoring of endangered and threatened species, and evaluate the effectiveness of protection projects;
- improve the integration of biodiversity concerns into the *agricultural sector*, through a targeted use of agri-environmental schemes and specific educational programmes.

Despite this progress, additional actions are needed to mitigate the *growing pressures* on natural assets from economic activities. Greece is among the four OECD countries that have not yet submitted the *National Biodiversity Strategy and Action Plan*, thereby lacking a comprehensive framework for the protection of species and ecosystems. The National Biodiversity Strategy is currently under consultation. The *actual management of the Natura 2000 network* needs improvement: less than one fifth of Natura 2000 surface is included in legally designated protected areas, and nearly half lacks the environmental study required to define conservation measures. Only a few marine areas are included in the network. Most protected areas still require management plans. Management responsibilities rest with many authorities at central and local levels, with consequent *overlapping and coordination problems* and weak enforcement. *Budgetary and human resources* should be reinforced. Management Bodies of protected areas have mostly relied on EU funds. Greece needs to ensure adequate long term financing, including funds to substitute for EU contributions. Many of the *mammal and freshwater fish species* living in Greece are threatened, and an increase in invasive alien species has been observed, especially concerning marine ecosystems. Inventories of species need to be extended and improved, and Red Lists of fauna and flora to be regularly updated. Conservation policy has yet to achieve an effective *mainstreaming of biodiversity* issues into other sectors. *Poor farming practices* and excessive use of water for irrigation have contributed to degrade semi-natural habitats and wetlands. The number of farmers participating in agri-environmental schemes has grown steadily, but still accounts for a small share of farmland. While forests appear relatively healthy, they

are threatened by frequent and devastating summer *fires*; more resolute prevention and restoration measures need to be undertaken. *Tourism development* exerts growing pressure on ecosystems, especially in coastal zones and islands, where protective provisions have been often infringed. Further efforts are needed to build *consensus* around nature conservation, informing local communities of related ecosystems services and economic benefits.

2. Towards Sustainable Development

Integrating environmental concerns into economic decisions

In the context of rapid economic growth and structural changes, key accomplishments include the elaboration of a national sustainable development strategy, strengthening of the environmental impact assessment process, and the establishment of a strategic environmental assessment process. *Environmental impact assessments* have been in place since 1990; they have now become an operational tool most important in a period dominated by *infrastructure building* (e.g. transport, energy, water). *Strategic environmental assessments* (SEA) are now embedded in law; the 2004 Olympic Games went through an SEA. Environmental objectives have been largely integrated into *EU funded programmes*. In the 2000-06 programming period, about 25% of EU support (excluding agriculture-related support) was allocated to environment-related investments at large (averaging 0.8% of GDP). Progress has been made in reducing *some emission and resource intensities* (e.g. NO_x and nitrogen fertilisers), showing a relative (although still limited) decoupling of environmental pressures from economic growth. The *energy intensity* of the economy has been considerably reduced, and steps have been taken to promote reliance on natural gas.

However, the *2002 National Strategy for Sustainable Development* has not been fully used to its potential as an integrative tool. The strategy has not been really influential over the past years and it has not been thoroughly monitored. It does not include targets, and focuses on the environmental dimension. The revised strategy should be more influential as an integrative policy tool with measurable targets and more operational monitoring and evaluation mechanisms. Overall *material intensity* in Greece is well above the OECD average, especially for fossil fuels (reflecting the country's large use of domestic lignite). Revenues from *environment-related taxes* as a share of GDP decreased during the review period, reaching 1.9% of GDP, among the lowest shares in OECD. *Energy and fuel taxes* are relatively low in Greece, and there is scope and need to apply economic instruments to encourage a shift to less polluting energy production. Electricity from lignite is exempted from the excise duty, and several *discounts and tax breaks on energy prices* are used for social purposes. Greece should consider revising taxes or charges to influence demand, and introducing targeted compensation schemes to address social issues. *Vehicle taxes* take account of fuel efficiency and environmental performance only to a limited extent.

Recommendations:

- include appropriate *targets and objectives* in the revised National Strategy for Sustainable Development;
- utilise fully the *institutions on sustainable development* now in place to ensure the implementation of the revised National Strategy for Sustainable Development; continue focusing sector integration and sound long-term planning with a view to achieve a low-carbon, energy and material efficient economy;
- expand the use of economic instruments as part of a green *fiscal reform* (e.g. energy taxation, progressive car taxation in relation to pollution);
- progressively eliminate *environmentally harmful subsidies* (e.g. agriculture water tariffs); consider replacing tax exemptions (e.g. on heating oil) with more targeted social compensation schemes;
- review the economic efficiency of *environmental subsidies* (e.g. to renewable energy sources) and revise them accordingly.

Integrating environmental and social decisions

Environment-related employment has increased, mainly related to large environmental infrastructure investments and to new government bodies created at national and local levels. Concerning environmental democracy, Greece ratified the Aarhus Convention in 2005 and transposed the related EU Directives into national legislation, with a well-designed institutional and legal framework for *environmental information* and reporting in place. A wide range of environmental information is available free of charge and accessible through web-based tools. The Greek legal system provides a broad recognition of individual and collective rights to a protected natural and cultural environment. *Access to courts* in environmental cases for individual citizens and NGOs is provided for in both administrative and judicial procedures. The Greek Ombudsman investigates cases of possible inappropriate administrative actions related to the environment. Mechanisms to assure *public participation* in environmental decision-making improved during the review period and public consultation is now widespread at all government levels. NGOs are full members of Management Bodies of protected areas and of Regional Water Councils and are actively involved in raising environmental awareness. *Environmental education* has received increasing attention and several projects have been implemented in primary and secondary schools. Local and national campaigns, as well as extensive media coverage of environmental themes, have raised environmental awareness. Greece has enjoyed further gains in life expectancy and reductions in infant mortality. *Health risk factors* (e.g. drinking water quality, ozone and PM₁₀ concentrations) are monitored on a regular basis throughout the country; a national legislation to contrast tobacco-smoke is in place. Several awareness raising initiatives have been addressing occupational health.

However, *employment* opportunities in environmental sectors are not being fully exploited in Greece. A comprehensive assessment of the impact of Greek environmental policy on employment would be very useful. The potential value of *public participation* in policy-making is still weakly acknowledged. Consultations often appear to be undertaken to fulfil legal obligations (e.g. at local level), especially when required by EU directives (e.g. Environmental Impact Assessment, Strategic Environmental Assessment, Water Framework Directive). A comprehensive framework for

environmental education at different stages of education is missing; environmental themes are integrated in school curricula and training programmes mainly on a project-basis. Gaps remain in collecting and processing *environmental health* data, and little attention has been given to cost-benefit analysis in environmental health policy design.

Recommendations:

- implement the *environmental health action plan*; priorities for action should be based upon scientific research and economic analysis (e.g. reduced health expenditure, improved labour productivity, improved well-being);
- further develop an active and long-term *environmental employment policy*;
- continue efforts to collect, process and disseminate *environmental information* at national and territorial government levels;
- continue to encourage more active *public participation associated with decision-making*, as well as effective implementation of provisions for access to environmental justice and follow-up to judicial decisions; enhance the effectiveness of consultation procedures;
- take further steps towards the integration of environmental themes at all stages of *education*, including professional training.

Strengthening land use and spatial planning

Considerable investments in *transport infrastructure* (e.g. major motorways in the West and North of the country) and *energy infrastructure* during the current review period have created better prospects for a more balanced distribution of economic development throughout Greece. Similar improvements in Athens (including a new metro and a new airport), have changed the city for the better. At the outset of the review period, Greece incorporated the principles of sustainable development in its spatial planning legislation. For the first time, the country armed itself with the *legislation* that is necessary to create a comprehensive planning framework to guide the spatial aspects of economic and social development and the protection of its natural and cultural heritage at a national, regional and local planning scale. Since then, *12 strategic Regional Framework Plans* for Planning and Sustainable Development have been adopted: one for each of the country's 13 regions except for the Athens Metropolitan Area, which already had its own master plan. The country's first national strategic spatial plan, the *General Framework*, and the *Specific Framework Plan* for renewable energy sources were approved in 2008. The *Specific Framework Plans* dealing with the tourism and industrial sectors are expected to be approved in mid-2009. Greek authorities claim some success in bringing down the incidence of unauthorised construction, which has been a longstanding problem. Greece also made progress with the establishment of a national cadastre. The review period saw the creation of numerous industrial parks, which in the long run will help remove industries from unsuitable locations.

It is still too early to assess the effects of all the planning activities on what is actually happening "on the ground". The reality so far has been one of spontaneous urbanisation whereby construction has often preceded planning, notably in the *coastal zone, on islands, and on the fringes of urban areas*. Policies specifically aimed at Integrated Coastal Zone Management are absent. The problem of *forest fires* is partially due to the weak planning system, including the lack of a complete *National Cadastre* and

of a *National Forest Registry*. The reforestation of burned and degraded forestlands slowed down during the review period. Towns and cities suffer from a dearth of open space and green areas. Planning decisions often suffer time delays, partly because issues need to be referred to the central administration. Ombudsman reports also suggest that the *administration of planning law by local authorities* still is far from efficient, including in terms of the required Environmental Impact Assessments, carried out a posteriori or bypassed altogether. Finally, the new Framework Plans will, by themselves, not secure good implementation and outcomes, and much will depend on a balanced interpretation of the term “sustainable development”: it appears that in many decisions to date, the word “development” has been given much greater weight than the word “sustainable”.

Recommendations:

- streamline the *administrative procedures* associated with environmental impact assessments and the application for planning and building permits; reduce building and housing *construction without prior planning*;
- ensure adequate control and strict enforcement of the existing legal framework regarding *construction without prior building permit*;
- complete the *National Cadastre and the National Forest Registry* as soon as possible;
- adopt and implement the proposed Framework Plans for *Coastal Areas and Islands* and for *Mountainous Areas*; set up a transparent monitoring system to *track and report on the effectiveness of the Frameworks* for Spatial Planning and Sustainable Development;
- increase the rate of *reforestation of burned and degraded forestlands*;
- raise *awareness and understanding of sustainable development* among the major stakeholder groups and in the Greek society at large.

3. International Co-operation

Although faced with the imperative of achieving near-term economic growth, Greece has embraced and promoted *long-term sustainable development* by implementing national actions to achieve, inter alia, the goals of the World Summit on Sustainable Development, the UN Millennium Development Goals and the EU Strategy for Sustainable Development. As a donor country, Greece’s *development assistance programme* has improved substantially with the establishment of the “Hellenic Aid” Department within the Ministry of Foreign Affairs. It has supported improved environmental governance and programme effectiveness at the international level by pressing for institutional reform and better programme coherence (e.g. within UNEP and the UN Commission on Sustainable Development), and by ratifying virtually all major multilateral environmental conventions. Greece has also made an intensive effort to transpose *EU environmental legislation* into domestic law. Significant progress was made in the *maritime transport* area in protecting the environment and improving the safety of life and property at sea; *fisheries management* was strengthened through national actions under the EU Common Fisheries Policy. Progress was made in protecting *endangered species* under the CITES convention, and in implementing the provisions of the Basel Convention on *transboundary movement of hazardous waste*. In the area of *climate change*, Greece has established institutional arrangements and developed analyses and plans to meet its commitments under the Kyoto Protocol and the EU

burden-sharing agreement. Greece has also intensified its efforts to engage its neighbours in co-operative efforts to address water quality and water flow issues associated with *transboundary rivers and lakes*. Greece has provided effective leadership of the *Mediterranean Component of the EU Water Initiative* (MED EUWI) since its launch in 2003.

While performance improved markedly in the past few years, Greece needs to intensify its efforts to comply adequately with the *EU environmental legislation*. In a number of areas (waste, natural areas, water management) gaps exist between the high quality of analysis/planning and actual programme implementation. Greece is behind schedule in achieving EU targets for renewable energy use and reduction of energy consumption. Despite the progress in the enforcement of laws and regulations to control illegal *trade in endangered species, ozone depleting substances and hazardous waste*, Greek authorities need to remain vigilant and to be adequately staffed and equipped to carry out these tasks. Concerning *coastal waters*, while their quality is generally excellent, pollution hotspots remain problematic due to uncontrolled development and inadequate wastewater treatment; management of coastal wetlands and protected areas needs to be improved and decoupled from EU financial support. While there are plans to progressively increase the *Official Development Assistance*, its environmental content remains quite small, and provisions do not exist for systematic environmental reviews of all proposed major development projects. Greece should be a leader within the IMO-ILO-UNEP framework on *environmentally sound shipbreaking*, commensurate with its commitment to sustainable development and its development assistance policy objectives. *Co-operation with neighbouring countries* on transboundary water and marine issues remains challenging, requiring further political and programme initiatives by the relevant countries.

Recommendations:

- continue efforts to *reduce greenhouse gases* with a view to achieving the EU emissions reduction target set for Greece; enhance efforts on energy efficiency and renewable energy sources;
- encourage Greek leadership within the IMO-ILO-UNEP framework in support of the *Convention on the Safe and Environmentally Sound Recycling of Ships*;
- strengthen the protection of *water quality in near shore marine areas and bays* through improved development siting, upgraded wastewater treatment and effective enforcement of existing national and EU environmental legislation and regulations; ensure that the environmental regulations governing water quality in the *aquaculture industry* are adequate to protect human health and environmental sustainability, and are fully enforced;
- strengthen *customs inspection and enforcement capacity* (expanded staff, improved training, better technology) to control illegal trade in endangered species, ozone depleting substances and hazardous waste;
- further utilise bilateral, regional and multilateral mechanisms to expand *co-operation with neighbouring countries* on the environmental management of transboundary waters;
- strengthen the environmental content of the *Development Assistance Programme* as it continues to grow, while ensuring that major development projects funded by Greece are subject to environmental reviews, where appropriate.

HUNGARY*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR MANAGEMENT**
- 3. WATER MANAGEMENT**
- 4. NATURE AND BIODIVERSITY**

Part II
SUSTAINABLE DEVELOPMENT

- 5. ENVIRONMENT-ECONOMY INTERFACE**
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- 7. ENVIRONMENTAL-SOCIAL INTERFACE**

Part III
INTERNATIONAL COMMITMENTS

- 8. INTERNATIONAL CO-OPERATION**

REFERENCES

* Also available in Hungarian.

CONCLUSIONS AND RECOMMENDATIONS*

This report examines Hungary's progress since the previous OECD Environmental Performance Review in 2000, and the extent to which the country has met its *domestic objectives and honoured its international commitments*. The report also reviews Hungary's progress in the context of the OECD *Environmental Strategy for the First Decade of the 21st Century*.** Some 46 recommendations are made that should contribute to further environmental progress in Hungary.

Over the review period (2000-08), Hungary's economy continued to grow and the *population* continued to decline and to age. The country underwent further *structural changes* and integration in the European economy; Hungary acceded to the *European Union* in May 2004. *Imports and exports* of goods and services represent 78% of GDP, and more than 85% of GDP is generated in the private sector. The country has received *foreign direct investment* reaching 5.4% in 2006. *Fiscal consolidation* and economic convergence in the EU now dominate the policy agenda.

Further to environmental progress during 1990-2000, the review period saw consolidation of this progress and alignment with EU environmental *acquis*. But pollution, energy and resource intensities can still be improved and environmentally related health problems subsist. Overall, the road towards environmental convergence within the EU will be a long one, on a number of issues.

To meet these *challenges*, Hungary 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 environmental concerns into economic decisions; and iii) reinforce international co-operation on environmental issues.

1. Environmental Management

Strengthening the implementation of environmental policies

Hungary has developed a comprehensive *environmental planning framework*, included two National Environmental Programmes (for the periods 1997-2002 and 2003-08) and related thematic action programmes, with quantitative objectives and performance indicators. Its programming framework formed the basis for the Environment and Energy Operative Programme which specifies the use of EU Funds and Hungarian matching Funds for the period 2007-13, in the context of the National Development Plan. The review period was characterised by the *consolidation of environmental legislation*, mostly driven by EU environmental "acquis" and EU membership in May 2004. Three of the four transition periods granted to Hungary have

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 2 June 2008.

** The objectives of the OECD Environmental Strategy 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).

already expired, leaving only the one for the treatment of urban waste water, which will last until 2015. Hungary is now also contributing to shape EU environmental policy (e.g. flood management, mining waste, chemicals, ground and bathing waters). The *institutional framework* for environmental management has evolved over the review period, with the gradual merger of authorities in charge of nature conservation, environmental protection and water quality and quantity management. The Energy Centre was established in 2000 to deal with sustainable energy issues. As recommended in the first OECD review, *enforcement activities* have increased: inspectorates have acquired both licensing and enforcement responsibilities over all environmental themes, and the system of non-compliance sanctions has been significantly strengthened. Progress has been made towards the *polluter pays principle* and the *user pays principle*: the use of *economic instruments* has increased with the introduction of an “environmental load charge” applying to air emissions and waste water discharges, and the revision of product charges on packaging wastes. Hungarian firms have greatly expanded their use of *environmental management systems*. *Eco-labelling* and green public procurement are being promoted.

However, Hungarian *environmental performance* is still not fully in line with OECD-Europe standards and EU targets. In particular, some positive trends of the 1990s have slowed down in recent years (e.g. for energy intensity, some air pollutant emissions, waste generation) or even reversed (e.g. fertilisers and pesticides use). Some health indicators are also of concerns. *Implementation of the second National Environmental Programme (2003-08)* has been lagging behind and Hungary appears unlikely to reach its targets in a number of fields (e.g. water quality, waste recovery). This suggests that efforts or available resources have not been always appropriate to implement the new environmental legislation, despite important EU support. The level of PAC investment expenditure is the same as in the first OECD review (about 1% of GDP), and total PAC expenditure is about 1.6% of GDP. Over the review period, *financial and human resource shortage* has limited monitoring and enforcement capacity of inspectorates. Regional and municipal administrations need to strengthen their environmental capacities and their expertise in economic analysis, also with a view to better absorbing EU funds for environmental projects. The effectiveness of *economic instruments* must be regularly assessed and charges periodically adjusted, to provide a balanced mix of licensing regulations and economic incentives. *Affordability* issues need also to be considered.

Recommendations:

- evaluate implementation of the second *national environmental programme*; speed up preparation of the third one (including targets, deadlines and means) and implement it;
- secure enough *financing and staff* to the environmental administration and inspectorates to ensure cost-efficient management and enforcement capacity;
- further expand the use of *economic instruments* and regularly assess their effectiveness, assuring a wider application of the polluter pays and user pays principles, taking into account competitiveness and social considerations; extend further cost-recovery to waste management;
- strengthen the use of *economic information and analysis* for environmental projects and policies (e.g. cost-benefit analysis).

Air

Since 1998, Hungary has *considerably reduced air pollutant emissions* and as a consequence has *improved ambient air quality*. Emissions of SO₂ and CO₂ have been further decoupled from economic growth, falling below the respective targets agreed at international and European levels. Per capita emissions of CO₂ are lower than the OECD-Europe average. Economic restructuring and the closing of several industrial plants have helped reduce emissions of particulate matter (-29%) and CO (-20%). The improvement in ambient air quality has resulted in a decreasing trend in morbidity and mortality associated with respiratory diseases. Concentrations of SO₂, CO, benzene and lead were kept below the limits throughout the country during the review period. The *national air quality monitoring network was extended*, doubling the number of on-line sampling points, and the vast majority of measuring stations were upgraded to collect data on particulate matter and aromatic hydrocarbons. *Air quality legislation was extensively revised* and is now consistent with international commitments and EU requirements. An “environmental load charge” applying to emissions of the main air pollutants from stationary sources was introduced. Investment in end-of-pipe equipment and improvement in fuel quality have contributed to a significant reduction in emissions from energy generation. Concerning *energy*, Hungary has made significant progress in opening energy markets; and *energy prices* for end-users have been further adjusted to achieve cost recovery. In 2006, the direct subsidy on natural gas for household heating was replaced by a more targeted social compensation scheme. The *energy intensity* of the economy has been reduced, gradually approaching the OECD Europe average. The *share of renewables* in total primary energy supply increased markedly following the introduction of a feed-in tariff in 2001, and the target for electricity generation from renewables was met well ahead of the 2010 deadline. Some large power plants shifted from coal to biomass, thus cutting SO₂ and CO₂ emissions. Concerning *transport*, increases in fuel prices, vehicle taxes and road tolls have helped moderate demand for road transport. Public transport is well developed and still prevails in the modal split for urban travel. Switching to less polluting fuels has been promoted via tax measures. Improvements in fuel quality and vehicle performance have helped to increase the energy efficiency of transport and to reduce related air emissions.

However, some positive trends that characterised the early 1990s slowed during the review period. *Emissions* of NO_x and VOCs have fluctuated slightly around the same level since 2001, and recent increases will make it more challenging to reach the respective emission ceilings. Similarly, the decline in emissions of heavy metals and persistent organic pollutants appears to have halted in recent years. Emissions of air pollutants and greenhouse gases from household and transport sectors are growing, partially offsetting progress achieved in the industrial and energy sectors, and potentially undermining improvements in *ambient air quality*, especially in urban areas. *Particles and ground-level ozone* are of particular concern: in 2006, daily limits were exceeded at most assessment stations, particularly in the capital city and large urban areas. The NO_x annual average threshold was also exceeded in some areas and in major cities of the country. The relatively low rates and exemptions for district heating providers may hinder the incentive function of air emission charges. Compliance with licensing regulations appears to remain the main driver for improving the environmental performance of large stationary sources. As in most EU countries, effective competitiveness in *energy markets* is still limited and a significant potential exists for increasing the efficiency of electricity generation. Whilst the feed-in tariff has helped to increase the share of renewables in energy supply, the support scheme might lead to over-subsidisation; cost-benefit analyses would help in assessing overall impacts. Further efforts are needed to increase

energy efficiency in the residential and transport sectors, as reflected in the recently approved National Energy Efficiency Action Plan. Households still benefit from exemptions on energy taxes, which may discourage efficient use of energy. *Transport demand management* has proven inadequate to influence decisions on car use, partly because of persistent financial constraints faced by municipalities. Commuter subsidies are not sufficient to support public transport and income tax provisions encourage private vehicle use. The growing motor vehicle fleet, as well as the boom in road freight transport which followed EU accession, threatens to offset improvements in vehicle technology and fuel quality. Road prices are not proportional to distance travelled and vehicle taxes do not satisfactorily take account of environmental performance.

Recommendations:

- strengthen *measures for reducing air emissions*, especially from the transport and residential sectors, so as to meet national emission ceilings and limit values for ambient air quality;
- maintain the *incentive value of emission charges* (e.g. the environmental load charge) by regularly reviewing their rates; ensure that incentives for energy efficiency provided by relatively high energy prices are not undermined by unjustified exemptions and subsidies;
- ensure *competitiveness in the energy sector*, in the EU context, to improve its environmental and economic performance; take further steps to increase *energy efficiency* in all sectors of the economy;
- reassess the support schemes for *renewables and biofuels*, and their overall impacts (including those on land use); consider introducing more market-oriented measures (e.g. green certificates);
- review *transport prices and taxes* (e.g. the vehicle tax) to better internalise costs and reflect vehicle environmental performance. Create incentives to influence transport decisions by businesses and individuals, to counteract projected traffic increases (e.g. gradually link road fees to distance travelled, reduce fringe benefits and tax rebates for private car use);
- further develop *traffic management in urban areas* (e.g. traffic restrictions in city centres, parking and road pricing) and continue to promote integrated public transport in major cities; give municipalities better control over their revenue sources and traffic management tools.

Water

Hungary's *administrative framework* (at both national and regional levels) was reorganised during the review period to merge responsibilities for water quantity and water quality issues. A *national river basin management plan* and the associated programme of measures are being prepared to implement the EU Water Framework Directive. *Water prices* now recover the cost of operation and maintenance for both water supply and waste water services. A *pollution charge* ("environmental load charge") applies to all activities that require a permit (e.g. waste water companies) and is gradually being phased in; the rate takes into account the vulnerability of recipient waters. The charge coexists with pollution fines for discharges in excess of permits; the rate of the fines was significantly increased in recent years, while allowing for quasi exemption if measures are taken to reduce the pollution load. The share of population connected to *waste water treatment* has increased to 60%, though delays occurred in

Budapest where a third treatment plant is due to begin operation in 2010. Massive funding of waste water infrastructure, with co-financing from the EU, is planned for the coming years. Hungary is a low and *flood-prone country*, with the largest flood protection system, and the largest fluvial flood plain system in Europe. Important steps have been taken to reduce vulnerability to flood hazards, including through preparing flood prevention and mitigation plans, revising land use planning legislation and local construction regulations, and taking a proactive stance at EU and international levels. The water quality of *large lakes* improved over the review period.

Recommendations:

- speed up implementation of the *Drinking Water Quality Improvement Programme*, with the aim of having all public water supply comply with drinking water quality limit values;
- further strengthen the flood prevention and control efforts; further enhance the ecosystem and land use approach to *flood management*; develop a flood insurance policy;
- pursue efforts to connect the population to *waste water treatment* so as to prevent widespread bacterial contamination of large rivers;
- further refine the structure and rates of *economic instruments* (e.g. user charges, abstraction and pollution charges) to give appropriate signals to all users and finance water management, while taking social factors into account;
- carry out a comprehensive analysis of the costs and benefits of implementing the *EU Water Framework Directive*.

Despite comprehensive programmes to open new drinking water sources, to extend public water supply and to improve purification technology, which has led to considerable progress, 23% of Hungary's *drinking water* do not comply with EU standards for ammonium, arsenic (of geological origin), nitrite, fluoride and boron (as well as iron and manganese). Bacterial contamination still prevails in *large rivers*, and mercury and zinc still contaminate the Tisza River (due to historical mining operations). Around 60% of the country's surface water bodies have been identified as being at risk of failing to achieve the environmental objectives of the EU Water Framework Directive by 2015. While a third of the country's *aquifers* are subject to pollution from untreated waste water and agriculture, several aquifer protection zones have yet to be established. Despite serious drought events in recent years, the rates of the *water abstraction charge* ("water resource fee") have not significantly increased and continue to vary according to the user. User charges for water and waste water services involve cross subsidies from industry to households. Despite *extreme floods* in recent years, a third of the country's flood defence dikes are not up to the national standard of one metre above the once-in-a-century flood level. Despite a recent change of philosophy towards increasing the role of nature conservation in *flood management*, including the "space for water" concept, Hungary continues to rely primarily on costly engineering approaches and very little on ecosystem approaches. Insurance policy against flooding has yet to develop.

Nature and biodiversity

Hungary has made many efforts to protect nature and biodiversity. The Hungarian Nature Conservation Act (adopted in 1996), still provides an adequate *legal framework* for biodiversity conservation throughout the country, including in areas that

are not currently protected. The development and implementation of the *network of Natura 2000* sites, in the EU context, will bring the area protected from 9.2% to 21% of the country. In spite of lack of resources, Hungary's nature conservation administration, its NGOs, and a large number of volunteers are working well and hard to strengthen nature and biodiversity protection. One example is the effective and productive collaboration between the Ministry of Agriculture, the Ministry of Environment and Water, and NGOs to prepare the payment system for Natura 2000 sites for the period 2007-13. Hungary has also developed a comprehensive biodiversity monitoring system with an excellent scientific basis.

However, Hungary has not yet adopted its *National Biodiversity Strategy*, although a good draft is available. The *capacity of the nature conservation sector* has decreased in recent years; for example, the national park directorates, the regional organisation for nature conservation, are unable to prevent the licensing of projects or development programmes that are likely to have negative impacts on biodiversity. Decreasing financial resources and staff are drastically limiting the implementation of nature conservation policies, at the time of implementation of the Natura 2000 network. For instance, during the last two years, the number of national park rangers has decreased by 20%. Urbanisation, transport infrastructure development, intensive wood harvesting for energy use and illegal hunting and logging, all exert negative impacts on biodiversity. Further *integration of nature protection and biodiversity in sectors* like agriculture, forestry, transport, tourism, hunting and land use planning is needed.

Recommendations:

- adopt at government level and implement the *National Biodiversity Strategy and Action Plan* as soon as possible, as a comprehensive action-oriented framework for ecosystem and species conservation at both national and local levels;
- strengthen the *implementation of the Natura 2000 Ecological Network*, and develop corridors between network sites;
- increase the human and financial *capacity* for nature conservation and biodiversity including in the public administration and civil society; increase the *involvement of stakeholders* in the nature conservation sector;
- continue to improve the *integration of nature conservation objectives in sectoral policies* such as agriculture and forestry, regional development and land use planning, transport and tourism;
- intensify efforts to *raise public awareness* about nature conservation and biodiversity, targeting all age groups, as well as groups such as hunters and farmers;
- assess land use changes resulting from the country's *plans on bio-energy development*; develop, adopt and implement a short-to medium-term strategy to promote the sustainable use of natural resources with appropriate involvement of stakeholders.

2. Towards Sustainable Development

While the present agenda is dominated by budget consolidation, and economic convergence in the EU, the Hungarian National Sustainable Development Strategy (NSDS), adopted by the government in June 2007, provides a very long-term (2050) and positive vision with which all members of society can identify. It goes beyond

i) the pre-existing National Development Policy Concept (up to 2020) and the National Spatial Development concept (up to 2020), and ii) the New Hungary Development Plan for the 2007-13 period.

Integration of environmental concerns into economic decisions

Hungary made progress over the review period in *decoupling* environmental pressures from economic growth for major conventional pollutants (e.g. SO_x, NO_x), CO₂, water abstraction and municipal waste. There has been progress in *integrating environmental concerns* into energy and transport policy at the strategic level, although the communication between the Ministry of Economy and Transport and the Ministry of Environment and Water has not always been fully satisfactory. As an instrument for integration, SEA has been introduced and successfully implemented in sectoral strategies, although not used in the case of transport policy. *The Polluter Pays Principle and the User Pay Principle* have been implemented further with the elimination of environmental subsidies for the private sector and progress towards cost recovery in the case of water, waste and energy prices. Revenues from environmentally related taxes stayed broadly consistent at 2.5% of GDP, in line with EU average. An increased use of *economic instruments* has to be recognised, with the introduction step by step of an environmental load charge, the extension of the product charge scheme and the adoption of the energy tax.

Recommendations:

- further improve the *pollution, energy and resource intensities* of the Hungarian economy; promote sustainable production and consumption patterns;
- strive to eliminate *environmentally harmful subsidies* (e.g. the fringe benefits of company car use);
- develop institutional mechanisms to systematically and continuously review and revise *economic instruments* (e.g. taxes, charges, trading), aiming at green tax reforms and green budgeting, considering competitiveness, distributive and employment issues; make sure that the conditions for granting exemptions are fully justified or fulfilled, to avoid undermining their incentive effects;
- ensure a high *absorption capacity for EU funds*; strengthen technical and economic expertise in the administration to apply EIA and cost-benefit analysis, SEA and environmental integration, when setting up priorities among projects submitted for EU funding, with special attention to non-environment projects;
- continue to improve *inter-institutional cooperation* at national and territorial levels of government, and integration of environmental concerns into sectoral policies;
- develop mechanisms of monitoring and evaluation of progress towards the objectives of the *National Sustainable Development Strategy*, including relevant indicators, and increased public participation.

However, *road freight transport* is increasing at a higher pace than the GDP rate. *Nitrogen fertiliser use and pesticide use* have also grown as a consequence of the EU income support to farmers. A review of potentially *environmentally harmful subsidies* was undertaken during the review period, but there has been no follow up. In the field of transport, fringe benefits granted to company cars encourage the use of the road. Fuel taxes were reduced from about 70% in 1998 to 50-55% in 2006, and road fuel prices remain below the OECD Europe average. The price of natural gas paid by Hungarian

households has increased but remains much below the OECD average. With an increase of EU funding concomitant with a downsizing of public servant staff, Hungary will have still to ensure that *cost-effectiveness* has a central place in decision criteria when establishing priorities among projects to be financed with EU money and that its *capacity of absorption* of EU funds is satisfactory.

Agriculture

The *national nitrogen balance* is low by OECD standards and the national phosphorus balance has decreased, to the extent of becoming negative. Agricultural emissions of greenhouse gases have decreased by nearly half since 1985-87 (base period under the Kyoto Protocol for Hungary). *On-farm energy consumption* was decoupled from agricultural production, showing better performance in the farm sector than in the rest of the economy. Hungary already met its *ammonia emission reduction commitments* (for 2010) under the Gothenburg Protocol. Use of methyl bromide has been prohibited in Hungary in 2005. Water use by agriculture has dramatically decreased. *Afforestation* to combat soil erosion has proved popular among farmers, because of attractive financial incentives; it has involved an increasing share of indigenous tree species. A *code of good agricultural practices* was introduced in the early 2000s, which led to a concept of "strict environmental management" that now applies to 1.4 million hectares of environmentally sensitive areas (out of 5 million hectares of farmland). The code will become compulsory in areas gradually designated as vulnerable to nitrate pollution (to cover nearly half of Hungary). Since the introduction in 2000 of *agri-environmental measures*, expenditure for such payments has increased and now accounts for 13% of total direct payments. The introduction of the *single payment scheme* (following EU accession) is an important step towards reducing production and trade distortions, and thus the degree of flexibility that farmers have in their production choices.

However, a quarter of farmland is affected by moderate to severe *soil erosion* and efforts to improve agricultural soil management have been limited. Little has been done to protect *on-farm biodiversity*: less than a quarter of Environmentally Sensitive Areas overlap with the recently established Natura 2000 network. Organic farming applies only to 2% of the agricultural land area and there is low consumer demand and awareness about organic products. The intensities of use of nitrogen fertilisers and *pesticides* have been quickly increasing in recent years, with the increase of EU support, and are now in line with the OECD Europe average. Many manure storage facilities do not comply yet with requirements of the code of good agricultural practices. Integrated Pest Management accounts for only 0.13% of total agricultural area. *Payments based on input use* have remained. *Top-up payments* (complementary to single payments) have the potential to distort commodity production and thereby to make the farmers decide on production without attention to environmental criteria. The budget devoted to agri-environmental measures under the new National Rural Development Strategy 2007-13 remains insufficient. *Budgetary expenditure on general services* has remained stable since accession, despite increasing availability of EU funds, thereby missing the opportunity to better help the farming sector build capacity on environmental management.

Recommendations:

- design *complementary national direct payments* (“top-up payments”) so as to maintain the degree of flexibility that farmers have in their production choices;
- prepare the shift from single payments (and their top-up payments) to income support *payments based on historical entitlements*, in the context of the CAP reform;
- design *cross compliance* with a view to achieve specific environmental outcomes;
- strengthen *on-farm biodiversity* protection in the context of establishing the Natura 2000 network;
- introduce compulsory *nutrient management plans* at the farm level in “nitrate vulnerable zones”;
- set a national target of reduction in treatment frequency of *pesticides*;
- increase the share of agricultural budgetary expenditure on *general services*, to speed up environmental R&D and innovation in the farming sector.

Integration of environmental and social decisions

Hungary adopted its second National *Environmental Health Action Programme* (NEHAP-II 2004-10) during the review period as well as a Children’s Environmental Health Action Plan (CEHAP). The latter followed Europe’s Fourth Ministerial Conference on Environment and Health (Budapest, 2004). Hungary has several positive indicators of environmental health: dioxin levels in human breast milk are among the lowest in Europe and mortality from respiratory diseases is lower than the EU-15 average. A national climate and health strategy, recently adopted, widens the scope of environmental health issues addressed in government policy. Hungary has also taken steps to promote *environmental democracy*, by developing a system to provide environmental information to the public, offering environmental education, and developing closer ties to local authorities, companies, NGOs and the media, with a view to raising environmental awareness. An innovative ombudsman’s position has been established concerning future generations. A 2004 Supreme Court Decision (the so-called “Uniform Decision”) has opened wider possibilities for non-governmental organisations to appeal decisions on a range of topics including the construction permit procedure. Despite limited resources, *environmental education* has progressed. For example, 272 elementary schools now participate in an eco-school network.

Important problems remain, however, aggravated by the *increase in both poverty and income disparities* that occurred over the review period. The life expectancy remains among the lowest in OECD countries. Rates of mortality from diseases of the circulatory system and malignancies are among the highest in the OECD. Greater attention needs to be given to the *health effects* of air pollution (fine particulate matter) and prevention of health problems related to drinking water quality. Although 93% of the population is supplied with drinking water from central distribution systems, the water does not always meet health standards. Exposure to *asbestos* is still a problem: so far 20% of the asbestos in monitored residential buildings has been removed. Certain trends in environmental democracy have also been unfavourable. Less than 10% of the municipalities have prepared a *Local Agenda 21*. Although steps were taken to facilitate public participation in environmental decision-making and appeal, the system is still not well understood or effectively used by civil society.

Recommendations:

- set higher priority on *poverty and income distribution* issues, including child poverty, in environmental management;
- pursue efforts towards meeting NEHAP II objectives and quantitative targets for *public health and the environment*;
- promote *active employment policies* in eco-industries and environmental services, and the role of the not-for-profit sector in environmental employment, especially in environmentally sensitive areas;
- further promote *citizen participation* in environmental decision-making and access to justice concerning environmental issues;
- continue to develop, use and disseminate *environmental indicators*, and promote access to environmental information;
- pursue *environmental education* efforts; further develop the *environmental training* of elected officials, civil servants and teachers, and establish training for justice officials; develop closer and more sustained relations with local authorities, business and NGOs, as well as with the media, with a view to *raising environmental awareness*.

3. International Co-operation

During the review period, Hungary managed to comprehensively *revise its environmental legislation* to prepare for *EU accession*. Since its accession to the EU, Hungary has actively participated in the negotiation of new environmental acquis, in the development of EU environmental policies and programmes and in the preparation of EU positions in major environmental negotiations. Hungary has deepened its *bilateral co-operation* (elaborating and signing 30 bilateral agreements), strengthened its co-operation with neighbouring countries and taken an active part in sub-regional, regional and global co-operation promoting sustainable development and environmental protection. Hungarian authorities have participated in a number of transboundary environmental impact assessment procedures under the *Espoo Convention* with Austria, Croatia, Romania and Slovakia, and have promoted international activities aimed at strengthening *environmental security and liability*. Hungary has significantly reduced its *SO_x emissions* in accordance with its obligations under the Convention on Long-Range Transboundary Air Pollution (CLRTAP) and its protocols, and has decreased its contribution to transboundary *SO_x pollution*. Hungary is very likely to meet its targets under the *Kyoto Protocol* and the Montreal Protocol and its amendments. Hungary has taken the first steps towards elaborating and implementing a *donor policy* that conforms to OECD principles.

However, Hungary did not have a comprehensive climate change strategy until recently. There has been insufficient integration of climate change concerns in sectoral policies (e.g. energy, transport). Hungary must be prepared to contribute to the challenging EU GHG emission reduction target by 2020. In early 2008, the Parliament adopted Hungary's National Climate Change Strategy 2008-25, and then the Energy Strategy 2008-20. Both strategies were discussed simultaneously to ensure coherence. *Emissions of VOCs and NO_x* increased in recent years: further control measures concerning polluting industrial and transport sources will be needed to meet the Gothenburg Protocol targets. Hungary's *capacities to enforce EU law* and to control

illegal movement of hazardous wastes, ozone-depleting substances and endangered species appeared insufficient in a number of cases. Ratification of the pollutant release and transfer register (PRTR) protocol is pending. Limited budgetary resources and cuts in human resources may endanger Hungary's implementation of international environmental commitments.

Recommendations:

- identify priority measures for mitigation of and adaptation to *climate change* based on an analysis of their cost effectiveness; ensure the co-ordinated implementation of the National Climate Change Strategy with energy, transport, agriculture and water policies;
- improve *energy efficiency*, especially for power plants, buildings and the transport sector;
- further contribute to the development and effective implementation of bilateral and multilateral co-operation, programmes and agreements, in particular focusing on protection of *transboundary watercourses*, prevention of *floods* in the Danube catchment area, and on assistance to prospective EU candidate countries;
- reduce *VOC and NO_x emissions* to meet the 2010 target set by the EU Directive on National Emissions Ceilings and the Gothenburg Protocol;
- strengthen *controls* for the transboundary movement of hazardous wastes, endangered species and ozone-depleting substances;
- increase *official development assistance*, and its environmental components.

ICELAND

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. IMPLEMENTING ENVIRONMENTAL POLICIES**
- 3. WATER AND WASTE MANAGEMENT**
- 4. LAND MANAGEMENT AND THE CENTRAL HIGHLANDS**

Part II
SUSTAINABLE DEVELOPMENT

- 5. ECONOMY AND THE ENVIRONMENT**
- 6. ENVIRONMENTAL-SOCIAL INTERFACE**
- 7. SECTORAL INTEGRATION: FISHERIES**

Part III
INTERNATIONAL COMMITMENTS

- 8. INTERNATIONAL CO-OPERATION**

REFERENCES

CONCLUSIONS AND RECOMMENDATIONS*

After sluggish growth in the early 1990s, Iceland's economic growth performance since 1994 has been one of the best in the OECD, averaging 4.5% in real terms and bringing Icelandic GDP per capita above the OECD average.

The economy depends heavily on Iceland's rich endowment in *natural resources*: the fishing industry on marine resources, the aluminium and ferrosilicon industry on hydropower and the tourism industry on nature and natural beauty. Fish exports and tourism development thus depend on a high-quality environment and a positive, "green" international image.

As Iceland is more sparsely populated than most other OECD countries, it does not suffer from the same order of pollution problems as many densely populated countries. Some *pollution issues* are nevertheless emerging: reducing pollution loading to water from municipal and agricultural sources, improving waste management, enhancing soil and nature conservation and controlling air emissions from increases in road traffic. These challenges largely reflect insufficient environmental infrastructure, together with changes in consumption patterns associated with recent increases in per capita income.

Concerning *international issues* and commitments, Iceland has a good record in transposing EU directives and in protecting the sea and areas of special natural value, but it needs to make progress in its implementation of these commitments, in reducing greenhouse gas emissions from transport and fisheries, and in development aid.

Thus it is all the more necessary for Iceland to: i) further implement environmental policies and strengthen its environmental infrastructure; ii) better integrate environmental concerns into economic decisions; and iii) reinforce international environmental co-operation. This report examines progress made by Iceland *since the previous OECD environmental performance review* in 1993, and the extent to which Iceland's *domestic objectives and international commitments* are being met, based on environmental effectiveness and economic efficiency criteria. A number of recommendations are put forward that could contribute to strengthening the country's environmental performance.

1. Environmental Management

Implementing environmental policies

Since the early 1990s and the first OECD environmental performance review of Iceland, the *Ministry for the Environment* has extended the scope of its responsibilities, among which are now: pollution prevention and control, nature protection, physical planning and meteorology. Staffing of the ministry and of the agencies operating under its auspices has increased. Regional public health inspectorates have been created to facilitate implementation of environmental policies. *Legislation* has been substantially

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting in November 2000.

enhanced: both environmental legislation, largely as a result of Iceland's participation in the European Economic Area (EEA), and land-related legislation, providing a framework for managing land resources and the central highlands. Significant progress has also been made in environmental impact assessment (EIA) and physical planning.

Implementing environmental policies, however, has proved difficult in many respects. *Licensing and enforcement*, which are shared between the Environment and Food Agency (EFA) for big firms and municipalities' health inspectorates for smaller ones, are lagging. Transposing EU environmental legislation has absorbed many resources at national level, while the small size of many local communities has complicated enforcement at municipal level, due to limited resources and possible conflicts of interests. *Industry* has only started using voluntary agreements, environmental management and eco-auditing. *Economic instruments* have been introduced (e.g. in fisheries and in hazardous waste management), but there is scope to increase their use (e.g. pollution charges, user fees for environmental services). There is a need for quantified *environmental policy objectives*.

Recommendations:

- pursue efforts towards revising and *implementing environmental legislation*, taking account of Iceland's EEA membership;
- strengthen *environmental licensing and enforcement*, e.g. by strengthening government inspection and environmental management by companies, and by ensuring that inspection fees cover inspection costs;
- define quantified *environmental policy objectives*;
- increase the use of *economic instruments* in pollution prevention and control and in nature conservation;
- stimulate environmental management initiatives by *industry*;
- assure timely implementation of the *physical planning* functions of municipalities.

Water and waste management

Icelandic inland and coastal waters are generally of *good quality*. Pressures on water quality mostly relate to point sources. *Waste water treatment plants* (primary treatment only) have been or are being built to deal with greater Reykjavik's municipal waste water, in response to Iceland's international commitments in the EEA, and investments are being made in rural areas to combine sewers and build outfalls for disposal at sea. *Cost recovery* on these investments is relatively low, however; prices for water supply are also low by international standards. Volumetric waste water charges might be introduced to cover increasing waste water expenditure. Intensive livestock production units increasingly threaten inland waters, as slurry is not allowed to be disposed of directly at sea; *nutrient* management plans should be introduced for pig farms and, more generally, the impact of agriculture on water quality should be monitored more closely.

In line with national objectives of the early 1990s, good performance has been achieved in recycling *waste* from households (e.g. beverage containers), closing unsatisfactory municipal landfills, introducing a hazardous waste charge (1996, based on producer responsibility) and achieving a high rate of recovery of hazardous waste (mostly

waste oil from the fishing fleet and other sources). The intent to extend this experience to other waste streams, especially packaging, end-of-life vehicles and old tyres, has been expressed. However, there is a need to promote cost recovery in municipal waste management, to better finance waste management services and to provide appropriate incentives. Most municipal waste still goes to landfill. A waste management bill is being drafted and municipalities are preparing or implementing regional waste management plans. There is a potential for increased private sector participation and investment in waste management.

Recommendations:

- continue investing in *waste water infrastructure*;
- apply the user pays principle in *pricing for waste water services* to households and industry, e.g. through volumetric pricing;
- introduce nutrient management plans at farm level for *intensive pig and poultry production*;
- adopt, as soon as possible, comprehensive *waste management legislation*;
- extend *producer responsibility* to packaging waste, end-of-life vehicles and old tyres;
- complete licensing of all landfills and incinerators as soon as possible, charge for *landfill waste disposal* and continue to develop modern municipal waste treatment.

Land management and the central highlands

Concerning *soil erosion*, Iceland has implemented projects to halt erosion in many of the most severely affected areas. Sheep grazing has declined as agricultural policy and shrinking markets for mutton and lamb have resulted in a halving of the number of sheep since 1980. Incentives have been provided to farmers to engage in land reclamation and afforestation. Information programmes on soil conservation and range management have been put in place. Concerning *nature conservation*, much progress has been made recently in establishing a legal and institutional base; government support to drain wetlands has ceased. In recent years, a legal framework has been put in place to assure the *sustainable development of the central highlands* (e.g. by specifying municipal boundaries, defining land ownership and related rights, planning infrastructure and conserving nature) and a regional plan has been adopted for the highlands, dealing with: protected areas; traditional uses such as grazing, fishing and hunting; energy resources; tourism and recreation; roads; and sanitation. A national master plan for hydro and geothermal resources is in preparation.

However, large areas of the country remain vulnerable to further *erosion* and overgrazing, and pressure from horse grazing has increased in the lowlands. There is a need to quantify policy objectives in soil conservation and to introduce new measures to enhance the role of local stakeholders. Concerning both *nature conservation and the management of the central highlands*, the legal framework and policies adopted need to be implemented. Most newly protected areas are small; larger wilderness areas and landscapes should be protected, a concern addressed by the 1999 Nature Conservation Act. Ranger staff and management plans are insufficient or lacking in most national parks and other protected areas. Red lists have been issued for birds and vascular plants and should be developed for other species. *Tourism* greatly increased in the 1990s and with it

the need to manage the pressures it puts on nature, as well as to finance additional facilities and rangers at the most popular natural sites. The *central highlands* should benefit from the current process of defining land ownership by 2007 and from planning efforts such as the regional plan for the highlands, municipal and local plans, and master plans for energy resources and tourism.

Recommendations:

- streamline soil conservation policy objectives by defining *quantitative targets for sustainable land use, soil reclamation and vegetation cover*;
- regulate *livestock density* based on the carrying capacity of soils, as defined by the Soil Conservation Service, for both sheep and horses;
- follow up on the 1997 survey of *soil erosion* by identifying the various pressures and potential policy responses;
- continue to implement the new legal framework and regional plan for the *central highlands* and increase the responsibility of local stakeholders in land reclamation by clarifying communal and individual *land ownership and user rights* in the highlands;
- extend *protected areas* significantly as regards wilderness and landscape protection (e.g. in the central highlands and coastal areas); prepare and implement *management plans* in all national parks, and extend red lists to cover all relevant species in Iceland;
- increase ranger staff and funding for *nature conservation*, e.g. by applying the user pays principle to the tourism sector, inter alia, through fees and levies on visitors to protected areas;
- diversify farm income by promoting *agro-tourism* and farm forestry.

2. Towards Sustainable Development

Economy and the environment

Iceland's economy relies heavily on *natural resources*; the fishing industry depends on marine resources, industry on hydropower, and tourism on nature and related resources. Iceland has achieved a high rate of economic growth in recent years. Some weak *decoupling* of economic growth from environmental pressure is occurring; for example, energy intensity has fallen since 1990, and SO_x and NO_x emissions are growing more slowly than GDP. There has also been a degree of progress on pollution management. Some environmentally favourable changes in *consumption patterns* have been induced, notably the switch from oil to geothermal energy for domestic heating. Iceland has also made progress towards sustainable management of natural resources. Framework conditions (e.g. regarding land ownership rights, municipality boundaries, procedures for planning and building infrastructure, and regional long-term planning) have been established to assure better use and protection of the natural resources of the *central highlands*. The *fishery management system* (individual transferable quotas coupled with better regulations) has enabled fish stocks to recover and produce good economic returns. The National Environmental Strategy, "*Towards Sustainable Development*", was published in 1993, followed by the National Sustainable Development Action Plan in 1997. The Ministry for the Environment has begun regular co-ordination meetings with several other ministries, local authorities and other stakeholders.

However, *implementation* of the sustainable development strategy and action plan has been patchy. Most ministries and local governments continue to give much more attention to economic considerations, and *integration of environmental factors* in sectoral and economic policies is limited. In some sectors, such as transport and tourism, environmental pressures are increasing and more coherent strategies are needed to address them. Iceland would benefit from improvements in *sustainable natural resource management*, further strengthening of the fishery management system and further reduction of farm support. The *environmental management* industry remains weak. The government is not promoting reduced energy and material intensity in industry, and the implementation of its "green government" policy is patchy. *Taxation policy* has been developed without taking full account of environmental issues, and use of *economic instruments* for environmental policy is limited. While EEA membership and EU environmental directives constitute a major driver for environmental policy improvements in Iceland, their translation and adoption into Icelandic legislation has dominated administrative attention, and their implementation has just started. *Environmental expenditure* remains low.

Recommendations:

- translate national sustainable development commitments into *integrated policies and programmes* in key economic sectors (e.g. fisheries, agriculture, energy, transport and tourism), with targets and timetables;
- further implement mechanisms to encourage *better interministerial co-ordination and co-operation* related to sustainable development;
- review the environmental effects of the *tax system*, integrate environmental concerns in fiscal policies and expand the use of economic instruments for environmental management;
- further increase public and private *environmental expenditure* so as to expand environmental infrastructure, implement national laws and translate international commitments into reality;
- encourage private companies to improve *environmental management standards*, and implement "Environment Policy in Government Operations".

Environmental-social interface

In line with a very long *democratic tradition*, Iceland has developed its environmental policies in consultation with relevant stakeholders. The 1997 National Sustainable Development Action Plan was drawn up *with participation of all relevant societal groups*, and a Local Agenda 21 process has been started in co-operation with the public. For the many environmental issues, institutions have been created for complaint and appeal: everyone has the right to go to court in environmental matters, though little use has been made of this possibility so far. However, since Rio, only one comprehensive state of the environment report has been published. *Environmental information* (environmental data, indicators and state of the environment reports) should be issued regularly to inform the public about the environment and give an accounting of the country's performance with respect to its own environmental objectives and commitments.

Much emphasis is given to the role of *environmental education* in sustainable development. By 2000, environment had been made part of the curricula for all levels of education (pre-school, compulsory primary and lower secondary, upper secondary, university), and implementation of this decision has started. *Public environmental awareness* was last measured in 1993. More regular national surveys of environmental awareness and public priorities are needed. The ways in which the public can contribute to sustainable development need to be further clarified and promoted. *Consumption patterns* are influenced by environmental information and awareness, as well as by price signals. A recent tax measure for the largest cars has given wrong signals to the public in the form of reduced incentives for fuel economy. Charges relating to water and waste only partly cover costs.

Available information does not indicate any "*environmental injustice*" with regard to exposure to pollution. The government's policy is to strengthen *regional development* so as to promote population growth outside the Reykjavik area. Through enhanced co-operation with local authorities and among communities, measures are taken to adjust regional development to changing economic circumstances in accordance with principles and objectives of sustainable development. A more integrated approach to industrial policy, regional development and environmental issues could prove useful, however. The effects of the *fishery management system* on regional development and income distribution are under active discussion; efforts should be made to enable the fishery management system to better address its social objectives.

Iceland has a high rate of volcanic and seismic activity and experiences landslides and avalanches. *Preparedness and mitigation measures* for natural disasters and environmental emergencies have been implemented. Considerable effort has been made in this field.

Recommendations:

- improve public access to *environmental information* by publishing periodic *state of the environment reports*, environmental data and indicators showing the progress made towards goals and targets;
- regularly carry out national surveys of public *environmental awareness*, and build consensus about environmental policies and their implementation;
- develop the use of environmental information and economic instruments to provide appropriate *signals to consumers*;
- further research the *social consequences of the fishery management system* and develop the decision making process so as to achieve the social objectives of sustainable fishery management;
- adopt a new *national plan for sustainable development*, with economic, environmental, social and regional dimensions, a long-term perspective and appropriate objectives and targets, based on extensive consultation;
- adopt a national spatial plan on land use, co-ordinated with the sustainable development plan.

Sectoral integration: fisheries

Icelandic fishery management in the past decade is a *success story*, as *fish stocks* have recovered and produced good *economic returns* for large segments of the fleet. Icelandic fishery management authorities have greatly improved the regulatory base, with *total allowable catch* (TAC) and related rules (no discard, gear rules, closure of fishing grounds). Since the introduction of the cod catch rule in 1995, stakeholders know the rules of the game, and pressure to increase TACs above what the scientific advice prescribes have ceased. The *individual transferable quota* (ITQ) system has had positive effects on the fishing industry: most stakeholders in the industry have benefited from the related economic results, and the quota exchange has stimulated efficiency and added transparency. Iceland has played a key role in advancing *bilateral* and *multilateral regional fishery agreements* that will help ensure long-term sustainable yields from the fish stocks concerned.

However, the system could be further improved and extended. The small-scale fishing fleet should be fully incorporated into the ITQ system. Catch rules could be extended to include *additional commercial stocks*. With respect to *environmental objectives*, better knowledge and management of the marine ecosystem (e.g. species interdependency, sea bed protection), is needed, as is control of the fishing fleet's air emissions (e.g. CO₂) and of fish processing effluents. It is important to increase transparency and consultation on the *allocative and distributional issues* involved in the fishery management system to broaden its acceptance and strengthen its benefits to Icelandic society. More research is needed on the long-term economic consequences of the system. The strategy for sustainable fishery management requires further development to assure coherence of environmental, social, territorial and economic objectives. In particular this relates to the regional distribution of landings and processing, which form the economic mainstay of many local communities. Overall, more *institutional integration* is needed to address the economic, environmental and social dimensions of the sustainable management of fisheries.

Recommendations:

- continue the more stringent approach to TAC setting adopted with the introduction of the *cod catch rule* in 1995, as well as associated technical regulations (e.g. closure of fishing grounds, net size regulations);
- adopt and implement catch rules similar to the cod catch rule for *other species* as appropriate, taking into account their biology and their value for the future of Icelandic fisheries;
- undertake further analysis of the economic, social and environmental implications of the *ITQ system* in the light of the latest evidence and experience;
- fully incorporate *small vessels* into the ITQ system;
- integrate *environmental concerns* in fishery policies and practices, including improved management of marine ecosystems, control of CO₂ emissions from the fishing fleet and reduction of effluents from fish processing;
- further develop and implement the *strategy for sustainable fishery management*, ensuring the coherence of environmental, social and economic objectives.

3. International Co-operation

Achievements

Iceland is closely associated with European countries as a member of the Nordic Council and the EEA, and it has close ties with North American trading partners. Its economy is highly dependent on exports of fish and development of tourism, two sectors that require a high-quality environment and a positive, "green" image. Iceland developed its environmental policy at a fairly late stage but made significant progress in the 1990s, in particular by *transposing many EU directives* into its legal system and giving legal status to its international commitments. It has ratified and implemented many international agreements, and it hosts the secretariats of two working groups under the Arctic Environment Protection Strategy.

Iceland has consistently acted to ensure greater *protection of the seas*. In particular, it has promoted the adoption of a regional convention on *persistent organic pollutants* and is seeking the adoption of a worldwide convention on the topic. Its main aim is to ensure that consumers continue to see fish products as healthy and attractive and that the sustainability of the oceans, in particular the coastal zone, remains intact. At national level, Iceland has undertaken a wide-ranging study of invertebrates in its exclusive economic zone and measured the (very low) level of pollution of its waters. It has strengthened its response capability in case of an *oil spill* and has become a party to international agreements on oil spill prevention and preparedness.

Iceland is a party to only a few international agreements on *transboundary air pollution* but, as a member of the Nordic Council, has agreed to reduce its emissions of volatile organic compounds. Good progress has been achieved in this area.

The country's unique *natural parks and protected areas* are great tourist attractions. Iceland has stepped up protection of wetlands under the Ramsar Convention and announced its intention to protect a larger part of its territory. Its carbon sequestration programme through revegetalisation has made considerable progress, and significant reduction in industrial greenhouse gas (GHG) emissions has been achieved.

Areas for progress

While Iceland's international obligations and responsibilities are considerable, its population is small. In addition, public environmental awareness is fairly recent. Thus there are *significant gaps* in its international co-operation programme caused by insufficient staffing and financial means. Its commendable transposition of EU directives needs to be followed up by greater effort at local level to *implement the resulting legislation* and carry out related data collection. The significant steps taken to inform the Icelandic public need to be supplemented by similar efforts geared towards the international community in order to publicise Iceland's achievements in fulfilment of environmental policies, its goals and objectives for future action, the state of its environment and the measures taken to implement new policies.

As Iceland seeks international support for its creative policies aimed at *sustainable use of its own natural resources*, it will need to give wider publicity to its efforts to protect its natural environment and to its special contribution to climate change policies, in particular through carbon sequestration. So far, Iceland has not taken

extensive or far-reaching measures to reduce *GHG emissions from transport or the fishing industry*. Excluding new and expanded energy-intensive industry (using renewable forms of energy), it may be assumed that net CO₂ emissions will have been stabilised in 2000 at the 1990 level, in line with the national commitment. So far, Iceland has not agreed to become a party to the Kyoto Protocol. Its gross *GHG emissions in 2010 are likely to be well above the 1990 level*. Measures taken so far to reduce CO₂ emissions from transport and fisheries have been rather limited and could be strengthened, especially if Iceland wants to carry out a climate change policy with ambitious goals. Participation of all societal members and stakeholders in implementing such a climate change policy would be needed.

Iceland's per capita NO_x emissions are considerably higher than the OECD average, the main reason being the large fishing fleet. They were supposed to be stabilised at the 1990 level, but are at present higher. On the other hand, they have been slowly decreasing in recent years, mainly because of the use of catalytic converters, despite the car fleet growth.

Although Iceland is well aware of the global dimension of environmental problems and of the need to help developing nations play a part in their solution, its contribution to *development aid* is, in relative terms, *among the lowest* for all industrialised countries and about four times below the level that the Icelandic Government said in 1993 was to be reached by 2000. Thus Iceland's bilateral aid is quite limited. Concerning multilateral aid, Iceland is not contributing to the Global Environment Facility, though it supports environmental projects in line with its foreign policy.

Recommendations:

- develop and implement a meaningful programme of measures, in consultation with all stakeholders, to *reduce GHG emissions from transport and fisheries*, while seeking international support for the greater use of industrial processes based on clean and renewable energy sources;
- develop knowledge and promote understanding for a policy of *sustainable utilisation of all marine resources* without compromising the future of any marine species;
- implement the newly transposed EU directives and *collect necessary environmental data* to meet international commitments;
- develop policy to protect *Ramsar sites* and natural parks of outstanding interest, with a view to maintaining the integrity of the Icelandic wilderness;
- *combat* soil erosion and land degradation and *create carbon sinks* through revegetalisation;
- increase official development assistance, to reach the OECD-DAC average;
- complete the national report on biodiversity.

IRELAND

1. CONCLUSIONS AND RECOMMENDATIONS

Part I

ENVIRONMENTAL MANAGEMENT

- 2. AIR**
- 3. WATER MANAGEMENT**
- 4. WASTE**
- 5. NATURE MANAGEMENT**

Part II

SUSTAINABLE DEVELOPMENT

- 6. ENVIRONMENT-ECONOMY INTERFACE**
- 7. ENVIRONMENTAL-SOCIAL INTERFACE**

Part III

INTERNATIONAL COMMITMENTS

- 8. INTERNATIONAL CO-OPERATION**

REFERENCES

CONCLUSIONS AND RECOMMENDATIONS*

This report examines Ireland's progress since the previous OECD Environmental Performance Review in 2000, and the extent to which the country has *met its domestic objectives and honoured its international commitments*. The report also reviews Ireland's progress in the context of the OECD Environmental Strategy for the First Decade of the 21st Century.** Some 38 recommendations are made that should contribute to further environmental progress in Ireland.

In 2000-07, Ireland *sustained the high rate of economic growth* that began in the mid-1990s; GDP growth averaged nearly 6% annually, well above the OECD and euro area rates. Once among the least developed Western economies, with high levels of economic emigration, in 2008 Ireland enjoyed the third highest per capita GDP in Europe. However, *Ireland's economy sharply slowed in late 2008*, due to the collapse of the construction sector, reduced private consumption and weak exports linked to the international economic downturn. The scope for fiscal stimulus is very limited in Ireland, which is one of the few OECD countries (with Hungary and Iceland) that have *tightened fiscal policy* in early 2009.

The crisis represents a challenge for maintaining environmental commitments. It also presents opportunities to reassess and reform those policies that are both economically costly and environmentally damaging. *Environmental policy priorities* include reducing greenhouse gas emissions in a comprehensive and cost-effective way, further enhancing water infrastructure and waste management, and strengthening nature protection.

To meet these *challenges*, Ireland will need to: i) strengthen its environmental management efforts; ii) further integrate environmental concerns into economic decisions; and iii) reinforce international co-operation on environmental issues.

1. Environmental Management

Strengthening the implementation of environmental policies

Ireland's environmental planning framework expanded significantly during the review period. Well-defined, ambitious objectives were established and efforts made to provide the means to achieve them. *Ireland's regulatory framework* was upgraded and brought into closer conformity with EU requirements. The 2003 *Protection of the Environment Act* strengthened regulation of activities most harmful to the environment and extended the scope of licensing to meet EU requirements for integrated pollution prevention and control (IPPC). *Other areas of legal reform* included biodiversity and wildlife protection, strategic environmental assessment (SEA), and air, waste and water

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting in October 2009.

** The objectives of the OECD Environmental Strategy 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).

management. The main *government agencies dealing with the environment* – the Department of the Environment, Heritage and Local Government (DoEHLG) and the Environmental Protection Agency (EPA) – enlarged their portfolios and staffing. The Environmental Enforcement Network, established in 2003, provides a mechanism for concentrating resources and promoting co-ordination and coherence across administrative divisions. *Economic instruments* have been introduced, especially in the waste sector. The revenue they generate supports infrastructure development and compliance promotion campaigns through the Environment Fund. *Voluntary approaches* by business and industry, especially regarding air and waste, have led to increased recycling, reduced air pollution and the promotion of eco-innovation and energy efficiency.

Recommendations:

- maintain the *commitment to meet the objectives* in the main environmental policies and programmes, in spite of the difficult economic context, by increasing cost-effectiveness of environmental policies and providing adequate funding for environmental infrastructure;
- maintain recent efforts towards harmonisation of Irish *environmental legislation* with EU directives and promote implementation, particularly regarding environmental impact assessment;
- consider how best to consolidate environmental regulations into a coherent framework with the aim of simplifying and clarifying requirements and promoting better compliance;
- in the context of the ongoing review of local governance, examine the *environmental responsibilities of different administrative levels* to identify opportunities for better co-ordination, economies of scale and improved policy development and implementation, e.g. as regards provision of water services and establishment of waste management infrastructure;
- review the Irish National Roadmap for the Implementation of the EU Environmental Technologies Action Plan, building on current initiatives, with a view to strengthening *incentives for eco-innovation*.

However, Ireland continues to face some implementation problems, in particular regarding surface and groundwater quality, waste management, and nature and biodiversity protection. The *lack of enforcement capacity in smaller municipalities* has been an important impediment. In spite of recent accelerated efforts, more needs to be done to *harmonise the environmental regulatory framework with EU legislation*. The environmental legal system lacks coherence. The European Court of Justice (ECJ) has delivered judgements against Ireland for not transposing EU regulations into national law and for otherwise failing to meet EU requirements. In 2006, the number of procedures brought by the European Commission against Ireland for infringing EU environmental directives was among the highest in the EU. Particular problems have involved the application of environmental impact assessments (EIAs) for projects in sensitive areas. The use of *economic instruments* has not been extended in the water sector, which relies on state budget transfers for investment and operations. Further opportunities for market-based approaches exist in air, biodiversity and waste management. More could be done to promote *environmental management in enterprises*, especially small and medium-sized companies. *Public expenditure for environmental protection* has increased significantly, but still represents a relatively small share of GDP. While a large part of

Ireland's public environmental expenditure takes place at local level, local authorities have limited fiscal autonomy. The *economic crisis* and large budget deficit impose serious constraints on government action and put at risk Ireland's ability to meet its environmental commitments.

Air

Following major reductions since 2000 in emissions of SO₂ (-61%) and *non-methane VOCs* (-17%), Ireland is on track to meet the relevant 2010 EU targets. The National Emission Ceilings (NEC) Directive target for *ammonia* emissions was achieved in 2001. Emissions of particulate matter (PM) have been substantially reduced in urban areas, and emissions of *CO and toxic contaminants* have decreased. *In all major sectors generating air pollutants, reductions have been made* as a result of i) a substantial shift from heavy fuel oil to natural gas in electricity generation and industry, ii) reductions in the sulphur content of fuel oil and gas oil, iii) decreased use of coal and peat in the residential sector and iv) application of catalytic controls and other technology in cars. *Voluntary agreements* between central authorities and the private sector significantly reduced the sulphur content in coal and petroleum coke for heating. *Urban air quality* complies with all standards for SO₂, NO_x, lead, PM₁₀, CO, ozone and benzene. EU requirements for levels of cadmium, lead, arsenic, nickel and polycyclic aromatic hydrocarbons (PAHs) in ambient air have been met. *Air quality monitoring* has improved, including recent requirements for small particulates, heavy metals (arsenic, cadmium, mercury, nickel) and PAHs. *Pressure on air quality from transport* has been reduced, especially in Dublin, through investment in light rail (tram and train networks), tunnels and bypasses. *Vehicle standards* have gone into effect: the share of inspected vehicles violating emission standards remains low and the availability of cleaner fuels has increased. *A long-term Transport 21 strategy and an ambitious Sustainable Travel and Transport Action Plan* have been adopted to promote sustainable mobility and access.

However, the decrease in *NO_x emissions* is very slow and Ireland, along with many other EU Member States, will face considerable difficulty in meeting the NO_x emission target of the NEC Directive. The installation of flue gas desulphurisation at the Moneypoint coal-fired electricity station, which is expected to bring national emissions of SO₂ below the 42 000 tonne 2010 ceiling, has yet to be completed. Ireland has not yet ratified the Stockholm Convention on persistent organic pollutants (POPs) or the Aarhus Convention protocols on POPS and heavy metals. To facilitate ratification, revised emission inventories of POPs and heavy metals have been finalised and reported in 2009. Some policy recommendations of the *2000 public transport strategy for Dublin* have not been implemented, most notably improvement of the bus service, integrated ticketing and facilities for cycling and walking. Property and land taxation, combined with land use planning procedures that are not integrated with investment in public transport infrastructure, have led to considerable *urban sprawl* and growing reliance on cars in urban and, increasingly, rural areas. Most *freight* is now carried by road, which increases air pollution pressures.

Recommendations:

- implement additional measures to *reduce NO_x emissions* in order to achieve current and forthcoming NEC Directive requirements; consider how these requirements could be achieved most cost-effectively among the relevant sectors;
- complete *retrofitting of the coal-fired Moneypoint power plant* to reduce SO₂ emissions; carry out *further investment in combined heat and power installations* in the industrial, commercial and service sectors; and ensure compliance of large combustion plants with requirements of the National Emissions Reduction Plan;
- ratify the *Stockholm Convention on POPs and the Aarhus Convention protocols on POPs and heavy metals*;
- implement the 2009 *Sustainable Travel and Transport Action Plan*, particularly measures to improve public transport in urban areas; assess how road pricing/congestion charges could contribute to achievement of the plan's objectives; and reinforce programmes to support public transport options in rural areas;
- *develop measures to better link land use and transport planning* with a view to controlling urban sprawl.

Water

Ireland generally enjoys *good biological quality in its rivers*, lakes and in-shore and marine waters. A small improvement in the biological quality of rivers and lakes has been observed in recent years. Substantial *investments in drinking water and wastewater treatment infrastructure* were made since the 2000 OECD review. As a result, the compliance rate with the EU Urban Waste Water Directive rose from 25% to 92%. Treatment plants removing nutrients now serve most eutrophication-sensitive areas, as the directive requires. More than 99% of drinking water supplied by public utilities meets health standards. Ireland has also improved the institutional arrangements for water management: a *new water services law* and more than a dozen new regulations (most transposing EU directives) have been adopted. The role of the Environmental Protection Agency in making sure local government carries out its water-related functions has been strengthened, including through good monitoring systems and a national auditing system producing comprehensive, publicly accessible summary reports. Ireland has met all deadlines to date for *implementing the Water Framework Directive*. A new approach to minimising flood risk is being put in place.

Nevertheless, the rate of progress so far is unlikely to prove sufficient to meet the Water Framework Directive goals for 2015. *Nitrogen levels in rivers and groundwater* are still on the rise in many areas. There has also been a rise in the trophic status of rivers. The clean-up of point sources of nutrients has been compromised by tardy implementation of the Nitrates Directive, which improved only after a judgement by the ECJ in 2004. Bacterial contamination is an issue for groundwater used as drinking water supply. Despite the high compliance rate with drinking water health standards, problems persist with *bacterial contamination in many group water schemes* serving small settlements. The city of Galway experienced outbreaks of cryptosporidium in 2002 and 2007, and old lead pipes cause unacceptably high lead levels in more than a few towns. Ireland still has an uncommonly high leakage rate from its urban supply systems despite recent improvements. Moreover, the country will not be in full compliance with the Urban Waste Water Directive until 2011, six years late. Many sewage treatment stations have a poor record regarding statutory effluent limits, and there is no inspection regime for septic

tanks. A fundamental and politically sensitive issue in Irish water policy is *pricing household consumption of water*; the absence of household water charges impedes the development of an economically, environmentally and socially efficient water services sector.

Recommendations:

- further consolidate *water-related legislation* into a coherent framework;
- consider establishing *dedicated river basin agencies* to implement the Water Framework Directive;
- introduce *water pricing for households*, in a way that takes account of environmental, economic and social considerations;
- strengthen measures to achieve “good” *quality status, at least, for Irish waters* by 2015, paying special attention to eutrophication; improve protection of drinking water sources;
- further integrate water quality and flood risk management considerations into *spatial planning and development management processes*.

Waste

The 1998 and 2002 *national waste policy statements* and the 2001 amendments to the Waste Management Law established ambitious targets and introduced measures for improved waste management. *A number of targets were met in advance of their due dates*, including the 2010-11 targets for recovery of paper, cardboard, wood and packaging waste, and the 2013 targets for recovery of construction and demolition waste and municipal waste. *Large-scale illegal waste dumping* has been eliminated through a mix of measures, such as widening kerbside collection of household waste, setting up a specialised EPA enforcement office and introducing complaint procedures and sanctions. *Agreements between industry and the government* on end-of-life products and improvements to the infrastructure for collecting recyclable waste from households have helped increase recycling rates for glass, wood, chemicals, electrical and electronic equipment, tyres, batteries and plastic. Rationalisation of waste planning and management, including the establishment of *ten waste management regions* (down from 34 previously), and the introduction of *economic instruments* (volume-based waste collection charges, and landfill and plastic bag levies) have helped reduce landfilling. *Revenue* from these instruments has helped intensify waste prevention and recovery measures and awareness-raising campaigns in the context of the wide-ranging 2004 National Waste Prevention Programme. *Closure of landfills* not meeting EU standards has been completed. *Recent initiatives*, notably the 2006 National Strategy on Biodegradable Waste, the 2008-12 National Hazardous Waste Management Plan and the 2007-11 Market Development Programme for Waste Resources, have set out a framework for increasing waste collection and recycling.

Except in manufacturing, however, waste generation has not been decoupled from economic growth. The amount of *construction and demolition waste* increased during the review period in line with rapid housing and infrastructure development. *Municipal waste* generation grew in line with population growth and final private consumption, and per capita waste generation remains among the highest in the OECD. Accelerated implementation of the *National Strategy on Biodegradable Waste* is now urgent following four-year derogations from the 2006 and 2009 EU Landfill Directive

targets. *Hazardous waste* has been on the increase and around 10% is classified as unreported, most likely being mixed with municipal refuse. Ireland continues to rely substantially on *foreign infrastructure for recycling and disposal*, sending abroad over 80% of the total waste and almost half of the hazardous waste generated. Despite improvement, *municipal waste collection* is fragmented and not adequately regulated. Some households still engage in *illegal backyard burning and fly-tipping*, and new legislation has been introduced in 2009 to address the issue of backyard burning. Although recovery has increased, waste management still depends heavily on *landfilling*, and Ireland is far from achieving the 2013 target of diverting 50% of household waste from landfills. The *mechanical-biological treatment capacity* is insufficient for residual waste. A comprehensive review of waste management policy, launched in 2008, should assist in setting priorities for a revitalised approach to waste management.

Recommendations:

- reinvigorate implementation of the *National Waste Prevention Programme*, in particular priorities identified under its 2009-13 Prevention Work Plan; improve co-ordination of *regional waste management plans* to achieve national waste targets more efficiently, in particular those for biodegradable and hazardous waste;
- extend *producer responsibility initiatives* to cover a wider range of end-of-life products;
- extend *waste collection programmes* further to cover as many properties as feasible; accelerate the roll-out of programmes for separate collection, giving priority to organic and hazardous waste from households and commercial activities;
- strengthen provisions in *contracts and licences for waste management operations* so that all service providers, public or private, have the same obligation to meet high delivery and quality standards; consider transferring the regulatory and monitoring authority for waste management to regional or national level;
- accelerate implementation of the Market Development Programme for Waste Resources to increase *recycling of waste* and the use of recycled materials within Ireland; extend market-based mechanisms for waste collection, sorting and recovery to encourage private investment in waste recycling and treatment facilities.

Nature management

Ireland has adopted its *National Biodiversity Plan* and made good progress with many of the 91 actions the plan identifies. Ireland completed the designation process for terrestrial Special Areas of Conservation (SACs) under the Habitats Directive, and is expected to do the same for Special Protection Areas under the Birds Directive by the end of 2009. The *Natura 2000 network* would then cover 14% of the national territory. Some progress was made with the formulation of tentative management plans for Natura 2000 sites; some 45 had been approved by the end of 2008. Almost a dozen *species management plans* (e.g. for the otter) have been adopted and are being implemented with the active participation of Irish nature NGOs, which carry out some of the work on the ground. The National Parks and Wildlife Service and NGOs also co-operated on the reintroduction of three raptor species (golden eagle, red kite, white-tailed eagle). Ireland has taken a lead role in the Global Plant Conservation Partnership, having adopted its own strategy in 2006. The opening of a Biodiversity Data Centre in Waterford in March 2009 can be expected to lift Ireland's performance to a higher plane as regards safeguarding biodiversity. Agri-environmental measures have

been adjusted to give greater weight to biodiversity concerns and have produced some results. *Forestry policies* now encourage the planting of broadleaf species and incorporate guidelines for biodiversity protection.

However, nature protection has remained the poor relative of Irish environmental policy both nationally and locally. A 2008 review presented a disturbing picture of the *poor conservation status of many ecosystem types and species*, and suggested that the 2015 targets of the Habitats Directive will be hard to meet. The constituency for nature conservation is smaller than in most European countries and this may be partly to blame for the relative lack of support. The under-resourced National Parks and Wildlife Service has struggled to meet the workload resulting from the National Biodiversity Plan and EU nature directives. Many proposed natural heritage areas, as well as marine SACs, still await formal designation. Less than 1% of the territory qualifies for the two highest IUCN categories of protected area; just one ecosystem type (bogs) dominates the area protected in the six national parks and the 155 national heritage areas. Protection of the many Natura 2000 sites requires a far more active *monitoring and management* approach than is currently taken. Local authorities have often lacked the capacity (in terms of resources, expertise and access to information), or the motivation, to take up the challenge of the local biodiversity plans they are expected to formulate and implement under the National Biodiversity Plan. Biodiversity considerations receive too little attention in *local land use development plans*. The considerable spending on agri-environmental measures is not yet sufficiently harmonised with ecological needs.

Recommendations:

- speed up preparation of *detailed, time-bound management plans* for Natura 2000 sites and natural heritage areas, and implement them;
- improve consistency of the *Planning and Development Act* with the protection and enhancement of biodiversity outside protected areas (e.g. by establishing "green corridors" linking nationally and locally important biodiversity areas);
- improve integration of biodiversity concerns in *sectoral policies and projects*, including through rigorous implementation of SEA and EIA procedures;
- improve the match between spending on *agri-environmental measures* and ecological needs, e.g. by placing more emphasis on measures in or near Natura 2000 sites;
- continue efforts to adopt, resource and implement an *island-wide strategy on invasive alien species*.

2. Towards Sustainable Development

Integrating environmental concerns into economic decisions

From 2000 to the second half of 2008, Ireland enjoyed sustained and rapid economic growth. In this period, Ireland made progress in *decoupling* environmental pressures from economic trends, especially for transboundary air pollutants; CO₂ emissions increased, but at a lower rate than GDP (relative decoupling). *Energy intensity* was considerably reduced, and is now the lowest in the OECD. Material intensity also steadily decreased, reaching the OECD average. These changes were closely linked with the restructuring of the economy towards sectors with low energy intensity and high

added value. Governance for *sustainable development* was consolidated. Since 1999, Comhar, the Sustainable Development Council, has served as a multistakeholder forum providing independent advice to the government. The National Development Plans for 2000-06 and 2007-13 have contributed to Ireland's progress in areas such as public transport and environmental infrastructure. Several mechanisms have been regularly used to *integrate environmental considerations in decision-making* at macro and micro levels, including SEA and regulatory impact analysis. Concerning *energy*, measures have been taken to promote the use of renewables and to assist businesses and households in improving energy efficiency. Ireland is on track to achieve the EU and domestic targets on renewable electricity by 2010. Some environmentally related taxes were introduced or revised in the 2009 fiscal package designed to respond to the economic crisis. The vehicle registration tax and annual motor tax were restructured on the basis of CO₂ emission levels.

However, further measures are needed to make economic development and environmental protection more mutually supportive. The growth of energy consumption in the transport, residential and tertiary sectors has resulted in *CO₂ emissions per capita* well above the OECD Europe average. *Waste generation* per capita is among the highest in the OECD and continued to grow during the review period. Despite the decrease in total consumption of *nitrogenous fertiliser*, the intensity of use (per unit of agricultural land) is well above the OECD Europe average; meanwhile *pesticide* use increased. The National Sustainable Development Strategy has lost momentum; progress on *implementation* has not been constantly monitored. There is a need to *integrate further environmental concerns* into sectoral policies and practices, particularly in land use planning, agriculture and transport, and to enhance implementation capacity at local level. *Transport trends* are of concern, with a dramatic increase in road transport for both freight and passengers. Concerning *energy*, there is scope to implement targeted demand-side measures to achieve additional energy savings. *Tax rates on energy products* are relatively low compared to other OECD countries and have not been adequately adjusted to inflation. There is scope to eliminate various energy *tax exemptions* and *environmentally harmful subsidies*, namely for electricity generation from peat and for domestic aviation, as well as to better target *transport-related taxes and prices* on vehicle use (fuel taxes and road pricing). Measures along these lines could help relieve pressures on the public budget and form part of the response to the economic crisis.

Recommendations:

- finalise the revision of the *National Sustainable Development Strategy*, make it fully operational with the introduction of targets, indicators and monitoring mechanisms, and assure consistency between it and existing sectoral policy frameworks;
- phase out *environmentally harmful subsidies* (e.g. for electricity generation from peat and for domestic aviation) and tax concessions (e.g. on coal and on fuel oil used by households and farmers) that create economic distortions and social inequity;
- replace some current taxes with appropriate environmentally related fiscal measures in the framework of a *comprehensive environmental tax reform*;
- realise the opportunities that have been identified to further improve *material productivity and energy efficiency cost-effectively*, for example in the residential, tertiary and transport sectors.

Integration of environmental and social decisions

Ireland has made progress in mapping and reducing adverse health effects of pollution, particularly those caused by urban air pollution. *Provision of environmental information* has improved through regular, high-quality state of the environment reporting and the operation of information centres. The creation of an independent Commissioner for Environmental Information under the 2007 regulations on access to environmental information, and the expansion of appeal procedures, strengthened *access to information and justice*. The establishment of an *environmental network* by NGOs and the government has enabled better co-ordination among environmental civil society organisations and facilitated more effective dialogue between NGOs and the authorities. Environmental training for teachers and the establishment of a regional centre on education for sustainable development have supplemented an already extensive network of Green Schools in widening *environmental education activities*. Numerous *environmental campaigns and green awards*, such as Tidy Towns, Green Flags and the Race Against Waste, have stimulated environmental awareness and initiatives at national and local level.

However, some *environmental health impacts* are still of concern: bacterial and heavy metal contamination of drinking water, air pollution from traffic and heating in urban areas, and exposure to naturally-occurring radon. Preparation of a *national environmental health action plan* to address these issues systematically and cost-effectively is long overdue. Historical *low participation of environmental NGOs* in decision-making may impede the way in which environmental sustainability is addressed in national development planning and infrastructure development. Current *regulations* contain *several provisions that may impede access to information*: the absence of a consistent and appropriate schedule of charges, the lack of a list of public authorities and the fee for appealing denial of requests for information to the Commissioner for Environmental Information. Remaining barriers to *access to justice by the public* still exist, including lack of administrative appeal procedures for projects covered by the Strategic Infrastructure Act, and prohibitive costs of legal proceedings in appeal and planning decisions. These prevent Ireland from ratifying the *Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters*.

Recommendations:

- complete the *national environmental health action plan*, focusing on the major environmental health risks, including those for children and other vulnerable groups; establish quantified targets that would enable the most important health benefits to be achieved, and identify cost-effective measures to address them;
- further improve *access to environmental information* by building capacity in public agencies on rights and obligations related to access to, and provision of, information; apply consistent and fair charges; abolish fees for appealing to the Commissioner for Environmental Information decisions that denied requests for information;
- make sure that Irish legal provisions for *public participation and access to justice* are consistent with the main requirements of the Aarhus Convention, with a view to the ratification of the Convention;
- promote broader *participation by NGOs* and relevant public organisations in the development and implementation of national and local development policies, programmes and projects.

3. International Commitments and Co-operation

Ireland has introduced a 3% *target for annual domestic greenhouse gas reductions* and an annual “carbon budget” to monitor progress. The government is committed to introducing a carbon levy that would apply to sectors outside the EU Emission Trading Scheme (ETS). By improving public transport services, the new transport policy released in February 2009 should help curb CO₂ emissions. A Cabinet Committee on Climate Change and Energy Security was established, chaired by the Taoiseach (Prime Minister). Since 1990, CO₂ emission intensity per unit of GDP has improved faster than the OECD Europe average and is now below that average. Ireland has made good progress in ratifying relevant *international agreements on marine pollution*. Ireland’s “pollution responsibility zone” is its exclusive economic zone, and Ireland is preparing accession to full membership of the Bonn Agreement to enhance co-operation on oil pollution preparedness and response. Steps have been taken to protect cold-water coral reefs from deep-water fishing off the west coast. *Co-operation with Northern Ireland* has been reinforced and extended to all-island issues (e.g. all-island electricity market, spatial planning). The North/South Ministerial Council was established and has met several times to enhance bilateral environmental co-operation, particularly on water quality and waste management. Good progress has been made on co-operation on nuclear safety issues with the United Kingdom. Ireland has built up a strong, internationally recognised *official development assistance* programme in which environment is one of four issues prioritised for mainstreaming.

Recommendations:

- implement the commitment in the 2007-12 Programme for Government to *introduce a carbon levy on sectors outside the ETS*, focusing efforts where further emission reductions can be achieved most cost-effectively;
- consider how payments under the *agri-environmental programmes* could be better linked to meeting the 2020 greenhouse gas reduction commitment;
- complete the preparation of a *national climate change adaptation strategy*, based on expected adaptation costs and benefits, and develop a plan for its implementation;
- speed up preparation of a *national contingency plan for pollution by oil and by hazardous and noxious substances*; increase the means of the Irish Coast Guard to effectively implement it;
- maintain the strong commitment to mainstreaming environmental concerns in *official development assistance*, including by helping partner countries undertake SEA on their development plans and strategies.

However, Ireland's *greenhouse gas emissions* in 2007 were 25% higher than the 1990 baseline, well above its EU burden-sharing target of 12.6% for 2008-12. Even taking the impact of the economic crisis into account, the distance to the Kyoto target is 1.3-1.8 Mt of CO₂ equivalent (CO₂e) per year. In a best-case scenario (i.e. including carbon sinks, applying additional measures and considering the reduction of activity in the economic downturn), emission projections in sectors outside the ETS still indicate a distance to target for 2020 of 2.7 Mt CO₂e a year. By 2020, projected agricultural and transport emissions would account for around 70% of total non-ETS emissions. The tax difference between diesel and unleaded gasoline has encouraged the sale of diesel-

fuelled vehicles, although CO₂ (and other air pollutant) emissions per litre are higher for diesel. Ireland has not yet prepared its *national contingency plan for pollution by oil and hazardous and noxious substances*; the Irish Coast Guard has very limited means to respond to either type of incident. Nor has enough been done to protect coastal waters from agricultural pollution: Ireland's national agricultural nitrogen balance has increased since 1990 (while it decreased in the OECD as a whole) and is now higher than the OECD average.

ITALY*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR MANAGEMENT**
- 3. WATER MANAGEMENT**
- 4. WASTE MANAGEMENT**
- 5. NATURE CONSERVATION AND BIODIVERSITY**

Part II
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- 6. ENVIRONMENT AND THE ECONOMY**
- 7. ENVIRONMENTAL-SOCIAL INTEGRATION**
- 8. SECTORAL INTEGRATION: TRANSPORT**

Part III
INTERNATIONAL COMMITMENTS

- 9. INTERNATIONAL CO-OPERATION**

REFERENCES

* Also available in Italian.

CONCLUSIONS AND RECOMMENDATIONS*

Italy has a large economy and a population of 57 million, concentrated on a relatively small territory, with strong regional disparities. *High densities* lead to strong environmental pressures which, together with the diversity and sensitivity of Italy's natural patrimony and its important cultural heritage, have made environmental protection a matter of serious public concern.

Priority environmental issues include urban air pollution, soil and water management, waste management, nature and landscape conservation, climate change, transport management, and protection of coastal areas and the marine environment. Measures to cope with hydro-geological risks (flooding, landslides and earthquakes) imply large central budget outlays. With its strong regional disparities, and the largest share of population over 65 years among OECD countries, Italy must find ways to achieve nationally balanced economic, environmental and social development. As a member of the European Union, it must comply with the high standards set out in EU environmental legislation. As a G-7 country, it must contribute to raising awareness of global environmental problems.

To meet this challenge, Italy will need to: i) improve its environmental infrastructure (e.g. for water supply, waste water treatment and waste treatment) and the efficiency of its environmental policies; ii) integrate further environmental concerns into economic and social decisions; and iii) reinforce its international environmental co-operation. This report examines progress made by Italy *since the previous OECD environmental performance review* in 1994, and the extent to which Italy's *domestic objectives and international commitments* are being met. It also reviews the country's progress in the context of the OECD Environmental Strategy**. Some 64 recommendations are made that could help strengthen Italy's environmental performance in a context of sustainable development.

1. Environmental Management

Implementing more effective and efficient environmental policies

In the last ten years Italy has met or almost met a number of its domestic objectives and international commitments (e.g. SO₂, heavy metals and POPs emissions, separate waste collection, nature protection, agri-environmental progress). It has also considerably strengthened its *national environmental institutions*, issued new environmental legislation, and further devolved environmental responsibilities to regional and local authorities while keeping responsibility for strategic planning and legal co-ordination at the central level. The human and budgetary resources of the Ministry of the Environment and Land Protection (MATT) have been increased very significantly;

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting in June 2002.

** The 2001 OECD Environmental Strategy's main objectives covered in the present Conclusions and Recommendations are: integrity of ecosystems (Section 1), decoupling environmental pressures from economic growth (Section 2), the social and environmental interface (Section 2), and global environmental interdependence (Section 3).

new directorates deal with sustainable development and protection from flooding, landslides and other natural disasters. The National Environmental Protection Agency (ANPA), which provides MATT with scientific and technical support, has been growing. There has been important *progress on environmental legislation* (e.g. water, waste reforms), mainly prompted by EU environmental directives. The competence of regions and local authorities with respect to environmental and land management has been strengthened during the *devolution process* (1997 Bassanini Act). Regional Environmental Protection Agencies (ARPAs) are being established to perform inspection and enforcement on request from regions. Some regions have begun to introduce integrated permitting for existing plants. *Enforcement* of environmental policies benefits from the actions of the Operational Unit for Environmental Protection of the Carabinieri, placed at the disposal of MATT; prosecution for violations of environmental legislation can rely on specialised judges and specific provisions in the criminal code (e.g. concerning water pollution, forest fires). *Environmental impact assessment* of projects, carried out at national level since 1989, has been an effective instrument. From 1996 all regions have been required to issue EIA laws, though today only half the regions have operational EIA procedures. The 1990s saw the development of *economic instruments* and *voluntary agreements*: measures were adopted to curb air pollution; a carbon tax was introduced in January 1999; implementation of new, tailored tariffs for waste collection and disposal is in progress in many parts of the country; and reforms are being implemented to improve water management. Eco-auditing schemes and eco-labelling have also been developed.

Recommendations:

- raise the level of *investment in environmental infrastructure* by fully disbursing funds allocated to MATT and by seeking additional private funding; increase the rates of environmental charges, non-compliance fines and inspection fees and generalise their use;
- evaluate the *cost-effectiveness* of the mixes of policy instruments in place (economic, regulatory, voluntary, land use planning);
- set *charges* at levels that create incentives and are in accord with the user and polluter pays principles, and explore the potential for pollution trading mechanisms;
- streamline the *legal environmental framework* and facilitate its implementation through setting clear environmental policy targets and implementation deadlines;
- complete the *establishment of ARPAs* and strengthen their role as the main monitoring and inspection bodies;
- further strengthen national EIA procedures and develop *regional EIA procedures* and IPPC permitting;
- strengthen the implementation of, and introduce environmental requirements in, regional *physical planning*, city master planning and building permitting.

However, the overall picture is mixed, as Italy has not met a number of its commitments or is not on the way to meet them (e.g. NO_x, NMVOCs, ammonia emissions, several water goals and targets, climate change, ODA). Transposition of EU legislation has often entailed significant delays. The IPPC Directive has not yet been transposed. Despite efforts made, the Italian legal framework remains too fragmented and complex. In many instances, taxes and charges have been set at a modest level and have had only modest environmental benefits. Cost recovery for water and waste services should be improved; progress needs to be made towards implementation of the *polluter pays and user pays principles*. There are important disparities in the environmental institutional capacity and the effectiveness of *regional and local authorities*. Many urban areas in southern Italy do not have city master plans. Some 15 to 20% of buildings are constructed without permits. Regions and provinces make little use of territorial planning for environmental purposes and risk management. An integrated approach to coastal zone management is lacking. There has been a relatively *low level of investment in environmental infrastructure*, possibly linked to delayed decisions associated with the devolution process and low spending capacity in the case of allocated funds.

Air

Italy has made very *significant progress* in improving air quality over the last ten years. While data from the 1990s are far from complete, exceedances of air quality standards for most major pollutants (e.g. SO₂, NO₂, CO) have generally decreased. This progress reflects mainly: i) the great strides made in reducing *emissions from electric power generation*, with the use of cleaner power plants (fuelled by natural gas and, increasingly, by renewable energy resources) and highly efficient combined heat and power plants; and ii) the reduction of emissions of all common pollutants by *industry*, including SO_x, NO_x, CO₂, VOCs from solvents, dioxins and furans, and CO. Italy's progress also reflects significant, though insufficient, reductions in transport sector emissions of NO_x, CO, VOCs and lead, despite large increases in total vehicle-kilometres travelled. Italy has met most (but not all) of its international commitments regarding air pollution, including those for SO_x in the Helsinki and Oslo Protocols and for NO_x in the Sofia Protocol.

However, much remains to be done. Many areas (e.g. urban ones) continue to have poor air quality, particularly with respect to *ozone and fine particulate matter*. Italy's cultural heritage is suffering from the impacts of air pollution. With a strong percentage contribution of total air pollution, *transport* is the sector most in need of further efforts. Italian regions have, with notable exceptions, largely failed to develop air quality plans as required under the 1988 Presidential Decree. Despite significant expansion, the *air quality monitoring* network remains uneven across the country (with unsatisfactory situations, particularly in the South) and for some pollutants (e.g. PM₁₀). Concerning *toxics*, time series are being developed for emissions of some air pollutants such as benzene, dioxins and furans, heavy metals and PAHs; estimates for other air toxics are not available. Under the *Gothenburg Protocol* (to be ratified) and EU Directive 2000/81 on national emission ceilings (to be transposed by the end of 2002), Italy's primary challenge will be reaching the targets for NO_x and VOCs.

Recommendations:

- take steps to reduce *ambient levels of particulate matter and ozone*, with emphasis on measures relating to transport;
- ensure implementation of existing legislation to measure and control *emissions of toxic air pollutants* from industrial sources, with a particular focus on those pollutants and sources that pose the greatest health risks;
- strengthen efforts to meet the targets of the Gothenburg protocols on reduction of emissions of *NO_x and VOCs*;
- complete and implement *regional air quality plans* to serve as primary evaluation and long-term planning tools; these plans should be explicitly and integrally linked to development of other regional and local plans (e.g. transport, energy, mobility);
- extend the use of *economic instruments*, such as emission trading schemes (especially for NO_x), and of *integrated pollution prevention and control* (e.g. plant-wide industrial permit limits);
- complete geographical coverage of the *air quality monitoring* network, extend monitoring of ozone and particulate matter, and improve quality assurance and control of monitoring techniques and data quality;
- accompany *liberalisation in the electricity and natural gas sectors* with strict implementation of energy savings objectives in these two sectors, as well as strict enforcement of the same air emission standards for new and existing power plants;
- promote further actions to develop the use of *renewable energy* in power plants.

Water

Legal provisions were made in the 1994 Galli Act for meeting the key objective of sustainable financing of water infrastructure development. Water legislation was consolidated in a 1999 Legislative Decree transposing key EU directives (e.g. urban waste water treatment, nitrates). *Optimal management areas (ATOs)* are being created within which different municipalities' *water and waste water services* will be consolidated, thereby improving efficiency. Consolidation of water services has begun with the creation of integrated water agencies, often involving direct concessions to companies owned by local governments. A *river basin* approach is applied to *flood and soil erosion* management; basin authorities are being created, and hydro-geological basin-level plans are being prepared that delineate areas subject to flooding and landslides. In northern Italy, efforts have been made to conserve or replenish water resources, especially in the Po river basin. In southern Italy, innovative demand management measures have been implemented to discourage water use exceeding crop requirements, and collective water supply networks have been established to promote industrial development. Pollutant discharges by the chemical industry have decreased. Bathing water has remained of high microbiological quality.

However, if water reform principles have been adopted (e.g. the Galli Act), *only a start* has been made towards putting them into operation. There has been little progress in meeting the key objective of *acceptable quality of all water bodies* set for 2008, primarily due to very limited investment in urban waste water treatment infrastructure. Milan and several other major agglomerations still do not have sewage

treatment plants. Inland water quality has deteriorated in major rivers and aquifers. Contamination by nitrates and pesticides remains of concern, though measures have recently been taken (delineation of vulnerable areas, introduction of a pesticide tax). Substantial *new funding* is required to cover the national deficit with respect to operating costs for water provision and waste water treatment, and to provide for much necessary investment. Specific provisions for such investments were included in the last financial law. Full cost recovery (of investment, operational and maintenance costs) would imply quite significant increases in water prices, which have remained very low by OECD standards. The public budget continues to subsidise collective irrigation schemes, including capital replacement. Low household water prices do not allow for necessary renewal of public water supply systems, and leakage is still high. There is a need to prepare economic analysis of how costs can be covered by tariff reform together with efficiency gains. *Intensity of water use* remains very high. There are still water shortages in the South, mainly resulting from both excessive groundwater abstraction for irrigation and high leakage in water networks. The right institutional framework is needed to address this problem; tradable water abstraction rights could be introduced as appropriate. *Watershed management plans* have not been approved. Regions should seek co-operation with river basin authorities on both water quantity and water quality planning, in line with the requirements of the new EU Water Framework Directive, yet to be transposed.

Recommendations:

- implement legislation according to the new EU Water Framework Directive and strengthen the role of *river basin authorities*;
- mobilise public and private investments to upgrade *urban waste water collection and treatment infrastructure*, in the context of the framework programme agreements between the State and the regions;
- speed up implementation of the Galli Act (e.g. application of *user and polluter pays principles*, consolidation of municipal water and waste water services within optimal management areas);
- implement statutory *water quality objectives* introduced by Legislative Decree 152/1999;
- implement demand management measures for *water resource conservation*, including stricter control of abstraction permits, and increase the use of treated waste water in irrigation;
- prepare *watershed management plans*, including both water quantity and water quality planning, in close consultation with the various stakeholders;
- strengthen prevention and mitigation measures concerning *flood management*; complete *hydrogeological risk plans* for all river basins;
- complete delineation of *areas vulnerable* to nitrate and pesticide pollution from agriculture.

Waste

With the 1997 Ronchi Decree, Italy transposed the EU directives on waste, hazardous waste and packaging waste. A number of specific objectives were adopted regarding *recovery of waste materials* and restriction of landfilling to pre-treated waste only; a waste accounting system was developed at national level. The regions were given responsibility for defining waste management plans to integrate waste collection, treatment and disposal in optimal management areas (ATOs), so as to overcome inefficiencies due to over-fragmentation of waste services. Separate *collection of "urban waste"* and material recovery increased steadily over the decade; in 1999 it almost reached the 15% target set by the Ronchi Decree. Data on "*special waste*" also show increased material and energy recovery, coupled with a decrease in landfill disposal. A private "consortium" was established to co-ordinate and stimulate the recovery and *recycling of different packaging materials*, with positive results (recycling costs are lower than in many other OECD countries). Significant increases have been recorded in the production of high quality compost from separately collected organic material. *Pricing of urban waste collection and disposal services* (intended to fully cover operating and investment costs on the basis of generated quantities) is being experimented with in a number of municipalities. Economic instruments are being used in the form of product charges levied on producers and importers of virgin materials, to assist in recovering packaging materials, waste oil and used batteries. Voluntary agreements have been launched (e.g. collection and recovery of single-use cameras, "computerised trading of waste" project). A national *inventory of contaminated sites* has been established and priorities have been identified.

While waste management reform has been adopted and its *implementation has begun*, much remains to be accomplished. Despite the stated primary objective of source reduction, per capita *generation of urban waste* has grown continuously since the early 1990s, reaching the OECD average of about 500 kg per capita in 2000. The volume of materials recovered through *separate collection* is still low, largely due to poor results in the central and southern regions; further efforts will be necessary to increase recycling of packaging materials. Large amounts of waste continue to be *landfilled* in small substandard facilities without pre-treatment. Uneven distribution of suitable treatment and disposal facilities is an obstacle to ensuring proper management of hazardous waste without transporting it over long distances. *Hazardous waste exports* were ten times greater in 1999 than in 1993, reaching 6% of total generation. Despite the reorganisation of the Waste Register in 1998, improvements are needed in *waste accounting and monitoring*, particularly with respect to generation, treatment and disposal of special waste. Many regions have not yet prepared a plan for organising integrated *municipal waste management networks within ATOs*. Use of *economic incentives* and other instruments, such as voluntary agreements, to promote waste minimisation and encourage recycling need to be further developed.

Recommendations:

- accelerate the adoption of *regional waste management plans*, including closing down small and unsatisfactory landfills and replacing them with disposal facilities that meet current technical norms and regulatory requirements;
- pursue efforts to increase *separate collection* of urban waste, including packaging materials, and adopt economic and regulatory measures to further develop the *recycling markets and industry*;
- develop the use of economic instruments and voluntary agreements aimed at reducing *waste generation*;
- improve the capacity and quality of *hazardous waste* disposal facilities and their national coverage;
- further improve *waste accounting and monitoring*, with special reference to generation and disposal of special and hazardous wastes;
- implement remediation measures in *contaminated sites* of national importance and speed up completion of regional inventories of contaminated sites.

Nature conservation and biodiversity

Italy vigorously expanded its *network of protected areas* in the 1990s: total protected land, which doubled over the decade, now covers 9.1% of the territory. During that period annual public expenditure on management of protected areas increased significantly and legislation was passed to further involve regions and local communities in the creation and management of protected areas. Regional protected areas and marine nature reserves are generally well managed; in particular, there is good public perception of and public involvement in management of regional protected areas. The proposed Natura 2000 network covers 16% of Italy's total land area. In 1998 the Inter-Ministerial Committee for Economic Planning (CIPE) decided to create a coherent national ecological network. To strengthen management of *fauna and flora species*, a comprehensive inventory of Italian fauna and an enhanced database on endangered flora species have been created. The 1992 Hunting Act introduced a number of innovations aimed at protecting and managing wildlife. Many animals are now protected under criminal law. Due to the increase in the extent of protected areas and vigorous reintroduction efforts, some large mammal species (including wolves and brown bears) made a strong comeback in the 1990s. The number of farmers participating in *agri-environmental schemes* has grown steadily, accounting for almost 20% of farmland; *organic farming* has developed rapidly and now takes place on 7% of total farmland. Forest management objectives have increasingly been oriented towards protection of ecological, social and aesthetic values. With EU support for forestry plantations on abandoned farmland, forested areas increased by 1.3% during the 1990s. They now cover about 23% of the territory. Intensity of use of forest resources (i.e. harvest divided by annual growth) has remained low, at 27%. In 2000 a Framework Act on Forest Fire Prevention was enacted. Italy has prepared a National Action Programme to Combat Drought and *Desertification*. It has also promoted many initiatives to increase public awareness of desertification. Regions and river basin authorities have developed their own detailed action programmes. Italy gave its support to *landscape protection* at international level by hosting the European Landscape Convention in Florence.

Despite this real progress, much remains to be done in view of the *high pressures on natural assets from economic activities*. Many of Italy's 1 200 vertebrate and 5 600 vascular plant *species are threatened*. One-third of forest trees are moderately to seriously affected by defoliation. Some 5.5% of the territory is vulnerable to desertification. Italy should finalise its National Biodiversity Strategy to create a framework for managing fauna and flora species. Fully operationalising the management of national parks should be strengthened. It is necessary to complement designation of Natura 2000 sites to improve ecological coherence (e.g. ecological corridors, buffer zones). Recently created *marine nature reserves* represent only a small share of coastal areas, and pressure on coastal ecosystems from tourism infrastructure development is increasing. There is an urgent need to protect *coastal areas* that are still well preserved. There is also a need to increase *expenditure on nature conservation*, including to protect biodiversity in small islands and in protected areas, for instance through increased reliance on economic instruments (e.g. access fees). In the second half of the 1990s public expenditure on nature conservation was equivalent to one-quarter of agri-environmental payments to farmers, which in turn represented less than 3 to 4% of total EU budgetary support to Italian agriculture and rural development. Nearly 47% of the territory falls within the scope of the 1985 *Landscape Protection Act* (Galasso Act), but regional landscape plans consist only of broad recommendations. Provinces should introduce territorial planning to ensure better co-ordination between landscape planning by regions and green space planning by municipalities.

Recommendations:

- complete the *National Biodiversity Strategy*;
- protect still *preserved coastal areas* and apply strict nature conservation measures in these areas;
- develop appropriate partnerships between the national administration and regions, municipalities and civil society, in order to *improve management of national and regional parks*;
- establish a coherent national ecological network, increase *expenditure* on nature conservation, including by increased reliance on economic instruments;
- evaluate the effects of *agri-environmental and farm forestry schemes* on nature conservation;
- fully implement and enforce *landscape protection acts and regulations*;
- strictly enforce *physical planning and environmental regulations* for new buildings and construction projects.

2. Towards Sustainable Development

Integration of environmental concerns in economic decisions

Italy has continued to make good progress in *decoupling* environmental pressures from economic growth, through low energy intensity and reduction of SO_x and NO_x emissions as well as through reduction of phosphate fertiliser and pesticide use. *Institutional integration* has improved. Progress in environmental planning is being achieved through preparation of the Environmental Strategy for Sustainable Development. Strategic Environmental Assessment has been developed as a tool to promote sustainable development (e.g. General Transport Plan). *Market-based*

integration continues to rely on high energy prices (due to taxes and historically high pre-tax energy utility prices), which have yielded environmental benefits; Italy's *energy intensity is lower than that of any other OECD economy*. Italy also relies increasingly on environmentally related taxes and environmental charges: a carbon tax on mineral/fossil fuels and a pesticide tax have been phased in; vehicle taxation has shifted to take greater account of environmental impacts (e.g. through being calculated on engine size); water and waste charges increased significantly in the latter part of the 1990s.

Recommendations:

- further integrate environmental concerns within *agriculture, energy and transport policies*, as well as health and tourism policies;
- expand the use of *strategic environmental assessment*;
- finalise adoption of the *Environmental Strategy for Sustainable Development*, with quantitative targets and time limits, based on full consultation with various stakeholders;
- review the economic efficiency and environmental effectiveness of *incentive schemes* granted in terms of subsidies, tax rebates or exemptions to various economic sectors;
- review existing *environmentally related taxes* (e.g. transport taxes, taxes on energy products) with a view to restructuring them in the light of a green tax reform;
- foster implementation of *cost recovery schemes* in waste management and extend such schemes to water management;
- make more systematic use of *integrated economic and environmental analyses* (e.g. cost-benefit analysis, data on public and private environmental expenditure) in environmental policy-making, with the aim of achieving sustainable development objectives more cost-effectively;
- mainstream *sustainable development* policy into institutional arrangements and decision-making at all levels (central, regional and local).

Nonetheless, further efforts are needed to *decouple* municipal waste generation from economic growth. *Co-ordination* among different administrations is not very well established, particularly at the technical level. Involvement of the Inter-Ministerial Committee for Economic Planning (CIPE) in environmental and sustainable development issues is to be encouraged. *Economic analyses* (e.g. cost-benefit analysis) carried out are insufficient to ensure cost-effective achievement of environmental objectives. *Taxes and charges* are not well targeted with respect to emission impacts, and there are many exemptions. Environmentally related taxes have had a low incidence. Some environmental charges are difficult to enforce, while some (e.g. a plastic bag fee) have been abandoned. Water prices are still low; they fall well short of overall operating costs, let alone providing financing for urgently needed capital expenditure. Water for agricultural use is priced extremely low, and groundwater resources are often abstracted illegally.

Integration of environmental and social concerns

Italy has made progress on *environmental information*, access to this information and public participation. Environmental reporting is well established at the national level (e.g. state of the environment *reports*, environmental *statistics*) and a *National Environmental Information and Monitoring System* (SINAnet) has been established. Italy proceeded with early ratification of the *Aarhus Convention*. The right of access to environmental information is laid down by law and is enforceable in the courts. Financial and technical support by MATT has had positive effects on *Local Agenda 21* implementation: over 500 local bodies are now involved, enhancing public participation. Capacity building of regional environmental administration has received support from EU Structural Funds, especially in the South (e.g. task-force of 150 experts to support regional environmental authorities and ARPAs). *Environmental education* has benefited from devolution of powers to the regions, as well as from technical and financial support provided by the national government (INFEA) and EU Structural Funds, especially in the South. Following several *natural disasters*, efforts have been made to assess the risk of such events (e.g. flooding, landslides, seismic and volcanic activity) occurring throughout Italy. *Urban revival* programmes have been implemented (Urban-Italy and national initiatives), leading to better quality of life in the urban environment. Rural development, including organic farming and farm tourism, provides a range of social and environmental benefits. Public awareness of the potential health effects of *electromagnetic radiation* (e.g. from powerful radio transmissions and high-voltage electric transmission lines) has attracted increased attention from scientists and other decision-makers; precautionary measures (e.g. more stringent standards) have been introduced.

Recommendations:

- reinforce efforts to reduce *regional disparities in access to environmental services* through development programmes (e.g. environmental infrastructure) in the South;
- further promote *capacity building* (e.g. EU Structural Funds task-force) in project and financial management, and in implementation of the Environmental Strategy for Sustainable Development, at both regional and local levels;
- promote the creation of *environmentally related jobs* (e.g. at local level, in organic farming, in small enterprises);
- review the lessons to be learned from *urban development programmes* carried out so far, and build on positive experiences in future urban revival and Local Agenda 21 projects;
- improve land use planning and building permitting through full use of information concerning exposure to *natural disasters and industrial risks*;
- strengthen *environmental information systems* through extended and improved monitoring, economic coverage (e.g. concerning environmental expenditure) and integration of information from various sources;
- further inform the public about its rights to environmental information, facilitate public access to *environmental information*, and encourage *public participation in decision-making*.

*Strong disparities still exist, however, especially between the North and South, in terms of access to environmental services (especially water). Despite successful urban revival programmes, the capacity to draw up, carry out and account for development programmes at the regional and local levels has generally been limited, especially in the South. Concerning *environmental information*, monitoring systems should be reviewed for relevance and consistency: availability of environmentally relevant economic information is weak; integration of regional data at national level suffers from insufficient harmonisation and problems with data flows; citizens are often unaware of their *right to environmental information*. Efforts to develop environmental awareness and public participation are uneven across the country. These efforts are particularly limited in less developed regions. Too little has been done to explore local creation of *environmentally related jobs*.*

Integration of environmental concerns in transport decisions

Italy has made significant progress in integrating environmental concerns in transport policies and practices. The new General Transport Plan (PGT) has benefited from close co-operation between MATT and the Ministry of Infrastructure and Transport, as well as from strategic environmental assessment. Its objectives aim at *environmentally sustainable transport* and achieving international environmental commitments. Steps have been taken to promote coastal shipping and combined sea-land transport, and more recently to develop transport infrastructure and reform the transport sector. Concerning transport *infrastructure*, environmental impact assessments have often helped mitigate negative impacts on habitats and landscapes. Concerning the *economic and regulatory context*, financial assistance has been made available to promote clean public transport and sustainable mobility in urban areas; economic and fiscal incentives have encouraged use of environmentally friendly fuels and vehicles; road fuel taxes and prices are among the highest among OECD countries. Concerning *traffic*, many cities are innovative, increasingly including reduction of air pollution in comprehensive mobility plans along with public transport measures. Italy has long used road pricing on its motorway network. Concerning *vehicles*, improvements in technology and fuel quality, incentives promoting alternative fuels, low emission vehicles, vehicle scrapping schemes and exhaust emission controls have had environmentally positive effects. Despite increased traffic volumes, most air emissions from road transport have not increased.

Nevertheless, Italy's rate of motorisation is among the highest in OECD countries. Road transport (both passenger and freight) has continued to grow and dominates the modal split; alternative modes tend to lack competitiveness (e.g. public transport, combined road-rail freight transport). The transport sector remains by far the largest contributor to air emissions of NO_x and NMVOCs; transport related CO₂ emissions continue to grow, as do emissions from two-wheeled *vehicles*. There is widespread *urban traffic* congestion, leading to continuing exceedance of air quality standards in many cities. Progress in developing and implementing regional and urban air quality plans has been slow. The effectiveness of EIA procedures should be further improved. The benefits of renewing the private vehicle fleet with less polluting vehicles have been offset by increased and high ownership (of four-wheeled and two-wheeled vehicles) and larger average engine size; the share of old vehicles remains high in the case of *trucks, buses and two-wheeled vehicles*. Taxes and charges are not fully in accordance with the polluter pays principle or the user pays principle; in particular, *exemptions* are granted to commercial and road freight transport. Many of the

recommendations of the 1994 OECD Environmental Performance Review remain valid. Further *co-ordination* is needed among national administrations, among administrative levels (state, regions, provinces and municipalities), and with neighbouring countries. Further *sharing of positive experiences* at local level, greater use of *demand side management* tools, reform of transport related *taxes and subsidies*, and effective application of *EIA and SEA* procedures are also necessary.

Recommendations:

- improve co-ordination of economic and environmental *planning of transport* among the state, regions, provinces and municipalities, and among national administrations;
- further develop *market-based integration* through implementing a mix of supply and demand measures (concerning infrastructure, vehicles, fuels and traffic, transport market reform, taxes and charges);
- strengthen *exhaust emission controls* and vehicle inspection, particularly for trucks and two-wheeled vehicles;
- further develop and implement a long term strategy and medium term action plan to create *alternatives to road transport* in long distance freight movements and in urban mobility, and to ensure an appropriate focus on transport infrastructure development;
- review and revise *transport taxes and charges*, so as to better internalise environmental externalities and eliminate distortions among transport modes (e.g. progressively reducing exemptions and/or incentives to road freight transport);
- ensure the effectiveness of *environmental impact assessment* (e.g. public participation, large infrastructure projects) and further implement strategic environmental assessment, in line with EU legislation;
- further strengthen international co-operation to reduce the share of road transport in *cross-Alpine freight movements*, with a view to minimising negative environmental impacts.

3. International Co-operation

As a G7 member, a founder of the EU and a Mediterranean country, Italy has continued to support international environmental co-operation very actively, ratifying most agreements and enacting most EU directives, including for *climate change and air pollution* commitments. It is to be commended for its *low energy intensity*, its clear GHG emission reduction *targets*, and its precise estimates of the environmental impacts of the national climate programme. In the 1990s Italy's performance in meeting international commitments to reduce *air emissions* was most satisfactory, with major reductions of SO_x and certain heavy metals as well as dioxins and furans. This progress will serve as encouragement in view of the further ambitious commitments being made (e.g. under the Gothenburg Protocol, to be ratified). With respect to *marine issues*, developments in the late 1990s have been positive for oil spill prevention, emergency response and ship safety, with quite significant equipment improvements, enforcement and commitments. Environmental co-operation with neighbouring countries has developed: Italy, France and Monaco have created a 100 000 km² *sanctuary* for protection of marine mammals, especially cetaceans, whose international status should be strengthened by UN recognition. Italy has also been very active in promoting international co-operation,

particularly in the area of drought and *desertification*. It has ratified all relevant international conventions concerning nature protection and biodiversity.

Under a business as usual scenario, GHG emissions in 2010 would reach a level 13% above the Kyoto target. Italy would therefore have difficulty achieving its *Kyoto target* (i.e. reducing GHG emissions by 6.5% relative to 1990) without fully implementing its recent national GHG emissions reduction programme (set out in the national Kyoto Protocol ratification law passed in May 2002). According to recent projections, strongly reinforced policies and measures as well as improved monitoring and enforcement are needed, along with appropriate public and private sector involvement. Concerning protection of the Mediterranean from *land-based pollution*, most importantly from agriculture, industry and untreated municipal effluents, too little progress has been made and much remains to be done; monitoring and reporting on the state of the surrounding seas should be reinforced. There is concern about the effect of *overfishing* on some fish stocks, which translates into significant reductions in Italian catches and consequent difficulty adjusting Italian fishing capacities to new circumstances. Italy's *official development assistance* has fallen to a very modest 0.13% of GNP. This ODA level does not seem commensurate with Italy's international role or with the size of its economy. However, the Italian government, which is committed to the EU goal of 0.33% of GNP by 2006, has indicated its intention to further increase its ODA to 1.0% of GNP at a later date.

Recommendations:

- increase the amount of *official development assistance* towards the Rio commitment of 0.7% of GNP;
- increase bilateral environmental ODA, as well as *environmental co-operation* with south-eastern European and other Mediterranean countries (e.g. Mediterranean Action Programme hotspots);
- implement, monitor and develop the national programme of *greenhouse gas emissions reductions* to meet the Kyoto target;
- continue effective implementation of the Montreal protocol and relevant EU regulations on *ozone depleting substances*; in particular, continue to enforce the ban on trade of CFCs;
- strengthen protection of the marine environment from *land based pollution* (from agriculture, industry, traffic and municipal waste water);
- ratify and implement the few remaining recent *international environmental agreements* awaiting ratification.

JAPAN*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. IMPLEMENTING ENVIRONMENTAL POLICIES**
- 3. AIR MANAGEMENT**
- 4. WATER MANAGEMENT**
- 5. WASTE MANAGEMENT**
- 6. NATURE AND BIODIVERSITY**

Part II
SUSTAINABLE DEVELOPMENT

- 7. INTEGRATION OF ENVIRONMENTAL CONCERNS IN ECONOMIC DECISIONS**
- 8. ENVIRONMENTAL-SOCIAL INTERFACE**
- 9. SECTORAL INTEGRATION: CHEMICALS**

Part III
INTERNATIONAL COMMITMENTS

- 10. CLIMATE CHANGE**
- 11. INTERNATIONAL CO-OPERATION**

REFERENCES

* Also available in Japanese.

CONCLUSIONS AND RECOMMENDATIONS*

Population and economic activities are extremely concentrated in dense metropolitan areas and along coastal plains in Japan, while two-thirds of the archipelago is mountainous and covered with forests. In the 1990s, *economic growth in Japan was considerably slower* than in the 1980s, with contraction of the economy for parts of the period. Agricultural and industrial production decreased. Final energy consumption and the energy intensity of the economy (energy use per unit of GDP) increased substantially, as did total road traffic. The Japanese economy is very dependent on imports of natural resources, such as energy, food and other raw materials.

The *most important pressures on Japan's environment* today originate from transport, agriculture, industry and, particularly, the growth of energy demand and private final consumption. Priority environmental issues include urban air pollution (NO_x, suspended particulate matter, toxics), waste management, water eutrophication, nature conservation, climate change, chemical management and international co-operation for environmental conservation. The Ministry of the Environment was established in 2001, 30 years after the Japan Environment Agency (which it replaced), with extended or strengthened environmental responsibilities such as waste management, international environmental co-operation.

This report examines progress made by Japan *since the previous OECD environmental performance review (EPR) in 1994*, and the extent to which Japan's *domestic objectives and international commitments* are being met. It also reviews the country's progress in the context of the OECD Environmental strategy^{**}. Below, some 60 recommendations are put forward that could help strengthen the country's environmental performance in a context of sustainable development. It is necessary for Japan to: i) increase the efficiency of its environmental policies; ii) integrate environmental concerns into economic and social decisions; and iii) reinforce its international environmental co-operation.

1. Environmental Management

Implementing more efficient environmental policies

In the 1990s, Japan's environmental legislation was further developed. Overall, the *mix of instruments used to implement environmental policy is highly effective*. Regulations are strict, well enforced and based on strong monitoring capacities. Significant progress has been made in tackling non-conventional air pollutants (e.g. dioxins, benzene), and waste management can be expected to improve further with the recent overhaul of the relevant legislative framework. Strict standard setting and financial support for research and development on new environmental technologies and

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting in January 2002.

** The 2001 OECD Environmental Strategy's main objectives covered in the present Conclusions and Recommendations are: integrity of ecosystems (Section 1), decoupling environmental pressures from economic growth (Section 2), the social and environmental interface (Section 2), and global environmental interdependence (Section 3).

treatment methods have had a positive technology-forcing effect, which has helped assure timely implementation of stringent regulations. The present system also has *some cost-effectiveness advantages*: nationwide emission or discharge limits are made more stringent at regional and/or local level when needed, often through agreements negotiated by prefectures and municipalities with industry. *Environmental impact assessment* (EIA) is systematically applied to major projects, and consultation of the public and of regional and local authorities has improved. Japanese industry has been proactive in establishing *environmental management and reporting systems*, and several branches have taken initiatives to reduce their environmental “footprint”.

Nevertheless, important gains in cost-effectiveness could be achieved through wider use of *economic instruments*. In particular, such instruments could help in: i) internalising externalities and generating economic signals that influence producer and consumer choices; and, ii) alleviating national and local government budget deficits. *User and pollution charges and environmental taxes* are not sufficiently used to internalise environmental costs. Financial assistance programmes are widely used to implement environmental policy, and their cost-effectiveness is not systematically evaluated. Application of the *polluter pays and user pays principles* is still incomplete, particularly concerning wastewater and waste services. Japan has made encouraging progress with user charges to cover the cost of wastewater services, but for household waste services, there is still a long way to go to achieve full cost recovery. With the exception of agricultural land contamination, management of *soil contamination* lacks a legal framework and liability is often unclear. In making policy decisions, greater consideration should be given to *economic analysis* of the options. There is still a need to improve consideration of mitigating measures and alternative options during the EIA process, giving a greater role to the public and NGOs. Voluntary agreements in the industrial sector should be rendered more transparent, with built-in monitoring mechanisms, and quantitative targets.

Recommendations:

- strengthen and extend the use of *economic instruments* (e.g. taxes and charges) to implement environmental policy in more environmentally effective and economically efficient ways and to progress towards sustainable production and consumption;
- continue to assure appropriate *enforcement of regulatory* measures;
- ensure that *voluntary agreements* become more transparent, effective and efficient;
- extend environmental legislation and policy attention to cover all types of *contaminated sites*;
- *review financial assistance programmes* used to implement environmental policy, assessing their environmental and economic effectiveness and their compatibility with the polluter pays principle (as proposed in the 1994 EPR);
- increase *economic analysis* of environmental policy measures, with the aim of achieving environmental objectives more cost-effectively.

Air

In the 1990s, *urban air quality* continued to improve in Japan. The very strong decoupling of emissions of conventional air pollutants from GDP already achieved (-82% for SO_x and -22% for NO_x while GDP rose by 140% over the 1970s and 1980s) was further reinforced in the 1990s (-5% for SO_x, NMVOCs and CO, while GDP rose by 13%). Japan's *emission intensities for SO_x and NO_x* (kg/unit GDP) are below the OECD average by 85% and 71%, respectively. Among OECD countries, Japan has the third lowest emission intensity for SO_x and the lowest for NO_x. Air pollution from lead has not been an issue for years. Japan has been in the vanguard among OECD countries on regulating *toxic chemicals*. Significant emission reductions have been achieved for a range of substances (-60% for total dioxin emissions, -45% for benzene, -43% for trichloroethylene and -50% for tetrachloroethylene from 1995 to 1999) by major emitting companies. *Motor vehicle emission and fuel quality standards* have been further strengthened and are now the strictest in the world (e.g. sulphur in diesel, under 0.05%; benzene in gasoline, under 1%). *Automobile fuel efficiency* has increased, although the gain has so far been offset by an increase in the volume of traffic. The 1992 law on automobile NO_x emissions requires special measures for sensitive metropolitan areas, and it was amended in 2001 to cover particulate emissions from diesel automobiles. The number of in-use *low-emission vehicles (LEVs)* increased significantly and now totals 2 400 electric vehicles, 5 300 natural gas vehicles, 200 methanol vehicles and 37 700 hybrid vehicles, though LEVs still account for a very small share of the total fleet.

Japan still faces the *challenge of decoupling the use of road transport from GDP growth* for both passenger and freight transport. Growth in demand for transport outstripped GDP growth in the 1990s, and *demand management measures* remain weak. This is Japan's Achilles heel when it comes to urban air quality and CO₂ emissions. The ambitious targets set for areas designated under the automobile NO_x law will be very difficult to meet. No substantial measures have been introduced so far to reduce *NMVOC emissions*, particularly from large stationary sources. Levels of *fine particulate air pollution* are an increasing cause of concern in large metropolitan areas. *Cost-effectiveness* should have received greater emphasis in integrating air quality management and transport decisions (such as the decision to earmark taxes for road building). There is very *little use of economic instruments* to reduce air emissions.

Recommendations:

- continue efforts to reduce *NO_x and NMVOC emissions*, in light of the persistent NO₂ and photochemical oxidant issue in metropolitan areas;
- further develop and implement comprehensive policies to control *fine particulate emissions* from both mobile and stationary sources and to meet environmental quality standards;
- continue efforts to *reduce emissions of toxic chemicals*, ensuring in particular that voluntary agreements are efficient and effective;
- use *cost-benefit analysis* more systematically in integrating major air management and transport decisions, including those for road investment;
- strengthen the management of *motor vehicle traffic* through a comprehensive package of policies including traffic demand management measures (e.g. land use planning, economic instruments, information technology) and measures promoting the use of more fuel efficient vehicles and of *less polluting transport modes*.

Water

Japan continued to make strong efforts in the 1990s to achieve its *water management objectives*. It also made progress in following up on several recommendations of the 1994 EPR. *Human health-related water quality standards* for 26 chemical groups are largely respected in freshwater and marine water bodies. Compliance with water quality standards related to the living environment in rivers has continued to improve gradually; it reached 81.5% for BOD in 1999. From 1991 to 1999, the percentage of the population covered by a treatment system of some sort increased from about 50% to 69%. *Local stakeholder groups* can now be actively involved in the implementation of flood control and river management projects. *River control practices* have begun to take account of the needs of aquatic species and the growing demand by citizens for river-based amenities. Industry has increased its *use of recycled water* to as much as 77% of its total water use. The management of *groundwater resources* has been strengthened. A start has been made towards adapting the management framework to emerging demands and towards better integrating the roles of the various authorities having responsibility for water management.

Recommendations:

- consolidate the body of *water-related laws* into coherent legislation integrating quantity and quality management and taking a whole river basin approach;
- take additional measures to expedite implementation of *sewerage construction* programmes (e.g. expanding advanced treatment infrastructure, improving combined sewer overflows); further increase the application of the polluter pays and user pays principles; consider a possible role for *public-private partnerships* towards this end;
- strengthen implementation of *nutrient reduction measures* for lakes, bays and inland seas, in particular regarding diffuse sources such as agriculture;
- strengthen the control of *substances hazardous* to human health and ecosystems, through cleaner production, effluent control, pesticide regulation and groundwater protection;
- streamline the *water quality classification system* and include ecological water quality criteria;
- continue to actively pursue the *restoration of river habitats to near-natural state* and extend stakeholder participation in river management to more river basins.

Such successes notwithstanding, Japan continues to face pressing *water management challenges*. It has not wholly met the objectives of its *sewerage construction* programme and remains well behind those OECD countries that are the most advanced in terms of municipal wastewater treatment; at the current rate of progress it may be another 15 years before it catches up. The costs of sewerage and wastewater treatment services are not yet fully covered through user charges (cost recovery is 57% nationwide). The *water quality status of lakes and enclosed coastal waters* has shown no significant improvement for a considerable period. *Eutrophication* persists as one of the country's most serious water quality problems, and the frequency of red and blue "tides" has not diminished noticeably. Japan has been slow to respond to the *need to reduce nutrient loads to receiving waters*, particularly in terms of diffuse sources such as agriculture. Wet weather overflows from combined sewer systems

cause severe pollution problems. Also, ecosystem aspects of water management are not yet given sufficient weight. The presence of *hazardous chemicals* (e.g. *trichloroethylene*) in *aquifers* poses problems for drinking water supply utilities, and nitrogen-related standards in groundwater are exceeded in 5% of observations. Japanese *water legislation* needs a more integrated approach. In particular, Japan needs to integrate quantity and quality management better and to move further towards an approach based on entire river basins.

Waste

Japan is in a very *challenging situation* concerning waste management. The shortage of landfill capacity due to the very high population density has led to reliance on incineration as the main way to eliminate waste (e.g. 78% of municipal waste, by weight). But public concern over dioxin emissions makes it increasingly difficult to build incineration facilities. Furthermore, the scarcity of natural resources renders Japan very dependent on imported materials. Hence Japan is making a *major ongoing policy and societal effort* to promote a recycling-based society, fully utilising materials by reducing waste generation and increasing waste recovery. In the 1990s, Japan stabilised its *waste generation rates* (for both total industrial waste and municipal waste) and decoupled them from GDP growth. The *2000 Basic Law for Establishing a Recycling-Based Society*, and related recycling regulations (e.g. for containers and packaging, household appliances, construction and demolition waste, and food waste) have strengthened the regulatory framework for waste management. The principle of *extended producer responsibility* has been incorporated into national legislation on containers and packaging and on some appliances. Recycling ratios for certain streams of municipal waste further increased in the 1990s. *Voluntary initiatives by business* have helped reduce generation and landfilling of industrial waste.

Recommendations:

- implement the *Basic Law for Establishing a Recycling-Based Society* and related recycling regulations, develop quantitative targets, monitor the effectiveness and efficiency of their implementation, and broaden the application of extended producer responsibility (e.g. to automobile producers);
- expand the use of *economic instruments* for waste management, especially *user charges* for cost recovery in municipal waste services;
- develop more efficient *municipal waste management services and companies*, increasing the setting up of intermunicipal treatment and disposal facilities;
- improve the accountability of industry concerning *voluntary initiatives* on waste reduction and recovery;
- increase capacity for *treatment and disposal of industrial waste*, with appropriate public access to information and participation.

However, only 6% of the *total cost of municipal waste services* is recovered through waste charges nationwide: the use of waste management charges should be extended and increased. Also, municipalities are not yet obliged to join the *recycling programme* under the packaging and containers law, and quantitative targets are lacking. The current “pay at disposal” scheme for electrical appliances may not be very effective.

Voluntary actions by industry should be monitored systematically and effectively. Cases of *dumping of industrial waste* increased in the 1990s. There is a need to expand capacity for treatment and disposal of industrial waste. Japan must also address its final-disposal needs, as it has very little *landfill capacity* left.

Nature and biodiversity

Japan has established very comprehensive and regularly updated *national inventories* (making up the “Green Census”) of nature and biodiversity, with broad support from researchers, experts, and volunteers. The inventories cover topography, geology, distribution of fauna and flora, conditions of ecosystems (including rivers, lakes and coastal habitats) and landscape amenities. Results of the fifth Green Census were treated, analysed and prepared for dissemination by a newly established Biodiversity Centre (1998). Of Japan’s total land area, almost 25% is designated for some form of protection. A *national strategy on biological diversity* was approved in 1995 and is now under review. *Administrative capacities* for nature conservation have been improved at national and local levels. Progress has been made in *integrating nature conservation* and rural amenity considerations into agriculture and forestry policies. In some areas, a *river basin approach* has been used to promote synergies between nature conservation, habitat rehabilitation, water management, forest management and local development initiatives involving a wide range of public and private actors and citizens.

Recommendations:

- strengthen measures to prevent the decrease, fragmentation and degradation of habitats in *protected areas* and extend such areas and their interconnection within a national nature network;
- intensify efforts to *integrate nature and biodiversity concerns* in agriculture, forestry, fishery and spatial planning policies (e.g. by gradually phasing out environmentally harmful subsidies, making support conditional on compliance with environmental and nature conservation standards, or rewarding efforts to improve biodiversity and amenities);
- review and revise the *national biodiversity strategy*;
- further strengthen the financial means, human resources and institutional capacities for *management of protected areas*; explore options for establishing financial mechanisms (e.g. a compensation fund for nature, financed by charges on land conversion and habitat interference);
- continue to promote *re-naturalisation projects* to rehabilitate degraded ecosystems and to return to nature unused agricultural or industrial land and reclaimed wetlands;
- accelerate progress in preserving and creating urban or peri-urban *open green space* and in revitalising *river banks*, with appropriate public participation.

However, many *animal and plant species* are threatened by extinction (over 20% of mammal, amphibian, fish, reptile and vascular plant species), with little improvement in the 1990s. Exotic species have affected some ecosystems. Effective and efficient management of protected area is hampered by the *multitude of separate legal bases* and responsibilities. Less than 3% of the protected areas is explicitly devoted to nature conservation. Enforcement and management capacities are weak, in particular in natural parks facing increasing pressures from visitors and development. The national

biodiversity strategy lacks quantified targets and does not adequately address the management of biodiversity outside protected areas (e.g. marine, coastal areas). Despite inspections at customs checkpoints, the *illegal entry of products from threatened and endangered species* continues. Integrating nature and biodiversity concerns in *spatial planning and urban development*, as well as in mainstream *farming, forestry and fishery* policies, is progressing slowly. *Economic instruments* should be used to provide incentives for compliance with nature conservation regulations and plans, or to provide funds for managing amenities and delivering services beyond legal requirements. *Green open space* in urban agglomerations is limited and under high pressure.

2. Towards Sustainable Development

Integrating environmental concerns in economic decisions

Japan has achieved major *decoupling* of environmental deterioration from economic growth during the two last decades in terms of SO_x, NO_x, fertilisers and pesticides. Water withdrawal and municipal and industrial waste generation are no longer growing. With the First and Second *Basic Environment Plans*, Japan established the necessary platform for integrating environmental concerns in sectoral planning; the Central Environment Council reviews progress reports from the various ministries implementing the plans. Environmental concerns are also part of the annual national budgeting process. A comprehensive *Greening of Government* programme implemented in the late 1990s has reduced the environmental footprint of the public sector. Based on the law on the procurement of eco-friendly goods (2000), a new programme for greening of government was launched in April 2001. *Integration of environmental concerns and fiscal policies* has begun with the ongoing greening of the automobile tax and automobile acquisition tax. Coal subsidies are decreasing and are scheduled to be phased out entirely in 2002.

Despite quite advanced and sometimes exemplary policies, the decoupling achieved in the 1990s has not been sufficient in some areas. For instance, *CO₂ emissions* continue to grow at about the same rate as GDP. A number of pollution trends are still on the increase in absolute terms, most notably those related to traffic and energy use. Remaining waste disposal capacity is reaching a critical point. *Physical planning* is not well co-ordinated with environmental planning. *Strategic environmental assessment* is not yet systematically applied to environmentally relevant sectoral policies, plans and programmes. Concerning *market-based integration*, little use is made of economic instruments such as fees, charges, taxes, tradable permits or deposit-refund programmes. Most environment-related taxes are earmarked for road construction and maintenance. The granting of *financial assistance to producers and consumers* in several sectors may go against both environmental effectiveness and economic efficiency objectives; *sectoral subsidies* should be systematically reviewed for their environmental implications.

Recommendations:

- better *integrate* environmental concerns in physical planning, transport, agriculture, energy and urban policies;
- ensure that co-ordinated and *integrated sectoral plans*, associated with the Second Basic Environment Plan, are developed through close co-operation among the ministries concerned, and assure accountability for implementation of the plans;
- take the necessary steps to systematically carry out *strategic environmental assessment* during the development of environmentally relevant policies, plans, and programmes;
- strengthen efforts to buy and use "*greener goods*" (e.g. via green procurement policies and the green consumer movement) so as to promote more sustainable production and consumption patterns;
- continue to *restructure environment-related taxes* in a more environmentally friendly way;
- review and further develop the system of *road fuel and motor vehicle taxes*, with a view to promoting more sustainable modes of transport, to internalising environmental costs, while paying attention to the demand for transport infrastructure and to introducing more flexibility in the allocation of the revenue;
- continue to *reduce sectoral subsidies* that have negative environmental implications.

Integrating environmental and social concerns

Japan has *high-quality environmental information*: white papers on the quality of the environment have been presented to the Diet and published annually for more than 30 years. Air and water quality monitoring is highly developed; the regular national surveys of the natural environment that comprise the Green Census provide comprehensive information on nature and biodiversity. A system for integrated environmental and economic accounting has been established and Japan has advanced material flow accounts. *Public access to environment-related information* is improving; a law on disclosure of information held by public bodies came into force in 2001, and a law on a pollutant release and transfer register (PRTR) was promulgated in 1999. Provisions for *stakeholder participation* in project evaluation were strengthened in the 1997 law on environmental impact assessment (EIA). Steps towards more integrated, participatory approaches to planning, implementing and evaluating environmentally relevant projects and policies have been initiated, in particular in the context of river basin management. The *Second Basic Environment Plan* has broadened the scope of environmental policy from production-related pollution control to consumption-driven pollution control and natural resource management, with emphasis on options for mobilising societal forces through participatory and partnership approaches. Campaigns have been launched to encourage environmentally responsible *consumption patterns* and behaviour (a "recycling-based society"). Environment-related jobs represent about 1.2% of total employment and their number is expected to grow. Environmental management and sustainable development are increasingly considered part of *local economic development*.

However, *environmental education* and, in particular, training (e.g. for teachers) should be intensified. Participatory approaches to governance should be better rooted in public administration and civil society. While victims of environmental contamination are well organised, *environmental NGOs* are still weak in terms of membership, staff and resources. They often focus on individual local subjects, and have limited representation on advisory councils and committees at national and prefectural levels. They have no established legal basis for standing in court for the common good. Local initiatives for sustainable development (*Local Agenda 21*) are sporadic and would benefit from a national network for co-operation. Environmental implications of major *socio-cultural changes* (e.g. in lifestyle, work and leisure time, ageing, settlement patterns and mobility) should be further explored. Little information is available on the positive or negative employment impacts of environmental policies.

Recommendations:

- further develop *environmental data, indicators and information* as tools facilitating decision making and communication, and review the potential for grouping related institutional capacities together;
- improve *public access to environmental information* held by the environmental administration, sectoral ministries and the private sector;
- review *distributional implications* of proposed market-based instruments for environmental management and sustainable development;
- promote the development of *environmental NGOs* and assure their representation on advisory councils and committees dealing with issues relevant to sustainable development at national and prefectural levels;
- promote *environmental education* at all levels and forms of education, including training for teachers;
- assess the impact of changes in *technology and lifestyle* (e.g. the impact of information/communications technology, increased recreation time, retirement) on environment and nature, taking into account related changes in patterns of settlement, transport, production and consumption.

Chemicals

Japan is an important producer, user and exporter of chemicals, accounting for 12% of world output value in the chemical industry (10% of total Japanese manufacturing value) and with higher demand per capita than any other OECD country. In the 1990s, Japan continued to implement regulations on the introduction of *new chemicals* to the market and registration of new pesticides. In recent years, Japan has also adopted *laws on a PRTR, dioxins and PCBs*, and strengthened measures to reduce emissions/discharges of hazardous chemicals. As an example of the results, dioxin emissions from a range of industrial sectors were reduced by 60-65% from 1997 to 1999. *Voluntary initiatives by industry* concerning air emissions of 12 *hazardous chemicals* have led to substantial reductions. Safe disposal of PCBs has been put back on track with the development of related legislation and technologies. Japan has begun to address the issue of *suspected endocrine disrupters*, and has continued to be very active in international programmes concerning chemical management, including that of the OECD (e.g. safety investigation of high production volume chemicals). Environmental *monitoring* of hazardous chemicals is systematic and thorough.

Progress is still required in several areas. *Protection of ecosystems* is not generally included alongside health in the objectives of Japanese chemical management policy. Quantitative targets for the reduction of releases of hazardous chemicals have not yet been set, except for dioxins and a few other substances. Japan's efforts towards *harmonisation of test procedures* (required before the introduction of new chemicals to the market) with those of other OECD countries should be actively continued. *Risk assessment* has been completed only for a few hazardous chemicals so far. *Risk information* to consumers concerning hazardous chemicals in products is insufficient. Data on production and consumption of chemicals are not systematically used to assess health risks, nor made public for better risk communication. The great majority of *existing chemicals* have yet to undergo safety assessment. A code of practice for pesticide application has been in place, and promoted through educational programmes for farmers, for many years. It is important to secure the implementation of the code. Following efforts made (e.g. inventory, development of disposal technologies), the environmentally sound disposal of *obsolete persistent pesticides* should be promoted.

Recommendations:

- further improve the effectiveness and efficiency of *chemical management* and further extend the scope of regulation to include ecosystem protection;
- strengthen voluntary initiatives in the chemical industry and grant a more active role to chemical producers in *safety investigations* (e.g. of *existing chemicals*);
- introduce measures to encourage manufacturers to reduce the *environmental and health risks* posed by *chemicals used in consumer products*, at all stages of the products' life cycle;
- continue to instruct farmers about and monitor their *compliance with regulations and guidelines concerning the application of pesticides*;
- continue to develop *publicly accessible databases on chemicals* (e.g. on toxicity, risk assessment, emissions at all stages of the life cycle) and strengthen *risk communication* concerning hazardous chemicals;
- continue to co-operate with other OECD countries (e.g. on harmonisation of test procedures for new and existing chemicals) and continue to *promote environmentally sound chemical management* in East Asia.

3. International Environmental Co-operation

Climate change

Japan formulated *ambitious climate protection targets* in the early 1990s and continued to give attention to combating global warming throughout the decade. Japan has a detailed climate protection policy whose implementation is well co-ordinated and regularly reviewed. Japan has consistently supported international climate protection efforts under the UN Framework Convention on Climate Change (UNFCCC). The *CO₂ intensity of the economy* (kg CO₂/unit GDP) decreased by 1.8% during the 1990s to rank eighth among OECD countries. Japan has pursued fuel switching away from oil and towards gas and nuclear power. It has made extensive and effective use of *energy efficiency standards* since the 1970s, and significantly strengthened them with the establishment of its "top-runner" programme in 1998. *Public transport infrastructure* is well developed in major cities, with differentiated tariffs, and public transport continues to

account for a large proportion of passenger trips in most metropolitan areas. Voluntary initiatives by Japanese industry have contributed to reductions of greenhouse gas (GHG) emissions from this sector. To influence energy users' behaviour, *public education programmes* promote efforts against global warming.

While weak decoupling was achieved in the 1990s between CO₂ emissions and economic growth, Japan's performance still contrasts rather starkly with its overall goal of reducing GHG emissions by 6% between 1990 and 2008-12. Its GHG emissions increased by nearly 7% between the baseyear and 1999. Japan has therefore fallen *short of the stabilisation targets* it declared by ratifying the UNFCCC and by establishing its Action Programme to Halt Global Warming. The *energy intensity of the economy* (toe/GDP) increased by 5% in the 1990s, a reversal of the trends of the 1970s and 1980s. Although Japan pursued improvements in energy efficiency in all sectors during the 1990s as a means of reducing CO₂ emissions, it has so far largely overlooked the potential contribution of *demand management measures* and *renewable energy sources*. Greater effort is needed to harmonise climate protection measures across sectors and among energy sources. Existing *environment-related taxes* should be reviewed and further developed, where appropriate, from the viewpoint of GHG reduction and other objectives. One example is road transport fuel taxation. Economic instruments such as taxes and charges are used less in Japan than in a number of OECD countries. Japan should continue its efforts to accomplish its *targets for limiting HFCs, PFCs and SF₆*.

Recommendations:

- seek the entry into force of the *Kyoto Protocol* in 2002, with *timely ratification* processes, and with the widest possible participation ;
- further develop the national policy framework to combat climate change, with a *balanced mix of policy instruments* (including an expanded use of economic instruments such as taxes and charges), to reach domestic and international commitments; review and further develop environment-related taxes where appropriate, from the viewpoint of GHG reduction and other objectives;
- develop and implement *co-ordinated demand management measures* (e.g. road pricing, parking charges, energy service company) and energy efficiency improvement measures (energy efficiency standards and other measures) in the *transport and residential/commercial* sectors;
- review and revise *voluntary initiatives in industry* to improve energy efficiency and reduce GHG emissions (e.g. more explicit targets, expanded public access to relevant information);
- take further measures to encourage the development and use of *renewable forms of energy* and to promote *fuel switching* where appropriate;
- continue to implement policy measures to reduce emissions of *HFCs, PFCs and SF₆* with a balanced mix of policy instruments.

* This recommendation is based on the OECD Environmental Strategy for the First Decade of the 21st Century and Section 1.5 of Chapter 9 of this report.

Other international commitments and co-operation

Concerning *marine issues*, Japan has taken major steps to improve its capacity to respond to large-scale oil spills since ratifying the *OPRC Convention* (International Convention on Oil Pollution Preparedness, Responses and Co-operation) in 1995. The Coast Guard carries out *regular surveillance of the exclusive economic zone* for illegal dumping or discharging from ships, and port authorities regularly check for MARPOL compliance by ships. Japan has implemented significant measures to reduce its fishing fleet capacity, in line with Food and Agriculture Organisation recommendations. *Bilateral and trilateral co-operation* with China and South Korea has been strengthened. Japan played a key role in establishing the Acid Deposition Monitoring Network in East Asia, one of the first region-wide co-operative and collaborative monitoring networks in the region, involving 11 countries. This network has become important for the exchange of scientific data and knowledge, which could lead to regional policy responses. Over 30% of Japan's *official development assistance* is in the environmental field. Japan ceased its *production of CFCs* in 1995. There has been a *gradual substitution of softwood plywood* for hardwood plywood in Japan's imports; the former's share increased from 15% in 1993 to 42% in 1999.

Japan has not yet succeeded in developing regional agreements for *oil disaster response* as the OPRC Convention requires. Although operating the world's second largest shipping fleet, Japan's measures for the management of ballast waters and ship scrapping are currently insufficient. *Bilateral co-operation with Russia* faltered in the late 1990s. Shared fish stocks of several fisheries in the North Pacific need to be restored and properly managed. On *transboundary pollution*, there is still a long way to go to reach the goal of developing a common understanding and basis for policy responses concerning both air and marine pollution. The rate of *recovery of CFCs from consumer products* should be improved. Progress towards Objective 2000 of the International Tropical Timber Organisation (to ensure that all imported hardwood comes from sustainably managed forests) is not measurable.

Recommendations:

- continue to develop *institutions for regional responses to oil emergencies*, including surveillance, analysis, communication and response (e.g. in the framework of the North-West Pacific Action Plan);
- continue to develop and implement international technical guidelines regarding *ballast waters and ship scrapping*;
- seek to strengthen regional collaboration to *improve the management of shared fish stocks* in the North Pacific;
- strengthen *bilateral and regional efforts* to address shared environmental concerns, particularly regarding transboundary air and marine pollution, and migratory birds;
- implement the new laws on *recovery of fluorocarbons from household appliances, automobiles and commercial air conditioning systems*;
- co-operate internationally to develop means of ensuring that *timber and wood products used in Japan* originate from sustainably managed tropical and boreal forests;
- further increase *official development assistance (ODA) for environmental purposes*, particularly that aimed at facilitating solutions to global environmental problems, as well as total ODA, taking into account the UN target (0.7% of GNP).

KOREA*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. POLLUTION MANAGEMENT**
- 3. NATURE AND BIODIVERSITY MANAGEMENT**

Part II
SUSTAINABLE DEVELOPMENT

- 4. ENVIRONMENTAL-ECONOMIC INTERFACE**
- 5. ENVIRONMENTAL-SOCIAL INTERFACE**
- 6. SECTORAL INTEGRATION: TRANSPORT**

Part III
INTERNATIONAL COMMITMENTS

- 7. INTERNATIONAL CO-OPERATION**

REFERENCES

* Also available in Korean.

CONCLUSIONS AND RECOMMENDATIONS*

After the 1997 financial crisis, the Republic of Korea displayed *one of the highest rates of economic growth in the OECD*: about 6% annually. Korea's GDP per capita reached USD 14 100 at current prices and exchange rates. GDP growth is *largely driven by exports*. Despite incentives offered in three free economic zones, foreign direct investment is relatively low. *Industry accounts for 42.5% of GDP* (well above the 29% OECD average). Manufacturing and energy-intensive industry remain predominant (Korea has the world's largest shipbuilding industry and the fifth largest steel production) though information and communication technology are growing. With a population of 48 million living in an area of just under 100 000 km², Korea has the *highest population density* (484 inhabitants per square kilometre) in the OECD. The Seoul megalopolis, with 48% of the population, produces 53% of the Korean GDP.

Further to good environmental progress during 1990-97, a period marked by Korea's accession to the OECD, the review period (1997-2005) saw *major progress* in addressing air, water and waste management, particularly in urban areas, and adopting new environmental legislation. However, indicators of carbon, energy and some material intensities still remain among the highest in the OECD. *Priority sustainable development challenges*, as reflected in the mandate of the Presidential Commission on Sustainable Development, include: i) recommending major policy directions and plans for sustainable development that integrate economic, social and environmental concerns; ii) proposing major policy directions in areas such as water and energy; iii) providing advice on the implementation of major international environmental agreements, such as the UN Framework Convention on Climate Change (UNFCCC); iv) proposing solutions for societal conflicts and disputes related to the country's sustainable development; v) promoting and facilitating implementation of Agenda 21 as well as the Johannesburg Action Plan; and vi) reviewing proposed national long-term strategies with respect to sustainability. Overall, further and strengthened efforts will be needed on the *road towards environmental convergence* within the OECD area.

Korea will need to: i) strengthen the implementation of its environmental policies; ii) enhance the integration of environmental concerns into economic decisions (e.g. energy, agriculture, transport, forestry, fiscal and land-use decisions); and iii) further gradually reinforce its international co-operation on environmental issues.

This report examines progress made by Korea *since the previous OECD Environmental Performance Review* in 1997, 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 54 recommendations are made that could help strengthen Korea's environmental performance in the context of sustainable development.

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 23 January 2006.

** 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).

1. Environmental Management

Strengthening the implementation of environmental policies

Achievements since the previous OECD environmental performance review (1997) include *striking progress* with air management (major cuts in SO_x, particulate pollution), water infrastructure (massive investment in sanitation, totalling about USD 20 billion since 1997), water management (establishment of river basin management), waste management (recycling, incineration and sanitary landfill infrastructure), and nature/biodiversity protection. *New environmental legislation* was adopted (18 new acts) and more bills are pending in the National Assembly. Korea is gradually changing its approach to environmental management. New legislation has been enacted to foster the use of *economic instruments* in environmental protection (e.g. Special Act on Metropolitan Air Quality Improvement for the capital region) and to introduce mandatory public green procurement (as part of the Act on Promoting the Purchase of Environmentally-Friendly Products). To improve *environmental management at the territorial level*, river basin environmental offices and a metropolitan air quality management office were established under the supervision of the Ministry of Environment. *Public-private partnership* platforms with business and environmental non-governmental organisations (NGOs) have contributed to addressing many environmental issues. Many firms have adopted environmental management systems and industry is actively engaged in voluntary approaches, notably in the areas of oil spill remediation, chemical management and energy saving. NGOs have been allowed to participate in environmental inspections. Continuous monitoring systems have been introduced, and monitoring by civilian groups has increased. Environmental impact assessment (EIA) of projects has been strengthened and reinforced to be more preventive through development of the prior environmental review system (PERS) in 1999; the effectiveness and enforcement of both EIA and PERS requires further attention. Integration of environmental concerns in *land-use planning* improved with a land-use reform and adoption of the principle “plan first, develop later” supported by two new acts. Pollution abatement and control expenditure increased in volume and remained at a robust rate of 1.6 to 1.9% of GDP. Environmental expenditure (including also expenditure on water supply and nature protection) is well over 2% of GDP. Overall, Korea has thus taken a range of actions to pursue environmental protection together with economic development and institutional decentralisation.

However, the *sharing of environmental responsibilities* (e.g. Ministry of Environment; Ministry of Construction and Transportation; Ministry of Commerce, Industry and Energy; Ministry of Maritime Affairs and Fisheries; Korean Forest Service) could be usefully reviewed and revised. In addition, important challenges remain concerning water, nature and air management. There are very high pressures associated with CO₂ emissions and with use of water, pesticides and fertilisers. The *permitting and enforcement systems* have been weakened in recent years. Following the 2002 transfer of all enforcement duties in the areas of air, water quality and municipal waste management to local authorities, the number of inspections and the proportions leading to violations and prosecutions have decreased. The permitting system is still single-media in approach, and lacks regular renewal procedures. Integrated permits for large stationary sources should be considered. The OECD recommendation in 1997 to foster *local capacity building* has not been fully implemented. There is a risk of environmental concerns being too often superseded by development interests in local decision-making. The integration of pollution and nature protection concerns in *land-use plans* varies

greatly among municipalities. *Economic instruments* should be reviewed to enhance their effectiveness and efficiency (e.g. streamlining, increased rates to induce changes in behaviour and to internalise externalities). The Framework Act on Environmental Policy of 1990 requires all levels of government to prepare five- and ten-year environmental management plans.

Recommendations:

- review and revise, as needed, national, regional and local *inspection and enforcement regimes*. Increase inspection and enforcement *capacity* at the local level and strengthen the mechanisms of supervision and evaluation at the national level to ensure effective and efficient implementation;
- introduce a *periodic permit renewal system*, and consider introducing *integrated pollution prevention and control* permits for large stationary sources at the national and regional levels;
- continue to increase the *use of economic instruments* (e.g. environmental charges, trading mechanisms) to further internalise environmental externalities;
- further integrate environmental concerns (i.e. pollution, natural resources, nature concerns) at all levels of *land-use planning*, and implement such land-use plans. Further use environmental impact assessment for projects and expand the range of administrative plans subject to prior environmental review;
- strengthen *public-private partnerships* and industry-driven environmental progress, including for small and medium-sized subcontractors of large firms.

Air

Overall, Korea has continued to progress in managing air pollution with determination and with very significant results. While the Korean economy and the number of road vehicles grew substantially during the review period, emissions of SO_x were strongly *decoupled* from economic growth and those of CO, NO_x, PM₁₀, lead and volatile organic compounds (VOCs) were weakly decoupled. Emissions per unit of GDP are half the OECD average for SO_x and well below the OECD average for NO_x. Both indicators now place Korea in the middle range of OECD countries. The SO₂ decoupling is due primarily to the use of cleaner fuels (e.g. liquefied natural gas (LNG) and low sulphur oil), to flue gas desulphurisation for large emission sources (e.g. power plants), and to cleaner industrial processes. For other pollutants, the main factors are the tightening of emission limits, stepwise improvement of fuel quality, switching to cleaner fuel, stringent controls on motor vehicle emissions, and the use of economic instruments (e.g. taxes/charges on polluting activities). On the whole, *ambient concentrations* of criteria air pollutants decreased during the review period. The goals of Korea's 1995-2005 environmental plan (Green Vision 21) for improved air quality in urban areas were generally achieved for SO₂ and, for the cities outside the Seoul metropolitan area, for NO₂ and particulates. Korea updated its body of *air pollution laws* and tightened its ambient air quality standards, which are now generally close to WHO guidelines. It enacted the *Special Act on Metropolitan Air Quality Improvement* in 2003 to address the air pollution issue in the Seoul capital region. Further *market-based and flexible approaches* were introduced. An emission trading ("cap-and-trade") system will be used in the Seoul capital region for SO_x, NO_x and total suspended particulates starting in 2007. A voluntary agreement with paint manufacturers seeks to reduce VOC emissions and a

start was made with the control of hazardous air pollutants. With respect to energy, Korea surpassed its Green Vision target for increasing the use of LNG.

Despite this progress, several challenges remain, mainly concerning *PM₁₀*, *ground-level ozone*, *NO_x* concentrations and *CO₂ emissions*. The incidence of *adverse health effects* caused by air pollution is estimated to remain very high, and would make further air pollution abatement highly cost-effective in the country with the highest population density in the OECD and a rapidly growing economy. In the *Seoul capital region*, the concentration of *NO₂* and particulates is still higher than in many large cities of other OECD countries. The rapid growth of the vehicle fleet and automobile use causes emissions to outpace improvements in fuel quality and engine technology. Ground-level ozone problems are widespread and increasing in frequency. *PM₁₀* concentrations in the Seoul capital region remain very close to the Korean standard of 70 µg/m³ (compared to the WHO guideline of 40 µg/m³). Comprehensive measures to tackle air pollution issues have been taken in the Seoul metropolitan area, but not in *other major cities and industrial complexes*. Little attention has so far been paid to air quality in rural areas or the effects of air pollution on vegetation and ecosystems. Higher priority should be given to *hazardous air pollutants*, which adversely affect health. Integration of environmental concerns into decision making in the *energy sector* remains limited and is one of the main priorities for energy policies. Despite some gradual improvement during the review period, *Korea had problems in reducing energy intensity* (i.e. energy use per unit of GDP) and now has one of the most energy-intensive economies, but it has been carrying out policies to reduce energy intensity and needs to strengthen these policies further. Likewise, the *CO₂ intensity* of the Korean economy is now well above the OECD average. The share of renewable energy sources in the energy supply (2.1%) remains very low.

Recommendations:

- complete and firmly implement the comprehensive air management plan for the *Seoul metropolitan area*;
- formulate and implement comprehensive air quality plans (including cost-benefit analyses) for the *major cities and industrial complexes* outside the Seoul metropolitan area;
- strengthen the management of *hazardous air pollutants*: monitor their concentration, analyse their health effects and reduce their emissions (e.g. from existing coal-fired power plants); take further measures to reduce emissions of VOCs;
- further improve *energy efficiency* so as to reduce energy dependency, air pollution and greenhouse gas emissions; bolster current efforts to expand the use of renewable energy sources; continue efforts to ensure that energy prices reflect environmental costs;
- ensure that work on energy being done by the Presidential Commission on Sustainable Development and the proposed National Energy Committee takes full account of the *pivotal role of energy issues in sustainable development*;
- ensure that efforts to manage air quality are *commensurate with the magnitude of the problem*, including the damage to public health, by: further integrating air pollution and sectoral policies (e.g. energy, industry, transport and urban planning); building capacity in local government; and expanding awareness of the health effects of air pollution and their economic burden.

Water

Korea made *unmistakable progress* in improving the water quality of its rivers during the review period and has set further ambitious receiving water quality targets for the future. *Water quality* in the country's four main water supply reservoirs improved to the extent that the Green Vision 21 target was reached a few years early. Korea extended the coverage of its *waste water treatment infrastructure* from 45% of the population in 1995 to an impressive 81% in 2004, and thereby surpassed another important Green Vision target for 2005. Good progress was also made in reducing industrial discharges and discharges from intensive livestock operations. Korea has begun moving away from the supply-dominated approach of the past towards a more integrated quality and quantity management of its water resources, adopting a *river-basin management approach* for its four major rivers. As part of this, in 2007 it will begin implementing a "total pollution load management" system to manage point-source pollution discharges. Effluent limits for sewage discharges were tightened. The use of nitrogenous chemical fertilisers was reduced by 29% during 1997-2003. Water legislation was further amended and updated during the review period, and much progress was made in implementing the user pays principle for domestic and industrial water use, although there are cross-subsidies from industry to households. Korea has made a start at trying to reverse the mounting damages caused by *flooding* by moving away from a sole reliance on engineering works towards a comprehensive approach that includes ecosystem management.

Recommendations:

- further strengthen *demand management* policies and consistently apply the user pays principle to all categories of users;
- consider how current water supply, sewerage, stormwater and waste water treatment policies can be harmonised in urban areas to achieve an *integrated urban water management*;
- strengthen limits on *industrial effluent* discharges and increase rates of pollution charges;
- speed up measures to control *non-point sources* of water pollution, notably from agriculture, and further reduce point discharges from livestock enterprises, including through a greater utilisation of manure;
- adopt and implement *biological water quality standards* for surface waters;
- ensure that *basin-wide flood control plans*, regional and local land-use plans, and comprehensive water resource management plans are consistent;
- consider *combining the policy functions* for water quantity and water quality.

Despite this progress, Korea still has a considerable *distance to go to meet its water quality objectives* for rivers and reservoirs: in 2004, only about one-third of 194 river sections met their quality targets. Biochemical oxygen demand remains the almost exclusive focus of management, while *heavy metals and persistent contaminants* have so far received little attention. Aquatic species and biodiversity have been neglected altogether. "Red tides" of decomposing algae in coastal waters are a sign of serious *nutrient pollution*. Three-quarters of sewage sludge is still *dumped at sea*. Water infrastructure in rural areas lags behind that in the densely populated urban areas. The proposed strengthening of regulations for industrial effluents has yet to be implemented. The impact of intensive agriculture on water quality and quantity has not been sufficiently

brought under control. The control of *diffuse pollution sources* is only beginning to be addressed. In order to face the long-standing, intense pressure on its water resources, Korea needs to undertake more efforts to confront the challenge of *integrated urban water management*, such as rainwater harvesting, reuse of grey water and retention of storm water.

Waste

Over the review period, Korea made *much progress* in waste management and achieved a number of top results among OECD countries. Korea decoupled the generation of municipal waste from private final consumption by limiting the increase in municipal waste to 6% between 1997 and 2003. Municipal waste amounted to 390 kg per person per year in 2003 (as in the mid-1990s). This result was achieved with a new *volume-based waste fee system*, as well as with measures to recycle *waste and food waste*. Concerning recycling and reuse, Korea surpassed its Green Vision 21 targets and can proudly present *rates that are among the highest in the OECD*: nearly three-quarters of all (municipal and industrial) waste was recycled in 2003. An *extended producer responsibility system*, implemented in 2003, further increased the recycling rate for targeted waste items by 12%. The first and second comprehensive national waste management plans adopted during the review period signalled the wish to adopt an integrated approach to waste management with quantitative targets. New legislation was enacted to deal with the growing problem of construction and demolition waste. New *sanitary landfills* were built, notably the world's largest landfill site at Sudokwon in the Seoul metropolitan area, and the management of landfills was improved, including the control of leaching and the recovery and use of landfill gas. Incinerators are increasingly equipped for energy recovery. Exports of hazardous waste decreased strongly over the review period. A nationwide inventory of problematic landfill sites was made and monitoring in landfill sites was strengthened (e.g. obligation to install leachate monitoring wells). Dioxin emission standards for incinerators were set.

Recommendations:

- further reduce the *material intensities* of the Korean economy through efficient waste reduction, reuse and recycling;
- strengthen measures to *reduce industrial waste* generation (e.g. promoting cleaner production, broadening the scope of the extended producer responsibility system, increasing the rate of the waste treatment fee);
- further *reduce municipal waste* generation (e.g. increased cost recovery from the volume-based waste fee);
- encourage the development of *markets for recycled products*, including by further extending green government procurement;
- promote more *efficient waste disposal* by municipalities and industry (e.g. improved management or closure of substandard landfills and incinerators; prevention of illegal dumping of industrial waste through the waste manifest system; reducing dumping at sea of wastes such as sewage sludge and dredged spoils; close monitoring of hazardous waste management);
- foster *public awareness of waste issues* (e.g. reducing waste generation, preventing illegal dumping, acceptance of waste infrastructure).

However, further progress towards a “*circular economy*” will require *increased economic efficiency* in waste management and additional efforts to reduce, recycle and reuse waste (the “3Rs”). This is all the more important as Korea’s economy is dependant on material imports. The generation of *industrial and hazardous waste* was not decoupled from economic growth during 1997-2003: industrial waste grew by 71% and hazardous waste by 31%, whereas the economy grew by 27%. The most important factor in the growth of industrial waste has been the rise in construction and demolition waste, a consequence of the extensive renovation and replacement of large apartment buildings built 30 or more years ago. Efforts to promote *cleaner technologies* have not been taken up sufficiently by small and medium-sized enterprises. Waste management policies at the national, provincial and municipal levels are not yet as well integrated as they might be. Korea still counts many small and medium-sized incinerators that do not always meet emission standards, although the number is decreasing. While waste legislation has enabled public participation in decision making and the payment of compensation to communities close to waste facilities, problems remain in finding efficient waste treatment solutions. The polluter pays principle is still only partially applied (volume-based waste pricing only represented some 43% of municipal waste collection and disposal costs in 2003). Markets for some recycled materials remain underdeveloped, notwithstanding the extension of the green public procurement system during the review period. *Illegal waste dumping* and dumping at sea remain an issue. Cost-benefit analysis should become standard practice in waste management decision-making.

Nature and biodiversity

Since 1997, Korea has further progressed in its efforts to conserve nature and protect biodiversity. It has strengthened its legal, strategic and planning framework. It has increased the staff for nature conservation. It has strengthened environmental impact assessment and extended its scope to include the impacts of rapid urban development and industrialisation on nature. Economic instruments have been used, such as an ecosystem preservation fee on large-scale developers. *Protected land and marine areas* are distributed across the territory and are being connected by nationwide ecological corridors (e.g. the Baekdu Daegan Mountain Range, protected coastal areas and the Demilitarised Zone). Korea has three marine and seashore parks, covering 270 000 hectares. The system of “nature sabbatical periods” for national parks, with periods of restricted access, has been effective. Concerning *species*, the number under legal protection has increased to 221 (following enactment of the Wildlife Protection Act in 2004), and progress has been made with the recovery of several endangered species (e.g. Asian black bear in Jiri Mountain National Park, musk deer in Ohdae Mountain National Park). The prevention of illegal hunting has been strengthened. In addition, the *management plans for forests*, mostly planted in the years following the Korean War and covering 64% of the country, pursue sustainable development objectives.

However, it is not clear whether Korea’s protection efforts are commensurate with the heavy pressures on nature and biodiversity that are associated with land scarcity, rapid urban and coastal development and industrialisation, and increasing demand for recreation. It has not always been possible to *reconcile nature protection with economic development*. Acute conflicts have arisen in peri-urban and coastal areas and in connection with the construction of transportation infrastructure and golf courses. By raising land prices, land speculation has hindered government efforts to purchase land for nature conservation, although private acquisition and protection of threatened

ecosystems has increased through the National Trust of Korea (an NGO created in 2000). While around 10% of Korea's land area is under protection, most *protected areas* have a relatively low degree of protection (IUCN categories IV and V), although the Seorak Mountain National Park was recently upgraded to IUCN category II. Species protection and habitat conservation need to be streamlined and carried out with better co-operation among the relevant ministries, especially in coastal and forested areas. Higher priority should be given to nature conservation in *land-use planning* at both national and local levels. *Expenditure* for nature conservation and biodiversity protection are on the order of 1% of pollution abatement and control expenditure and less than 0.02% of Korea's GDP. *Illegal trading* of endangered species continues to occur. Scientific knowledge of species and habitats should be increased. *Awareness* of the ecological and economic value of nature, landscape and biodiversity (e.g. as assets for recreation and tourism, and a provider of service values such as flood protection) should be raised.

Recommendations:

- give higher priority to nature conservation and biodiversity protection; protect *ecologically valuable areas in urban, peri-urban and coastal areas*, e.g. by use of land-use planning, prior environmental review and environmental impact assessment; increase attention to landscape values;
- strengthen *funding and human resources* for nature protection; increase the purchase of land by central and local government for nature protection; develop the use of economic instruments (e.g. ecosystem conservation charge); encourage stakeholder participation in policy planning;
- increase the actual protection of designated *protected areas*; streamline the management of these areas by the relevant authorities; minimise the impact of recreational and tourist facilities;
- strengthen *species protection*, including through habitat protection, sanctions for illegal hunting and trading, recovery programmes and measures against invasive species; ensure consistency in the actions taken by different authorities;
- set targets for nature protection in *coastal areas* and develop appropriate funding mechanisms to reach them;
- further *integrate* nature and biodiversity considerations into sectoral policies and practices (e.g. agriculture, forestry and fisheries);
- further strengthen *scientific knowledge* of Korea's natural resources and biodiversity (e.g. through surveys in the Demilitarised Zone and other valuable areas) to support policy decisions; prepare *biotope maps* at the local level to support the protection of valuable areas; raise *awareness* of the ecological and economic value of nature, landscape and biodiversity.

2. Towards Sustainable Development

Integration of environmental concerns in economic decisions

Korea succeeded in the review period in strongly *decoupling* several environmental pressures from GDP growth (e.g. SO_x emissions, the use of pesticides and fertilisers in agriculture); SO_x and NO_x emissions per unit of GDP are *below the OECD average*, as is per-capita municipal waste generation. Although *municipal waste*

generation has continued to increase, it has risen at a lower rate than GDP due to an active recycling policy, volume-based waste charging and, more broadly, Korea's emphasis on a "3Rs" (reduce, recycle, reuse) strategy for waste management. The introduction of cross-compliance in *agricultural policy* and of agri-environmental payments in 1996 brought positive environmental outcomes. *Tourism and forestry* sectoral plans have been prepared with due attention to environmental concerns. As tourism accounts for 4.8% of Korea's GDP, the second tourism development plan (2002-11) aims to increase eco-tourism and strengthen environmental impact assessment of tourism development projects. The fourth forest development plan (1998-2007) foresees conservation of 25% of planted forest ecosystems. In the *fisheries* sector, a total allowable catch system was adopted in 1998 and the doubling of budgetary transfers to fishery policies since 2000 was mainly to preserve the marine environment. Adoption of the Coastal Zone Management Act (1999) was followed by development of an integrated *coastal zone* management plan (2000). There is no evidence of environmental progress affecting the overall *competitiveness* of the Korean economy. On the contrary, environmental efficiency is enhancing the results of a number of Korean firms in international markets. As regards institutional arrangements, the *Presidential Commission on Sustainable Development* was created in 2000 (as an advisory body), and a sustainable development strategy was launched in June 2005.

However, with *rapid economic growth* and *high population densities*, Korea continues to face challenging sustainable development issues. Its intensities of energy, water, pesticide and fertiliser use as well as its CO₂ emissions are among the *highest in the OECD*. High priority should be given to further reducing the energy and CO₂ intensities and material intensities of the Korean economy. Further improvements in reducing air pollution should bring health and related economic benefits. The *energy and transport* sectoral plans have been prepared with little regard to environmental concerns. The second national energy plan projects energy demand to grow by 3.1% a year over the period 2002-11 and envisages only limited changes in the energy mix (with only 5% for renewables by 2011). The *prices of electricity and natural gas* for industry are kept low though being higher than production costs. Electricity is largely produced from coal (with subsidies for domestic production) and from nuclear energy (with little provision to the fund for nuclear waste management). In the *agricultural sector*, border protection continues to be very high and with it the level of market price support, thus creating incentives for unsustainable farm practices. Efforts to decouple direct payments from production should be pursued. No sectoral policies or plans have yet been subject to *strategic environmental assessment* and there is limited use of *cost-benefit analysis* to support policy formulation. In the context of Korea's low overall tax burden (by OECD standards), in-depth thinking about environmental tax reform is desirable. The pursuit of balanced territorial development, including the construction of a new administrative capital city and of new transportation infrastructure, will offer challenging opportunities to "green" the country's *physical development*.

Recommendations:

- strengthen *institutional mechanisms* to foster integration of environmental concerns in sectoral policy planning (strategic environmental assessment) and in large projects, under the guidance of the Presidential Commission on Sustainable Development;
- develop *economic analysis capacity* within the Ministry of Environment;
- establish an institutional mechanism, such as a *green tax commission*, to review the environmental effects of fiscal instruments, identify environmentally harmful subsidies, and improve the use of economic instruments;
- reduce the *differential in energy prices* (electricity, natural gas) between households and industry, with a view to fostering demand-driven energy planning policy;
- further reduce *energy, material and pollution intensities* performance indicators.

Integration of environmental concerns in transport decisions

Overall, Korea has undertaken wide ranging and often innovative efforts to address the challenges associated with transport. Concerning *vehicles*, a substantial strengthening of emission standards has resulted in limited growth in emissions of NO_x and CO in spite of a rapid increase in the road vehicle stock. These standards were further strengthened in January 2006, to levels comparable to those of the EU and the United States. More *stringent emission inspections* for in-use vehicles, using both loaded tests and on-road checks, also contributed to these results. Concerning *fuel quality*, the lower sulphur content in diesel fuel and lower benzene content in unleaded gasoline are clear improvements. A large fleet of compressed natural gas (CNG) buses is already in use, and the 23 000 urban buses will be using CNG by 2010. Concerning *traffic*, economic instruments (e.g. congestion pricing, traffic generation charge, parking fee) and fiscal incentives (targeted exemption or rebates) have been strengthened to induce environmentally-friendly behaviour. Efforts have been made to improve traffic management, including the expansion of bus-only lanes and modern traffic engineering techniques (e.g. the Intelligent Transport System). Concerning *infrastructure*, the creation of the Seoul-Busan high-speed train line and plans to increase funding of the railway are positive developments, although road construction will continue to receive the lion's share of transport investment funds. In light of the expected further increase in transport demand, a new national infrastructure plan has been elaborated for the period to 2019, with measures to promote multi-modal freight transport and public transportation.

Nevertheless, the transport sector is still responsible for large shares of NO_x, PM₁₀ and CO₂ emissions in Korea. *Traffic congestion, and the resulting pollution by particulate matter and CO₂*, is worsening. PM₁₀ levels in large cities are increasing; in Seoul, they exceed the Korean air quality standards due mainly to increased use of commercial diesel vehicles. The introduction of private diesel vehicles on the Korean market should benefit from best available technology to trap particulate emissions. The average speed of traffic in some large cities is decreasing and the estimated economic cost of congestion (1.6% of GDP) is growing, although *traffic demand management* measures (e.g. parking fee differentiation, congestion pricing and voluntary non-driving days) have been introduced. It is expected that the success of the measures taken so far will be offset by the volume increase of car and truck use. Further efforts to manage

transport demand and to achieve a better modal balance, taking into account environmental and other externalities, are clearly needed. Concerns about *CO₂ emissions* have not been fully integrated into transport policies. Average energy efficiency standards were introduced for vehicles in January 2006; related labelling could be considered. A variety of *environment-related taxes and charges*, such as a road fuel tax, environmental improvement charge on diesel vehicles, and traffic inducement charges will be reviewed as part of a forthcoming reform of transport-related taxes and charges. Further integration of environmental concerns into transport policy should be pursued, using the full range of available instruments and addressing vehicles, fuels, traffic, infrastructure and financial issues associated with transport management.

Recommendations:

- continue efforts to strengthen *emission and fuel efficiency* standards for vehicles, as well as to improve *fuel quality*; continue efforts to review various policies to internalise externalities related to transport and the environment;
- give higher priority to *transport demand management*, e.g. through road and road fuel pricing; streamline the current *economic and fiscal incentives* to enhance environmentally sustainable transport;
- move towards a more environmentally *sustainable modal share of freight traffic*;
- pursue efforts to facilitate *public transportation in urban areas*, e.g. through further expansion of bus-only lanes and integrated fare systems;
- pursue integration of *transport, housing and land-use policies* in the context of sustainable development.

Integration of environmental and social decisions

Since 1997, Korea has made progress in strengthening its *environmental democracy*. *Environmental information*, as well as access to it, has improved. Efforts have been made to *strengthen participation and partnerships* between government and other stakeholders including business and a growing range of environmental NGOs. Mechanisms for resolving environmental disputes have included promoting dialogue (through the *Presidential Commission on Sustainable Development*) and public participation (through environmental impact assessment of development projects), as well as providing access to administrative and judicial procedures (through national and local environmental dispute resolution commissions). These have helped to prevent some conflicts and increase the dialogue with stakeholders on emerging environmental issues. A draft law addressing prevention and resolution of environmental and social disputes is in Parliament. Korea has made efforts to reduce adverse *health effects* caused by environmental pollution, particularly air and water pollution. In January 2006, Korea adopted a national environmental health action plan. Considerable progress has been made in environmental awareness and in further developing *environmental education* and training in schools and society at large.

However, further improvement is needed of the various mechanisms for preventing and resolving *environmental conflicts*, including conflicts over new infrastructure and other development projects and over competition for the use of scarce land (e.g. at the periphery of urban areas, on coastal areas). *Environmental indicators* should help measure environmental progress and support environmental management at

strategic, planning and programming levels. Despite recognising the importance of *environmental health*, Korea has yet to streamline its environmental health measures, especially those for *indoor air* and occupational health. The number of people affected by asthma and respiratory disease has increased. There are issues regarding *occupational disease* (e.g. pneumoconiosis, hearing loss, heavy metal poisoning, solvent toxicity, chemical substance poisoning) and *work-related disorders* (e.g. musculoskeletal disorders). While the capital area produces half of the country's GDP, multiple *regional disparities* have increased, requiring a strengthening of the policies for balanced regional development. Such efforts should address disparities in water-related services, waste services, and compliance with air and noise regulations. Access to environmental services should also be considered in the context of household income and social security coverage.

Recommendations:

- further strengthen mechanisms for preventing and resolving *environmental conflicts*; strengthen and broaden *public participation*, especially in preparing and implementing development projects and assessing their environmental impact; strengthen the *liability legislation* in order to better compensate for damage to the environment in line with the polluter pays principle;
- develop and use *environmental indicators* to support environmental management at strategic, planning and programming levels; continue to expand the scope of and access to the pollutant release and transfer register;
- expand analysis of environmental health issues (including monitoring, epidemiological studies, economic analysis), especially for large cities and industrial complexes and near contaminated soils; ensure implementation of the ten-year *National Environmental Health Action Plan*; monitor its implementation with appropriate indicators; strengthen management of indoor air quality and *occupational health*;
- review and improve *water supply* management on the basis of equity, efficiency and financing criteria;
- further raise *public awareness* of environmental issues and promote sustainable consumption patterns and *land use*.

3. International Co-operation

Korea made *impressive progress* during 1997-2005 in projecting internationally its environmental values, influence and leadership. This reflects Korea's commitment to environmental protection domestically and globally, as well as its recognition of the obligations and capabilities associated with its rapid economic growth and its new responsibilities as a member of the OECD community of industrialised nations. Since the previous OECD Environmental Performance Review, Korea has hosted numerous major international environmental meetings (e.g. the 2005 UN-ESCAP Ministerial Conference on Environment and Development in Asia and the Pacific, the 2004 UNEP Special Session of the Governing Council and Global Ministerial Environment Forum), participated much more extensively and actively in *multilateral and regional* organisations, and played a lead role regionally in advancing environmental capacity-building and programme initiatives. Ratification of global conventions on oil spills, wildlife conservation, chemicals, hazardous wastes and climate change was followed up rapidly by implementation of national legislation, reporting and public

awareness campaigns. Similarly, Korea fulfilled its commitment to adhere to the body of OECD Decisions and Recommendations on environmental matters, following its accession to the Organisation in 1996. Korea *expanded its outreach systematically* to now include memorandums of understanding and technical exchanges with developing countries in Southeast Asia, the Middle East and Africa. It provided leadership within the Northeast Asia region by focusing attention and resources on transboundary problems of special interest to Korea, including dust and sandstorms, acid rain, marine fisheries and migratory wildlife. A strong, comprehensive national marine fisheries management regime was established. And the Republic of Korea's *efforts to engage North Korea* in protecting the unique ecological resources of the Demilitarised Zone gained international attention and endorsement.

Recommendations:

- continue to strengthen and build on Korea's recent *expansion of international engagement, co-operation and leadership* in regional and global environmental problems;
- set out in the next national plan on *climate change* specific objectives and precise measures to be taken over the next few years to reduce the rate of growth of greenhouse gas emissions in order to participate actively in the UNFCCC process;
- reduce Korea's production and export of *ozone-depleting chemicals* to ensure that the nation's responsibilities under the Montreal Protocol are fully met on schedule;
- continue to expand *support to developing countries* through public and private bilateral institutions and programmes as well as through financial and in-kind support for regional and multilateral banks and programmes, while seeking to increase the environmental dimension of Korea's official development assistance;
- continue to tackle *marine pollution* problems, including pollution in Korean waters and eutrophication of shallow coastal waters; further strengthen *oil pollution* prevention, preparedness and response;
- upgrade Korea's environmental *enforcement capabilities* to comply with international commitments on transboundary movement of hazardous wastes and on trade in endangered species, forest products and restricted chemicals, including ozone-depleting substances;
- enable ongoing multi-national planning, modeling and monitoring programmes on *critical regional problems* of acid rain, dust and sandstorm pollution, and fisheries management to move into the operational problem-solving phase at an early date;
- pursue, bilaterally and in concert with other nations and international organisations, a strategy for ensuring sound environmental management of the *Demilitarised Zone*, including its possible designation as a UNESCO Biosphere Reserve.

On the other hand, the absence of specific greenhouse gas reduction targets in Korea's three-year national action plans on *climate change* weakens pressures and incentives for reducing greenhouse gas emissions meaningfully in the foreseeable future. Korea met its initial 2005 *commitment under the Montreal Protocol* for the phase-out of CFC production, after having been granted an extended phase-out schedule as a

“developing country” under the protocol; and it has prepared a 2005-10 CFC reduction plan. While Korea’s *official development assistance* and its environmental component have been increasing, the funding levels are well below those of other OECD donors and are not commensurate with Korea’s economic status. *Inspection and enforcement* remain weak for ensuring compliance with domestic laws and international commitments on the transboundary movement of hazardous waste, trade in endangered species and chemicals, and ship-based marine pollution. Some progress has been made in reducing *land-based sources of marine pollution*, including the dumping of sewage sludge and dredged spoils in coastal waters, but this remains an issue. Concern about overfishing has emerged. *Overall*, the Korean economy is evolving from a developing country status (especially since Korea’s accession to the OECD in 1996) towards convergence with other OECD countries’ economies (with the aim of reaching a GDP per capita of USD 20 000 in the coming years). In parallel, environmental convergence has advanced with the adoption of the body of OECD environmentally related Council Acts and engagement in regional and multilateral environmental co-operation. However, *the road to full environmental convergence will require strengthened efforts*, particularly concerning climate, stratospheric ozone, aid and marine issues.



LUXEMBOURG

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR AND WATER**
- 3. WASTE AND MATERIALS MANAGEMENT**
- 4. NATURE AND BIODIVERSITY**

Part II
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- 5. ENVIRONMENT-ECONOMY INTERFACE**
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REFERENCES

CONCLUSIONS AND RECOMMENDATIONS*

This report examines the progress that Luxembourg has made since the last OECD Environmental Performance Review, in 2000, and assesses the extent to which the country has *achieved its national objectives and respected its international commitments*. It also examines Luxembourg's progress in the context of the OECD Environmental Strategy**. The report offers 41 recommendations intended to help strengthen Luxembourg's environmental performance.

Between 2000 and 2007, Luxembourg's economy grew rapidly, by 34%, and its population rose by 9%. In 2008 and 2009, it suffered the effects of the international economic and financial crisis. Luxembourg is the richest country of the OECD, and its economy is dominated by services (mainly banking, insurance, real estate and services to business), which account for 85% of GDP. Pressures on the environment, stemming primarily from consumption (pollution from transportation, waste generation, and land use), are heavy. Luxembourg is also characterised by its international interdependence. First, with its *neighbouring countries*: its economy is highly integrated with those of Belgium, France and Germany in particular and around 90% of its trade is with Europe. Luxembourg's geographical situation and economic development have also made it a focal point in "la Grande Région". More than 40% of domestic jobs are held by non-resident border crossers, and 75% of automotive fuel is sold to vehicles not registered in Luxembourg.

Luxembourg's environmental policies have achieved significant results, but there is room for further progress, particularly regarding sanitation, nature and biodiversity conservation, greenhouse gas emissions, and – more generally – sustainable development. With the current preoccupation over the financial crisis and ways of addressing it, the environment is often viewed in some political debates as a constraint on economic development. To *address these challenges*, Luxembourg will need to: *i)* pay greater attention to cost-effectiveness in implementing its environmental policies; *ii)* integrate environmental considerations more effectively into economic decisions, particularly as they relate to transportation, energy and taxation; and *iii)* pursue and expand its international co-operation on environmental issues.

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 7 October 2009.

** The objectives of the OECD Environmental Strategy 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) and global environmental interdependence (Section 3).

1. Environmental Management

Strengthening the implementation and efficiency of environmental policies

Luxembourg has a very comprehensive set of domestic environmental laws, based largely on European legislation. It currently has a *control and inspection unit for classified facilities* and a mobile inspection unit for enforcing regulations relating to nature and forests. In 2003, the Luxembourg government adopted a *Master Programme for Territorial Planning*, as a physical planning tool at the national level. This programme provides a reference framework for the *master plans for primary sectors* (transport, landscapes, housing, and economic activity zones), which are in the process of adoption. Regulation remains an effective tool for implementing environmental policies, although voluntary instruments are now being used in many sectors. Government funds contribute to public environmental expenditure. They are financed by budgetary allocations (Environmental Protection Fund, Water Management Fund) and by partially earmarked taxes, such as fuel and vehicle taxes (Financing Fund for the Kyoto Mechanisms).

Recommendations:

- encourage more sustainable *modes of consumption* through regulatory and economic measures and appropriate demand management (for example, in the areas of solid waste, mobility, public and private buildings, land use);
- reinforce the internalisation of external environmental damage; enforce the "*polluter pays*" and "*user pays*" principles more effectively (for example in the management of waste, sewage, energy and transport);
- make environmental policies more effective and efficient through the use of *economic instruments* and closer *monitoring of the results* of environmental actions;
- ensure better *coordination of central and local government efforts* to implement environmental and land use policies, including European directives (for example, classified facilities, water management, space and species management);
- continue to implement the law on *strategic environmental assessments*.

Yet Luxembourg is facing a number of environmental challenges in terms of pollution (waste water treatment, air pollution from NO_x) and unsustainable patterns of consumption (transport, energy, recreation, space). Its biodiversity and its landscapes are under threat. To address these challenges, *implementation* of environmental policies will have to be strengthened. The principles of "*polluter pays*" and "*user pays*" (especially for waste and water management) should be applied more effectively; greater use should be made of *economic instruments*; and the actual results of environmental policies should be measured more closely. Efforts by the central government and local authorities are not always well coordinated. Luxembourg has a plethora of plans and programmes, but the measures contained in those plans are not sufficiently spelled-out in terms of their costs, timing or budgeting. Luxembourg has been slow to implement certain laws (the Sustainable Development Plan, sectoral master plans) and European directives. For example, there are gaps in Luxembourg's *implementation of the Seveso directive*, which calls for external emergency plans that entail active obligations to notify local residents.

Air

Emissions of *several atmospheric pollutants* have been reduced over the last 10 years (SO_x, NO_x, NMVOC). *Emissions of non-methane volatile organic compounds* (NMVOC) should meet the reduction target set by the EU directive on national emission ceilings (NEC) for 2010. SO₂ concentrations have been kept well below the authorised limit value for the protection of human health. Limit values for fine respirable particles (PM₁₀) have never been exceeded. A national target has been set to have 25% of homework commuting covered by public transit by the year 2020.

However, limit values for the protection of human health from *nitrogen dioxide* (NO₂) are being exceeded in Luxembourg City, primarily because of automobile traffic. Luxembourg is not likely to meet the target for NO_x emissions set by the NEC directive. Measures will have to be taken to control the main sources of NO_x (urban heating, industry and transportation). These measures would help prevent the formation of ozone, of which NO_x are precursors. *Concentrations of ground-level ozone* are regularly above the pre-alert threshold for the protection of human health at several sites. The country has yet to come up with a regional ozone plan. Bio-surveillance programmes for dioxins and furans (PCDD/F) in the vicinity of steel plants indicate that sometimes certain health standards are exceeded.

Recommendations:

- take more effective steps to reduce *NO_x emissions* and meet the targets of the EU emission ceilings directive (NEC), including action on energy and transportation pricing;
- estimate the level of absorption of *dioxins and furans* among people living in the steelmaking basin, and reduce their exposure;
- strengthen the benefits of *climate change policy* for emissions of conventional air pollutants;
- pursue efforts to *develop public transport*, so as to achieve the 2020 objective that it covers 25% of home-work commutes.

Water

A *Water Management Administration* was created in 2004, bringing together various services under the supervision of the Ministry of the Interior and Territorial Planning in order to create an appropriate instrument for integrated water management. A *new water law* consolidates the various pieces of water legislation and transposes the EU water framework directive and floods directive. The law seeks to harmonise the *structure of water pricing* and introduces the principle of full cost recovery for drinking water supply and urban sewage treatment. It introduces *an abstraction tax and a pollution tax*, which are to come into force in 2010. Draft management plans have been prepared for the country's two main river basins. A master programme for managing flood risks will be prepared for the different communes facing such risks. The national nitrogen balance has improved significantly.

Drinking water sources, however, have not been protected, despite a legal obligation to do so that dates back more than 15 years. Many *aquifers* have been contaminated by nitrates and pesticides. Implementation of the EU water framework directive will not be easy: at least 40% of *surface water* is likely to fall short of the 2015 EU targets for chemical and biological quality. Only 22% of the population is connected to a tertiary-level *waste water treatment plant*, even though the entire country is classified as a sensitive zone. The legal obligation to recover 100% of water service costs by 2010 will not be met without major pricing adjustments. *Financial assistance to the communes* from the Water Management Fund has been doubled to help them to cover 90% of sewerage and sewage treatment investments. *Rural development policies* have focused more on farm modernisation and the continued use of agricultural land than on targeted protection of water resources.

Recommendations:

- implement the new Water Law; in particular, *promote river basin management* through the Water Management Administration and the water district management plans;
- apply the *"user pays" and "polluter pays" principles* to water pricing for households, industry and agriculture; ensure financing for *tertiary-level waste water treatment plants* required by the EU urban waste water directive;
- consider the establishment, on a voluntary basis, of *sustainable management plans at the farm level*, in order to make farmers more accountable for managing inputs, water and biodiversity;
- *strengthen control of drinking water quality*; delineate drinking water protection areas around aquifers and protect them.

Waste and materials

Luxembourg has for many years been pursuing an *active policy* of waste and materials management. The *legislative and regulatory framework* is comprehensive, in accordance with European legislation, and there is a *General Waste Management Plan* that sets qualitative and quantitative objectives. There are many activities relating to information, awareness and advice. During the review period, *municipal waste* increased less quickly than GDP (relative decoupling); *collection and recycling rates* also improved, and are among the highest in Europe; and residual mixed waste remained stable. There has been significant progress with *"problem"* household and industrial waste. There is now a legal basis for managing them, and this ensures greater consistency at the national level. Luxembourg industry makes heavy use of *secondary raw materials*, and self-sufficiency is guaranteed for the disposal of municipal waste. Significant progress has also been made with respect to *inert waste*.

Municipal waste production per capita, however, is among the highest in the OECD, although cross-border workers contribute to that production. The targets of 30% reduction in specific disposable waste and bulky waste has been missed. Municipal waste management still suffers from a *lack of coherent* planning at the national level, which makes it difficult to exploit synergies. As a result, the quality of sorting is uneven and there is considerable unexploited recovery potential, particularly for organic components and plastics from municipal waste. The *polluter pays principle* is only

partially applied, and prices vary among the communes. There has been little progress in managing *waste from the health sector*: it is no longer coordinated, and self-sufficiency is not guaranteed for the treatment and disposal of infectious waste. Despite a survey of *contaminated sites*, there is no plan for rehabilitating them, and there is no assured funding for cleaning-up orphan sites.

Recommendations:

- implement the *General Waste Management Plan* with more efficient measures for achieving the principal objectives, and with the necessary financial and other means;
- establish harmonised and differentiated pricing for municipal waste management across the country, based on the *polluter pays principle* and cost recovery;
- achieve *economies of scale* by encouraging communes to cooperate more effectively and coordinate their actions (collection methods, selective sorting, recycling programmes);
- coordinate the management of *hospital* and similar waste, in partnership with interested parties in Luxembourg and the neighbouring countries;
- establish a multi-year clean-up and rehabilitation plan for *contaminated sites*, including orphan sites, and specify how they will be funded;
- establish a database in support of a policy to enhance *resource productivity* and identify the best measures for achieving it (e.g. use of new technologies and innovation).

Nature and biodiversity

Luxembourg today has institutional, legislative and financial frameworks for implementing a nature and biodiversity conservation policy. The objectives are spelled out in the *National Plan for Sustainable Development* (1999) and the *National Plan for the Conservation of Nature* (2007). Luxembourg has thus made up for most of its lag in setting the framework for nature and biodiversity conservation. A *registry* of biotopes is now used to identify the most important ones and ensure they are taken into account in land use planning. A natural environment *Observatory* will make it easier to monitor landscape changes that could affect biodiversity. The European *Natura 2000* programme has fostered the protection of natural spaces (which increased from 6.5% to around 17.5% of the national territory during the review period). Initiatives to restore watercourses are contributing to biodiversity and to flood prevention, particularly in the context of agreements signed between the central government and the inter-communal syndicates. There is now more assistance for promoting sustainable forestry practices among private landowners.

However, the number of threatened species is still high and there is continuing pressure on biodiversity caused by fragmentation of the territory, urban sprawl, and transportation infrastructure. Despite a significant increase in protected areas, they are still far from fulfilling their potential to support biodiversity: they have few management plans and many of those that exist are just now being put into effect. The economic services derived from ecosystems (relating for example to climate change, flood prevention and water purification) are generally *underestimated*. *Agro-environmental subsidies*, specified in the EU framework, are not sufficiently utilised, and there is still

need for a rural conservation policy that integrates natural habitat restoration into farm management. *Sustainable management of privately owned forests* is still difficult to implement because of the fragmentation of properties.

Recommendations:

- establish *two strong conservation areas* of sufficient size (for example IUCN categories I to III), one in a forest zone and one in a farming area, to serve as *biodiversity reservoirs*;
- develop and implement management plans, enhance biological productivity in the *protected areas* (protected zones, Natura 2000 zones, natural parks, Ramsar zones); establish *biological corridors* linking the Natura 2000 zones in order to facilitate migration of fauna and flora;
- pursue partnerships between the *central government and the communes* on joint conservation and habitat rehabilitation projects;
- make greater use of economic instruments to encourage landowners to *adopt sustainable farming and forestry practices* that will favour biodiversity; develop programmes to pay for the economic services that ecosystems provide, particularly aquatic and forest ecosystems;
- establish *forest management programmes* to rejuvenate the forest so that it can supply biomass for energy production and to enhance its capacity to sequester CO₂.

2. Towards Sustainable Development

Integrating environmental concerns into economic decisions

Despite its growing GDP and population, Luxembourg has made progress in *decoupling* environmental pressures from economic growth. Generally speaking, such decoupling has been relative, except for SO_x and NO_x emissions, where decoupling has been absolute. A 2004 law laid the basis for the National Plan for Sustainable Development, which is to be renewed every four years and linked to sectoral plans. A participatory follow-up process (assessment report and indicators) has also been established. The law created an Interdepartmental Commission on sustainable development (CIDD) and a Superior Council for Sustainable Development (CSDD) comprising representatives of civil society. Progress has been made in integrating environmental concerns into certain sectoral policies such as transportation, with priority given to *public transport* and an increase in the Rail Fund, but efforts have been inadequate in other sectors. With regard to the *taxation of transportation and energy*, the annual vehicle tax is now calculated as a function of CO₂ emissions, and a fuel tax (the "Kyoto cent") has been introduced to combat climate change. A National Plan for Energy Efficiency has been introduced, together with economic incentives targeted at the construction industry, and a national body has been created to provide information and advice on energy savings and renewable energy.

However, decoupling problems persist, especially for *CO₂ emissions*. Trends in the transport and energy sectors are of concern, particularly as the "*motorisation rate*" is among the highest in the OECD, and taking account of sales of fuel to non-residents, Luxembourg's economy is the most carbon-intensive in the OECD in per capita terms. The country's wealth also generates pressures from household consumption and other economic activities. The 1999 National Plan for Sustainable Development, mostly

implemented by the Ministry of the Environment, is to be replaced by a new plan for which a draft, approved by the government in 2009, has yet to be adopted. The *gasoline price gap* between Luxembourg and neighbouring countries should be reduced to encourage fuel savings and to reduce the emissions caused by fuel exports (transit, cross-border workers, "gas pump tourists"). These exports in fact account for 75% of fuel sales in Luxembourg. Some tax provisions, such as the commuter head tax, are potentially damaging to the environment. A comprehensive "*green tax reform*" as recommended in the previous review, has not been undertaken. Environmental policies lack a *long-term vision*. The environment is still often seen in some political debates as a constraint on economic development. R&D efforts (the environmental component of the CORE programme), eco-technologies (the new 2009 Action Plan), energy savings (2008 National Energy Efficiency Plan) and the promotion of public transport are all part of a *new conception of the environment as an economic opportunity*. But as Luxembourg looks ahead post-crisis, it is not certain that environmental action will receive greater priority, beyond the country's European commitments.

Recommendations:

- develop a "*green package*" as part of efforts to sustain economic activity and to emerge from the crisis, with a proactive and *long-term environmental vision*;
- promote *synergies* between the environment and R&D, technology, exports, energy savings and resource productivity in the context of diversifying the national economy;
- adopt and *implement* the National Plan for Sustainable Development; adopt and implement the sectoral master plans;
- identify and eliminate *subsidies* and tax provisions that are potentially damaging to the environment;
- review, revise and increase, when necessary, environmental taxes and charges, in particular on transportation and energy, perhaps in the context of a *broader tax reform*;
- review *subsidies* for energy savings and renewable energy and assess their economic efficiency and environmental effectiveness.

Integrating environmental and social decisions

During the period under review, a number of *health indicators* have improved: life expectancy is up, while the child mortality rate is down by half and is now half the OECD average; the dioxin content of maternal milk is lower. Health risk factors, and environmental ones in particular, are regularly checked and the results are often published. Luxembourg has adopted electromagnetic field exposure limits that are stricter than those in the European recommendation are. With regard to *environmental democracy*, Luxembourg ratified the Aarhus Convention in 2005, and its Protocol on Pollutant Release and Transfer Registers in 2006. The recent trend in legislation and case law has facilitated *access to justice* for environmental protection associations. A public mediator has been appointed. The State provides financial assistance to NGOs dedicated to environmental protection and to local and regional initiatives for implementing the *Action 21* programme, and they have multiplied with this support. New legislative provisions have strengthened the *role of the communes*, inter-communal co-operation, and *partnership with the central government* in nature conservation. The

Ministry of the Environment conducts regular environmental awareness campaigns. The University of Luxembourg has a programme for research on environmental technologies and is helping prepare a national strategy for *sustainable development education*.

Although Luxembourg has a high standard of living, some of its health indicators are worrying: for example, the death rate from respiratory diseases is higher than the OECD average. Children are more exposed to *health hazards relating to air pollution*, noise and road accidents than in other EU countries. A "noise map" has been prepared, but no measures have been taken to *combat noise*. There has been little strategic thinking about the links between health and environmental conditions. Greater attention should be paid to the potential economic benefits that would flow from better environmental conditions and a healthier lifestyle. With respect to *environmental information*, there has been little progress in collecting and publishing environmental data, and the country is falling behind in its national and international reporting obligations; people are not always informed about public consultations; inadequate use of environmental indicators hampers environmental governance and planning; the *links between the economy and the environment* have not been studied; there is no regular collection of data on public and private spending on environmental protection nor material flows analysis, part of the OECD Council recommendation on resource productivity.

Recommendations:

- design and implement a national plan for better *integration of environmental and health policies*;
- improve the production and dissemination of *environmental information* for timely compliance with national obligations and international commitments; seek synergies among the different players;
- analyse the *interactions of environmental policy with the economy* (for example, expenditure data); develop environmental accounting and material flow accounts;
- pursue local initiatives for implementing the *Action 21* programme;
- develop environmental *education*, particularly in secondary and higher education, as part of the new National Plan for Sustainable Development.

3. International Co-operation

Among OECD DAC members, Luxembourg is one of the most generous donors. In 2008, it devoted 0.92% of GNI to *official development assistance*, exceeding the United Nations target of 0.7% and approaching its own objective of 1%. Around 8% of total bilateral aid goes to environmental protection, water supply and sanitation. The government is committed to enlisting public support for efforts to adapt to climate change. *Regional co-operation* with neighbouring countries on nature and water conservation has been boosted within the context of the "Grande Région" and the International Commissions for the Protection of the Moselle and the Sarre. Despite some delays, Luxembourg transposed the main European environmental directives into its domestic legislation during the period under review. Luxembourg's presidency of the European Union, in the first half of 2005, helped win adoption of the guideline to "Encourage the sustainable use of resources and strengthen the synergies between environmental protection and growth" of the Lisbon Strategy. In 2008 Luxembourg

adopted a national plan for implementing the Stockholm Convention, detailing measures taken and progress achieved in reducing or eliminating *persistent organic pollutants* (POPs). Real progress has been made concerning trade in hazardous substances (hazardous waste, chemical products, POPs, ozone-depleting substances) and environmentally responsible business conduct (for example implementation of the OECD Guidelines for Multinational Enterprises).

In 2007, GHG emissions were at their 1990 level, and Luxembourg's action plan will not be enough to achieve the *ambitious target* (-28% below 1990 levels) set under the *Kyoto Protocol* and the EU burden-sharing agreement. CO₂ emissions per capita are the highest in the OECD (although a significant portion comes from international road transport). The sector shares of GHG emissions have changed radically since 1990: *i*) emissions from the steel industry have sharply declined with replacement of blast furnaces by electric arc furnaces; *ii*) *transport emissions* have risen with the growing number of cross-border travellers and higher export sales of diesel and gasoline, reflecting lower prices in Luxembourg vis-à-vis neighbouring countries. Luxembourg will need to rely heavily on *flexible mechanisms* (estimated at about EUR 360 million) to achieve its GHG targets. The country is unlikely to meet its *NO_x emission* reduction goals (52% below 1990 by 2010) set under the Gothenburg Protocol to the Convention on Long-range Transboundary Air Pollution. Compliance with international commitments is lagging, particularly with respect to the *EU environmental directives*. Luxembourg has been cited on several occasions for infractions of European environmental legislation (urban waste water, nitrates, integrated prevention and reduction of pollution). These lags could be overcome by devoting more resources to meeting international commitments and by giving greater economic and diplomatic priority to the environment.

Recommendations:

- continue to strengthen the environmental dimension of *official development assistance* (environmental projects, environmental impact assessments of other projects, climate change adaptation);
- speed up and reinforce implementation of the measures adopted for achieving the Kyoto target; prepare for *post-Kyoto* by integrating climate change objectives into energy, construction and transport policies (for example, energy efficiency, energy charges and taxes, transport charges and taxes);
- expand co-operation mechanisms through the international commissions on transboundary waters (for example, mutual evaluation of management plans and action programmes);
- fulfil obligations and reinforce co-operation regarding *air pollution* in Europe (European directives, Gothenburg and Aarhus protocols); promote and contribute to implementation of a *regional plan for ground-level ozone*;
- implement the National Plan for the *Stockholm Convention*, including for substances recently added;
- promote international environmental co-operation and step up *environmental diplomacy* efforts in Europe and around the world.

MEXICO*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR MANAGEMENT**
- 3. WATER MANAGEMENT**
- 4. WASTE MANAGEMENT**
- 5. NATURE AND BIODIVERSITY MANAGEMENT**

Part II
SUSTAINABLE DEVELOPMENT

- 6. ENVIRONMENTAL-ECONOMIC INTERFACE**
- 7. ENVIRONMENTAL-SOCIAL INTERFACE**
- 8. SECTORAL INTEGRATION: AGRICULTURE AND RURAL DEVELOPMENT**

Part III
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- 9. INTERNATIONAL CO-OPERATION**

REFERENCES

* Also available in Spanish.

CONCLUSIONS AND RECOMMENDATIONS*

Despite the 1994-95 peso crisis and a sharp economic slowdown in 2001, Mexico's GDP grew by 41% overall between 1990 and 2001 while its *population increased by 22%* (the highest rate among OECD countries) to reach over 100 million today. The Mexican economy is the eighth largest in the OECD and the largest in Latin America, though GDP per capita is among the lowest in the OECD area. These national data mask the existence of *dual consumption and production patterns* and the persistence of regional disparities. Income inequality in Mexico is among the greatest in the OECD area. *Poverty* remains widespread, affecting 53 million people in urban and rural areas, including in particular the indigenous population. Particularly since 1994 (conclusion of the North American Free Trade Agreement and accession to the OECD), Mexico has pursued a policy aimed at *opening up its economy* and integrating it with world markets. Mexico is Latin America's most important exporting country by far; it has extensive oil and natural gas reserves and a wealth of other mineral resources, while its industrial sector is competitive in many fields. With 1.3% of world land area, Mexico hosts about 12% of known terrestrial biota and is one of the world's 12 *megadiverse countries*.

Strong *decoupling* of environmental pressure from GDP, as seen in a number of OECD countries, has not yet been achieved in Mexico. Indeed, recovery from the currency crisis and overall subsequent rapid economic growth have occurred together with increased pressures on the environment, including through pollution and natural resource use, despite the establishment of a solid environmental legal and institutional framework. Further, Mexico has adopted an ambitious approach to environmental governance, increasingly mainstreaming sustainable development as a guiding principle of sectoral policy-making processes and as a shared responsibility of different sectors and institutions. Today, *priority environmental issues* include: water and forest management, which have become issues of national security; integrated management of natural resources; environmental management and environmental planning at the watershed level; decentralisation of environmental management and decision-making; increased public participation and the right of access to environmental information; ensuring that users of natural resources pay for the environmental cost of resource use; and, strengthening of environmental legislation, inspection and compliance rates. Several of these issues reflect pressures on the environment deriving from Mexico's development choices and demography, as some 1.5 million new citizens per year increase the challenges of providing basic environmental services.

To meet these challenges, it will be necessary for Mexico to: i) thoroughly implement its environmental policies, improving cost-effectiveness and financing to extend environmental infrastructure; ii) further integrate environmental concerns into economic and social decisions; and iii) meet its international environmental commitments. This report examines progress made by Mexico *since the previous OECD Environmental Performance Review* in 1998, and the extent to which the country's *domestic objectives and international commitments* are being met. It also reviews

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

progress in the context of the *OECD Environmental Strategy*.^{*} Some 61 recommendations are made that could help strengthen Mexico's environmental progress in the context of sustainable development.

1. Environmental Management

Implementing environmental policies and developing the environmental infrastructure

Environmental legislation progressed during the review period. The General Law on Ecological Balance and Environmental Protection (covering air, sea and fresh water quality, hazardous waste, soil, protected areas, environmental impact assessment and noise) was updated in 1996 to introduce *integrated pollution control* for air, water and waste (introducing a Single Environmental License) and, in 2001, to establish the right of *public access to environmental information* and to strengthen public participation. New general laws were recently enacted on wildlife protection (2000) and on waste management (2003). In addition, all states have created their own environmental legal regimes. An increasing number of environmental offences are considered in the criminal code, and penal sanctions have been taken (e.g. for arson in forests). *Emission standards* are now linked to environmental quality objectives for recipient bodies. *Voluntary industry audits* have led to the granting of clean industry certificates. *User charges for Federal marine reserves* have recently been introduced and will be extended to terrestrial protected natural areas. Efforts are being made to develop public-private partnerships in the water sector.

However, though Mexico has recognised the severe environmental degradation confronting it, time as well as sustained and continuous efforts will be required to implement and fund its environmental policies. Devolution of environmental policy implementation has not been accompanied by adequate capacity building at state and municipal levels. This *implementation gap* reflects, in particular, the complex and sometimes unclear distribution of environmental competency across levels of government and limited local authority to raise revenues from taxes or charges. The scope of *environmental enforcement* has been broadened to address unsustainable use of natural resources (e.g. illegal forest cutting) but without the necessary parallel increases in staff and budget of the Federal Attorney for Environmental Protection (PROFEPA). Irrigation Districts continue to be inspected separately by the National Water Commission (which both inspects and enforces its own irrigation schemes), while individual irrigation schemes (50% of irrigation water) are virtually uninspected. There is wide scope to extend the use of *economic instruments*, particularly in air and waste management. User charges for water and waste water services are set below cost recovery levels. Farmers are exempt from water abstraction charges. *Pollution abatement and control expenditure* has remained low by OECD standards. In fact, there are very large needs with respect to environmental infrastructure (e.g. water supply, waste water collection and treatment, waste infrastructure) which reflect cumulated underinvestment in such infrastructure and rapid population increase in urban areas. Given Mexico's environmental objectives, there is a *financing gap*: insufficient Federal

* 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 2.3), integration of social and environmental concerns (Section 2.2) and global environmental interdependence (Section 3).

spending on environmental protection, limited application of the user and polluter pays principles, the limited revenue-raising ability of states and municipalities and low reliance on external financing all explain Mexico's difficulties.

Recommendations:

- improve *enforcement of environmental legislation*, especially for nature and forest protection, by enhancing the human and financial capacity of PROFEPA and fostering partnerships with police authorities; review water related enforcement and compliance and include waste water discharge in integrated pollution control licences;
- extend the application of the *user and polluter pays principles* through better pricing of water and waste services, with due regard to social constraints;
- review the scope for introducing *new economic instruments* such as product charges on hazardous waste streams, air emission charges, payments for environmental services and water pollution charges;
- expand *environmental infrastructure*; in particular, increase related spending (e.g. from public, private and international sources), improve efficiency in the provision of environmental services, and develop public-private partnerships in the water and waste sectors;
- accompany decentralisation of environmental management to states and municipalities through commensurate *devolution of powers to tax and charge for environmental services* and determined efforts to build local administrative and technical capacity;
- formalise *institutional integration* mechanisms relating to sustainable development; further integrate environmental concerns into economic, fiscal and sectoral policies (e.g. transport, energy, agriculture, tourism).

Air

Air pollution has significantly declined overall in urban areas during the last ten years, including in the megacity of Mexico. CO, SO₂ and lead concentrations have decreased in many Mexican cities. There is evidence of a reduction of acute respiratory diseases in children under five. Mexico has switched from fuel oil to natural gas for part of its electricity production; the share of *natural gas* in total primary energy supply increased to 21% while oil's share fell to 62%. Seven large metropolitan areas have adopted local *air quality management programmes* that address pollution by the industry, service and transport sectors as well as environmental recovery. *Fuel quality improvements* have been the cornerstone of these programmes. Reducing the lead and sulphur content of motor vehicle fuels contributed to the reduction of some emissions from mobile sources. A regional surcharge was applied to petrol in order to finance environmental improvement measures in the Valley of Mexico Metropolitan Area (ZMVM) and to internalise environmental externalities. Further, several Official Mexican *Standards* have been issued concerning emissions from mobile and fixed sources, and more stringent *limit values* have been introduced for *vehicle emissions* of CO, NO_x and hydrocarbons. Vehicles with catalytic converters replaced after five years of operation, clean companies, and facilities using natural gas have been exempted from air quality emergency plans due to a recent regulation. The number of firms voluntarily carrying out eco-audits has consistently increased. Significant progress has been made with

implementation of the OECD recommendation on the Pollutant Release and Transfer Register.

Recommendations:

- continue to strengthen *implementation and enforcement* of the regulatory system;
- extend air emissions regulation to additional *industrial branches* and update existing regulations for SMEs; improve compliance rates, particularly for the most polluting firms;
- better enforce *vehicle inspection*, make it mandatory in the most polluted cities and extend it to buses and lorries; speed up *renewal of the vehicle fleet*; further develop and implement *traffic management* in urban areas, giving appropriate priority to public transport;
- strengthen integration of air quality concerns in the industry, transport and energy sectors through use of *economic instruments* as well as elimination of subsidies with harmful environmental effects;
- continue efforts to improve *fuel quality*; in particular, reduce the sulphur content of diesel and petrol, internalise externalities in fuel prices; proceed with appropriate investment to reduce emissions and to prevent accidents in the energy sector (e.g. in refineries, power plants);
- give higher priority to pollutants with significant impacts on *human health*; in particular extend air quality monitoring to include PM_{2.5} and VOCs;
- further develop the air management capacity of *states and municipalities*; extend *air emission estimates* to the whole country, including to all cities with over 500 000 inhabitants and to energy and industrial facilities; strengthen criteria in air quality emergency plans and extend such plans to the most polluted cities.

However, *exposure to air pollution remains a severe threat to public health*. Extremely high pollution episodes have become rare, but the number of days on which air quality standards are exceeded has remained unchanged. *Suspended particles and photochemical ozone* are of particular concern. Ambient air quality standards for PM₁₀ are exceeded up to 30% of the year in all metropolitan areas. The goal of reducing national NO_x emissions by 40% by 2000 was not achieved. An integrated, long-term approach is required to reduce ozone concentrations to safe levels in the ZMVM. Relatively high levels of emissions from the transport, industry and energy sectors remain a challenge. *Transport* is growing rapidly: the number and use of private vehicles, as well as freight transport, are increasing partly as a result of NAFTA. This “volume effect” has offset the benefits of improved fuels, vehicle standards and traffic management measures. Implementation and enforcement of vehicle inspection programmes is to be strengthened for both cars and commercial vehicles (e.g. buses and lorries). Conversion of high-use vehicles (such as taxis) to compressed natural gas might be usefully revisited. Regulation of *industrial emissions* from specific branches requires updating (e.g. for SMEs) and several branches are still unregulated. Three-quarters of firms inspected in 1998-2002 were not in compliance with air emission standards. Concerning the *energy sector*, the national oil company (PEMEX) has already made important investments and half its facilities are working towards obtaining clean industry certificates; however, it still needs to invest massively to control air pollution (e.g. in its refineries) and to prevent accidents at production facilities. The energy sector reform has

not been engaged. The potential for using economic instruments and reducing economic distortions with negative environmental consequences (e.g. due to subsidies) remains to be further explored in the transport industry and energy sectors.

Water

Mexico made substantial progress towards the targets it set itself in the 1995-2000 National Water Plan. Targets for providing access to *water supply, sanitation services and waste water treatment* were largely met in urban areas, though performance fell somewhat short of targets in rural areas. Over 95% of drinking water supplied is now disinfected, with a consequent dramatic decrease in the number of cases of gastro-intestinal disease and the disappearance of cholera. There has been progress towards *decentralisation* of water management: several National Water Commission programmes are now administered at state level; state water laws have been passed in many but not yet all states, and state water commissions have been created. About 25 *river basin councils* are now operating. Administration of *irrigation districts* has been transferred to user associations, which have management and financial responsibility for operating and maintaining their irrigation systems. Water abstraction rights and permits for waste water discharge have been recorded in a Public Register available on Internet. Mexico has greatly improved its water information systems; large amounts of water data and documentation are available. Stakeholder participation in water management is actively promoted.

Recommendations:

- increase current water-related *investments* and management efforts, in order to meet Mexico's 2025 long-term objectives and the 2015 Johannesburg targets for water supply and sanitation, with due regard to the rural population;
- pursue current proposals to increase *compliance* by local utilities and industry with the effluent limits and deadlines of 1996 standard;
- encourage drinking water and waste water facilities to obtain ISO accreditation to improve the *operational performance* of treatment plants;
- continue efforts to improve the *water efficiency of agricultural irrigation*, particularly groundwater-fed irrigation; take measures to halt overexploitation of groundwater aquifers;
- further develop demand management measures that encourage *sustainable water use* and further progress in the transition towards pricing of water services, whilst giving attention to the special needs of the poor;
- strengthen and further develop an *integrated watershed approach* to both improve water and forest resources management and provide environment-related services more efficiently;
- reinforce current policies for *awareness raising* on water quality and for fostering stakeholder participation in water basin management;
- give greater weight in water management to the protection of *aquatic ecosystems* (e.g. rivers, lakes, estuaries, deltas, wetlands).

Use of water resources nonetheless remains *unsustainable*. *Investment in water infrastructure*, already low by OECD standards, fell in real terms during the 1990s. It currently stands at about *half of the investment that would be required* to achieve a sustainable scenario by 2025. Little over one-quarter of urban waste water is treated. Few waste water utilities met the 2000 deadline for effluent limits (set in a 1996 standard); the rest were subject to large fines. Some treatment stations are not operating due to lack of funds. Industrial discharges are largely untreated. The operational standard at treatment stations is often well below design specifications. Water utilities find it difficult to make customers pay their water bills, with the result that their income is too low to maintain good service. *Enforcement* also suffers from inadequate resourcing, and standards are not well respected. *Water losses* from irrigation and drinking water supply systems, despite recent improvements, remain high. The degree of *over-exploitation of groundwater* resources is increasing. Ecological aspects of water quality have so far been given too little consideration.

Waste

Significant efforts have been made to improve *hazardous waste management* in Mexico. Treatment and disposal capacity is increasing steadily and rapidly, with proper waste management capacity reaching 50% of hazardous waste generation and 100% of biological and infectious waste generation. A system to monitor hazardous waste generation, treatment and disposal has been established and its coverage is expanding. The inter-ministerial framework for managing use of toxic chemicals has been active, and efforts to promote substitution of non-hazardous for hazardous substances have been strengthened. Work to identify *contaminated sites* has begun, with these sites being prioritised according to the urgency for remediation. Remediation has been initiated at two sites.

Recommendations:

- *enforce waste regulations* and reduce *illegal disposal* of hazardous and municipal waste, at national and local government levels;
- continue to enhance *hazardous waste* management, and to improve monitoring of hazardous waste generation, by working towards the completion target for the national registry (100% coverage by 2006);
- implement the newly adopted framework legislation for *municipal waste management*; increase the waste management capacity of municipal authorities and operating enterprises;
- develop a national strategy and local programmes to reduce urban and hazardous *waste generation*;
- increase *investment in infrastructure* (e.g. new sanitary landfills, closure of illegal landfills) for municipal waste management and extend services to medium and small cities;
- improve and modernise *recycling and reuse of municipal waste*, introducing producer responsibility for selected waste streams and taking social factors into account (e.g. the role of the informal sector); increase *composting of organic waste*;
- speed up identification of *contaminated sites*; develop and implement a national remediation strategy.

In contrast, *municipal waste management* is at an early stage. Framework legislation has recently been approved but it remains to be implemented. Proper disposal capacity is so inadequate that over half of municipal waste is sent to uncontrolled and illegal landfills. Local governments do not have the capacity for proper waste management. Most households do not pay for waste collection. While a deposit-refund scheme was recently proposed for plastic bottles, there is still little use of economic instruments. Though part of municipal waste is recycled in the informal sector, recycling rates in Mexico are among the lowest in any OECD country. Little has been done to address waste streams of concern (e.g. tyres, used oil, plastic packaging).

Nature and biodiversity

As a megadiverse country, Mexico hosts approximately 12% of the world's total biodiversity. It is a world centre of origin and domestication of food germ plasm. Mexico now has a *complete legal and institutional framework* with which to tackle challenges relating to conservation and sustainable use of biodiversity. It has adopted a model National Biodiversity Strategy and is taking steps to define and implement a National Biodiversity Action Plan. Biodiversity and natural resource policies since the 1990s have aimed at changing production activities with adverse environmental impacts and using biological resources in a sustainable way. *Designated protected areas* increased substantially during the review period. This was accompanied by the establishment of the National Commission for Protected Natural Areas and the National System of Protected Natural Areas, adoption of a number of management plans, and increased funding from public, private and international sources. The National Forestry Commission was created in 2001 to implement the National Forest Strategy, whose objectives are to reduce rural poverty, increase the share of forestry in GDP and reduce deforestation by 75% over the period 2001-25. This led to a 15-fold increase of Mexico's budget for forest management and to enactment in 2003 of a new law for sustainable forest management. Concerning species, some progress was made with conservation and recovery projects for several priority species and the System of Units for the Conservation, Management and Sustainable Use of Wildlife, which covers over one-third of the national territory. The introduction of *incentives for conservation* and sustainable use of biodiversity (e.g. charges at marine national parks, proposed payments for environmental services to forest communities implementing biodiversity conservation initiatives) is a positive step.

However, *important problems requiring solutions can still be identified*. Mexico's biological wealth is *seriously threatened* and is undervalued as a primary factor in socio-economic development. Biodiversity loss and issues have been associated with the pressures created by inadequate earlier development policies: conversion of natural habitats to unsustainable agricultural schemes, deforestation in temperate and tropical forests, overgrazing of arid zone vegetation, illegal trade in threatened species, conservation conflicts in protected areas, lack of integrated coastal zone management programmes, risks of genetic contamination. The *deforestation* rate is still extremely high (among the highest in the world). Despite progress in managing protected areas, these areas account for under 10% of the territory and some types of ecosystems are under-represented; human, material and financial resources are still insufficient, leaving a sizeable number of protected areas without management plans. In the last few years the number of endangered *animal and plant species* has increased. There is a lack of specific legislation regulating access to and sustainable use of genetic resources.

Recommendations:

- integrate *biodiversity* concerns into the planning, execution and evaluation of public policies (e.g. agriculture, forestry, tourism, rural development), in line with the National Biodiversity Strategy and National Biodiversity Action Plan;
- significantly increase *financial resources* (from public, private and international sources) for biodiversity conservation at national, state and local levels, including through user charges;
- further develop the National System of *Protected Natural Areas*: extending its geographical and ecological coverage; providing resources to develop and implement management plans; promoting the establishment of biological corridors; and stimulating participation by private initiatives, as well as indigenous and local communities, in their conservation;
- foster recovery of *endangered species* populations, protecting their natural habitats and reducing illegal trafficking in wild species;
- support conservation and management of terrestrial and aquatic ecosystems *outside protected natural areas*; expand *ecological land planning*;
- combat *deforestation*, particularly for tropical woods and forests: strengthening reforestation programmes; promoting sustainable forest management; encouraging forest certification; and redirecting agricultural subsidies in forest areas to finance public ecological assets;
- consolidate *information systems* on Mexico's biological diversity and introduce *monitoring and evaluation* of biodiversity related policies and actions;
- promote new laws to regulate the access to and sustainable use of *genetic resources*, consistent with international trade and multilateral environmental agreements.

2. Towards Sustainable Development

Integration of environmental concerns in economic decisions

Attaining sustainable development has become increasingly an explicit aim of the strategic National Development Plan (issued by the Office of the President and covering six year periods, based on a 25-year outlook). This plan provides the framework for the programming of much Federal public expenditure by sectors. *Environmental programming* is co-ordinated with other sectoral programming. The National Environmental and Natural Resources Programme is issued every six years. The Programme to Promote Sustainable Development in the Federal Government seeks to include sustainable development targets and action plans in sectoral planning. "Presidential" targets have been set for all ministries, including performance requirements in terms of environmental outcomes and public administration. Two national crusades have been launched, to raise public awareness of tropical deforestation and water resources and of waste management. Since 2001, the Ministry of Environment and Natural Resources (SEMARNAT), which oversees air, water and waste management as well as nature conservation and forestry, has participated in inter-ministerial economic, social and law and order meetings. There is *institutional integration* of environmental concerns within tourism policies (e.g. national eco-tourism programme, Agenda 21 for the tourism sector) and within energy policies (resulting in lower energy intensity and weak decoupling of total final energy consumption from economic growth, fuel switching from oil to natural gas, improvement of road fuel quality).

Prices of *road fuel* have steadily increased. A petrol surcharge was levied in Mexico City's metropolitan area to raise revenue for environmental activities; it has been discontinued.

However, Mexico has not achieved strong *decoupling* of environmental pressure from economic growth as has been done in some other OECD countries. This reflects its development choices as well as rapid population growth. Major sources of direct *environmental pressure* include road traffic, industrial and agricultural production, and energy production and consumption. Road freight traffic increased by 78% between 1990 and 2001, while industrial production, agricultural outputs and primary energy supply rose by 43%, 33% and 24%, respectively. *Market-based integration* has remained very limited. There have been many proposals to improve energy pricing and transport taxation, but few have been put into practice. Excise duty on fuels, designed to protect public revenue and consumer prices from fluctuations in world oil prices, and taxes on vehicles could be further differentiated according to environmental externalities. No strategic environmental assessment is carried out in the case of *transport sector policies*. Limited efforts have been made to influence modal split, resulting in a 78% increase in road freight traffic over the decade. There is very little institutional and market-based integration within the *agricultural sector*. On the contrary, support is provided for the development of intensive irrigated production, and the various agricultural and rural development programmes are designed and implemented with little regard to environmental protection. Progress in developing *renewable energy sources* has been slow, and further investments are needed to expand natural gas production and distribution to meet targets.

Recommendations:

- fully take into account environmental concerns should *fiscal reform* be completed; there is a strong need for an increase in revenues to invest in environmental infrastructure;
- improve the environmental effectiveness of *energy and transport taxes*, differentiated according to air pollutant emissions and fuel efficiency; consider wider use of green taxes (petrol surcharge) to internalise environmental externalities and raise revenues;
- remove *environmentally harmful subsidies* (e.g. electricity and water) whilst giving due consideration to social concerns (e.g. replacement by direct income support for poor farmers and households so as not to distort price signals);
- improve *institutional integration within agriculture policies*, including through creating an environmental unit within the Ministry of Agriculture, Rural Development, Fisheries and Food;
- prepare a strategic environmental assessment of *transport policy*, including measures to reduce urban traffic congestion and develop rail and sea freight traffic, based on cost-benefit analysis;
- finalise the *strategy on energy and the environment*, with nationwide objectives and targets and expected completion dates, including for PEMEX and the Federal Electricity Commission's facilities.

Integration of environmental and social concerns

In the last five to ten years, Mexico has made significant progress in reducing the health impacts of pollution. In particular, a *drop in child mortality rates* (e.g. from acute gastro-intestinal and respiratory diseases) is related to water disinfection and air quality improvements. An *active policy towards income and employment generation* through environmental/natural resources management programmes is achieving positive and sizeable results. The quantity and variety of environmental information available from national authorities (e.g. data, indicators, environmental accounting, state of the environment reports, Pollutant Release and Transfer Registers) has progressed to an advanced stage, though (as in many other countries) statistics from different agencies are not always consistent and some gaps remain. Mexico recently introduced a new law on *transparency of government activities and public access to information*; this emphasis is reflected in the whole array of its environmental laws and regulations. SEMARNAT and the Ministry of Social Development are committed to work together to certify each other's programmes, with a view to meeting both environmental and social objectives. *Environmental education* in both the formal and non-formal educational systems is commendable, as are attempts to reach the least literate part of the population. Indigenous people have been given extended rights, which should enable them to benefit more from the biodiversity they help conserve.

Recommendations:

- further improve health and quality of life, particularly in areas with high marginalisation levels, by reducing the share of people who do not have *access to basic services* (e.g. safe water, basic sanitation, electricity);
- continue to promote initiatives that contribute to *income and/or job generation* together with environmental improvements (e.g. reforestation, eco-tourism, sustainable forestry), particularly in rural and less developed regions;
- further strengthen *environmental education and awareness*, especially among young people;
- continue the development and *use of indicators* to measure environmental progress and related institutional effectiveness;
- ensure practical implementation of the *right of access to environmental information*.

However, efforts on all these fronts (e.g. health, income generation, education, rights of indigenous communities), as well as improvement of access to environmental services, need to be consolidated and extended. Poverty and regional inequalities hamper further progress. *Access to basic services* such as safe water, basic sanitation and electricity remain inadequate, particularly in less-developed regions and poorer communities (including urban slums). Respiratory illnesses due to urban air pollution, as well as indoor air pollution in rural communities where wood-burning stoves are used, still need to be addressed. While a register of hazardous activities has been established, handling of hazardous chemicals and pesticides (especially by migrant farm workers) still entails significant occupational health risks. There is a correlation between poverty and deforestation, as clearing forested land for subsistence farming is often the only way marginalised farmers can secure a livelihood. In many instances such progress will require not only well targeted programmes and more efficient environmental management, but also increased financing.

Sectoral integration: agriculture and rural development

Fertiliser and pesticide use in Mexico is low by OECD standards. Over the last ten years, while farmland area has increased, per hectare use of nitrogenous fertilisers has fallen; this is partly because direct subsidisation of agricultural inputs has been eliminated and payments based on input use have decreased considerably. There have also been efforts to improve pesticide regulations and harmonise registration procedures with those in other OECD countries. Many harmful pesticides, including chlordane and DDT (two persistent organic pollutants), have been withdrawn from the market. *Soil and water conservation infrastructure* is being rehabilitated in rainfed areas to retain rainwater and curb surface water runoff and soil erosion. The ambitious 1992 *water pricing reform* has resulted in water user associations currently covering 80% of operational and maintenance costs in irrigation districts, compared with 20% in the early 1990s. The 1992 *land tenure reform* gave many Mexican farmers titles to property, thereby providing incentives to increase productivity in agricultural and forestry activities and to consolidate small plots into viable farms. The major agricultural policy reform process aims at improving the *market orientation of agricultural production*. The overall level of agricultural support in Mexico is low by OECD standards (Producer Support Estimate of 22%). The share of incentives aimed at intensifying agricultural production is falling significantly, while that of support more decoupled from agricultural production is increasing. Payments have been introduced to prevent use of fires as a farming practice. *Eco-certification* of forest management and of shade-grown coffee plantations is being developed. Further policy reforms give greater emphasis to creation of *new income sources in rural areas*. A new Law on Sustainable Rural Development was enacted in 2001. Rural development measures have been regrouped in a comprehensive national programme (the Concurrent Special Programme). More staff and a larger budget in the Ministry of Agriculture, Rural Development, Fisheries and Food (SAGARPA) are being devoted to rural development policy.

However, commercial farmers tend to *overuse water and chemicals* on high-potential irrigated land. Agricultural water use has increased over the last 10 years; intensity of water use was already high, to the extent that water has become a significant constraint on sustainable development in many agriculture areas. Every year new areas are brought under irrigation, largely due to public investment in water infrastructure and government transfers to support on-farm irrigation, including recently increased subsidies for groundwater pumping. Consumption of methyl bromide (bromomethane), an ozone layer depleting fungicide, has dramatically increased. Traditional and subsistence farming also contributes to environmental degradation, as it tends to encroach on forests and fragile land to sustain agricultural production. *Deforestation* continues at alarming rates in tropical forests, mainly due to forest conversion to farmland or grassland. On-going agricultural policy reforms could provide new incentives for development of profitable forestry, provided the otherwise unremunerated but environmentally beneficial public services associated with forests are compensated. In fact, the link between agricultural policy and forest management has remained weak. Though decoupled from production, the Programme of Direct Payments to the Countryside (PROCAMPO), introduced in 1994, has not led to significant changes in agricultural production. The option of green PROCAMPO payments for environmental purposes has scarcely been used, partly reflecting limited institutional integration between SAGARPA and SEMARNAT. The *environmental effects of PROCAMPO*, including changes in pressures on marginal farmland, have not yet been evaluated. Neither have the anticipated *environmental effects of NAFTA* (from 2003, free trade applies to all agricultural commodities except maize, beans, sugar and powdered milk). *Rural development policy*

has supported poor populations, but with little attention to land use patterns. In some cases land reform has led to fragmentation of forestland or its conversion to farmland. A limited amount of ejido land has actually been sold; no attempts have been made to contract out management of large-scale forests on ejido land. Few rural development activities have combined environmental and poverty alleviation objectives. Use of economic instruments to increase local people's revenues should be further explored, as well as the potential for carbon sequestration and eco-tourism.

Recommendations:

- create *synergies among agriculture, rural development, environment and natural resource management*, particularly by reinforcing institutional integration between SAGARPA and SEMARNAT and their respective agencies at the Federal and state levels and by developing a national agri-environmental strategy with quantified objectives;
- pursue efforts towards *water pricing reform in agriculture*, particularly by progressively eliminating environmentally harmful irrigation subsidies;
- contribute to the *development of profitable forestry* in the context of agricultural policy reform; in particular, further reduce incentives to intensify agricultural production and compensate populations engaged in forest management for otherwise unremunerated though environmentally beneficial public services, possibly through PROCAMPO;
- promote consolidation of forest units on ejido land into viable larger-scale forest units in the context of *land tenure reform*, and introduce more flexibility to allow contracting out of forest management;
- explore use of *economic incentives* to increase the revenues of rural populations; in particular, evaluate the potential for further promoting eco-tourism in protected areas;
- assess the environmental effects of PROCAMPO support payments, as well as the anticipated environmental effects of NAFTA.

3. International Commitments

Mexico has greatly improved the manner in which its international environmental agenda is being addressed. To a great extent it has acted in line with other OECD countries, though it has not always been obliged to do so. It has assumed *responsibilities beyond its legal obligations* under the Climate Change Convention and the Montreal Protocol. Mexico ratified the Kyoto Protocol in 2000. CO₂ inventories have been carried out and effective measures have been taken to reduce GHG emissions. CO₂ emissions have been decoupled from GDP growth. Consumption of ozone-depleting substances has been much reduced, in advance of mandatory requirements. Mexico has important responsibilities relating to *its rich biodiversity*, but resources with which to protect the environment and conserve natural resources are limited. It has made considerable *progress towards protection of whales, sea turtles and dolphins* and has created the world's largest whale sanctuary. It promotes co-operation with like-minded countries that are also rich in biodiversity, with a view to creating an equitable system of natural resource use. *Bilateral environmental co-operation* has been strengthened, and *regional environmental co-operation* with other Latin American countries has increased. Mexico has provided technical assistance to support sustainable development in a number of Latin American countries. Tripartite environmental co-operation within North

America is increasing and has led to concrete results; improvements were made recently in waste water treatment near the northern border.

However, Mexico is experiencing difficulties *implementing its legal regime*, as well as adequately *funding* projects, in order to meet its international commitments. Law and order in the environmental protection area could be improved, especially in an open economy like that of Mexico. *Air pollution* in the twin cities along the northern border has worsened, largely due to increasing international lorry traffic. Cross-border difficulties have arisen over *water use* in northern Mexico. Current plans concerning access to drinking water and basic sanitation are not consistent with undertakings under the UN Millennium Declaration or the objectives agreed at the Johannesburg Summit. Additional financial resources should be made available to ensure consistency. Regarding climate change, economic instruments are still not used as incentives for behavioural change or to finance subsidies encouraging use of cleaner energy. Activities to protect the *marine environment* and coastal ecosystems from land-based activities and pollution sources, and from pollution from ships, could be given greater attention and be better co-ordinated.

Recommendations:

- continue to emphasise the use of *indicators and quantified targets* in developing result-oriented international environmental strategies;
- address the negative environmental impacts of growing *international trade and investment* in northern Mexico;
- strengthen both the institutions to enhance bilateral co-operation and the mechanisms that encourage international commitments, consistent with *environmental management decentralisation*;
- develop *like-minded countries* positions on international issues, such as biodiversity conservation, response to climate change, and international law, and assume leadership as appropriate;
- develop a national strategy to reduce the rate of growth of *GHG emissions*, with specific objectives and precise measures to be taken over the next few years, including under the proposed Clean Development Mechanism;
- seek the development of *integrated management of international water basins*, with special emphasis on efficient use of water;
- improve institutional mechanisms to provide better protection of the environment in *marine waters*, coastal waters and coastal zones, and increase involvement by SEMARNAT in this regard;
- continue to develop institutions and measures to combat marine *pollution from ships* and to respond rapidly to *oil emergencies*.

NETHERLANDS*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR MANAGEMENT**
- 3. WATER MANAGEMENT**
- 4. NATURE CONSERVATION AND BIODIVERSITY**

Part II
SUSTAINABLE DEVELOPMENT

- 5. ENVIRONMENTAL-ECONOMIC INTERFACE**
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Part III
INTERNATIONAL COMMITMENTS

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REFERENCES

* Conclusions and Recommendations also available in Dutch.

CONCLUSIONS AND RECOMMENDATIONS*

The Netherlands, which has a *very open economy*, experienced rapid expansion during the last ten years. It is the world's sixth largest exporting country, and its gross domestic product (GDP) is the world's 14th highest. The Netherlands has become a hub of international commerce, with a transport infrastructure centred on the port of Rotterdam (the busiest port in the world) and Amsterdam-Schiphol airport.

Very high densities of both population and economic activities have led to very intense pressures on the country's environment. Together with the delicate geographical balance between land and water, these pressures have made environmental protection a matter of serious public concern. Environmental issues have a *strong international dimension* in the Netherlands, reflecting regional environmental interdependencies (e.g. transboundary air and water pollution, North Sea pollution), regional economic interdependencies (EU membership, the country's role as a gateway to Europe) and global environmental issues (e.g. vulnerability to climate change and sea level rise, the importance of trade and environmental aid).

Since the early 1990s, the Netherlands has made considerable progress in *decoupling* a number of environmental pressures from economic growth and meeting several of its ambitious environmental targets. This progress reflects the reshaping of the Dutch economy and the strengthening of environmental policies, including in the EU context. Today *priority environmental issues* include: loss of biodiversity, climate change, over-exploitation of natural resources, threats to human health and external safety, damage to the quality of life, and possible unmanageable risks. Several of these issues reflect pressures on the environment deriving from the Netherlands' development choices, such as intensive agriculture and transport.

It will be necessary for the Netherlands to: i) improve the cost-effectiveness of its environmental policies; ii) further integrate environmental concerns into economic and social decisions; and iii) reinforce its international environmental co-operation on environmental issues. This report examines progress made by the Netherlands *since the previous OECD Environmental Performance Review* in 1995, and 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 52 recommendations are made that could help strengthen the Netherlands' environmental performance in the context of sustainable development.

1. Environmental Management

Implementing cost-effective environmental policies

In the last ten years the Netherlands has met or come close to meeting a number of its domestic objectives (e.g. concerning SO₂ emissions, toxic air contaminants, groundwater depletion, flood protection, phosphorus concentrations in

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

water, expansion of the ecological network) and international commitments (e.g. transboundary air pollution and North Sea targets). The *Environmental Management Act* (EMA) provides a framework for co-ordinating environmental legislation, though water, soil and nature management are subject to specific legislation. New regulations establish corporate financial liability for environmental damage. At the central level *enforcement* staff recently increased by 10%, following regrouping of the environmental, spatial planning and housing inspectorates; the number of inspections has also increased and penal sanctions have been applied. To maintain their incentive function, fine levels have been made proportionate to the size of the company. As a result, compliance levels have increased. Inspection and prosecution pay particular attention to the movement of dangerous goods. *Environmental taxes* (e.g. on groundwater, landfill) and a regulatory energy tax have been introduced and other taxes are under discussion. Charges apply to point and diffuse water pollution, and producer responsibility has been extended to a range of waste streams. Overall, economic and fiscal instruments are used widely in the Netherlands. A new *spatial planning policy* to control urban development and protect landscape areas was issued in 2000. Overall, industry has been responsive and often proactive in improving its environmental performance, particularly through *environmental agreements* (e.g. covenants) and *environmental management* and auditing; there are also environmental reporting obligations for companies. The customised licensing system introduced in 1995 reflects a shift from regulatory approaches to monitored self-regulation. Environmental agreements, which are more or less binding substitutes for regulation, have been successful in a number of areas in the Netherlands; long-term environmental objectives have been agreed with industry in a series of branch agreements, and the contributions expected from individual companies have been included in their operating permits. Flexibility in meeting objectives, and a stable investment context, have made these schemes attractive to firms. The characteristic *policy mix* of regulation/licensing plus economic instruments plus environmental agreements continues to be productive. The gradual move to de-emphasise environmental agreements and regulation (arising from economic liberalisation and greater European and international integration) and to place more emphasis on economic instruments has merit, especially as it takes advantage of the government's strength in establishing frameworks rather than micro-managing.

However, despite this positive picture the Netherlands has not met several of its commitments or is not on the way to meeting them (e.g. for CO₂, NH₃, NO_x and VOC emissions, nitrogen inputs to water, nature protection, green space in urban areas). Many of the previous *NEPP targets* for emission reductions and for environmental quality have been postponed or revised. Water management and nature conservation objectives are being addressed separately, reflecting the institutional setting. As a result, *integration of nature and water management* initiatives in central and local land use planning (e.g. water areas for flood prevention, green areas for nature conservation) has been weak. Licensing of groundwater abstraction and waste water discharge is not covered by the EMA and has remained separate from integrated air, noise and waste licensing. There is a somewhat unclear *split of enforcement and licensing responsibilities* among the central, provincial and municipal levels in this relatively small country, though administrative agreements have been signed to enhance co-operation among enforcement partners. Customised licensing (based on overall pollution reduction targets) applying to the 100 top companies (mostly multinational) conflicts with the IPPC logic that requires BAT standards for each individual production process. Fines are too low to prevent illegal traffic linked to international trade (e.g. CITES, Basel Convention). There has been a tendency to focus on fiscal rather than economic instruments, with no air emission charges, user charge levels with little effect on water consumption, and flat

rates applied to municipal waste collection charges. *Implementation of environmental agreements* should be accompanied more systematically by transparency mechanisms and the threat of penalties, such as levying of an energy tax, in cases of non-compliance with targets. The move towards market-based instruments may be difficult to make in all areas. Increased emphasis on market based instruments should not come at the expense of experimentation with other approaches such as labelling and support for eco-design.

Recommendations:

- retain and refine *quantitative policy targets* for reducing environmental pressures, and strengthen efforts to see that they are attained without slippage;
- enhance the *role of provinces* as a key level of policy integration, including environmental policy planning, land use planning and water management planning;
- improve the *split of enforcement and licensing*, especially at local level, and clarify the *responsibilities* of the central, provincial and local levels; possibly broaden the scope of inspection and enforcement by the VROM Inspectorate to include IPPC companies;
- take steps toward implementing the *IPPC Directive* for large companies, in such a way that emission trading can be applied in the best possible way;
- reinforce integration of nature and water management objectives in *central and local land use planning*; establish periodicity in the preparation of land use plans;
- extend the use of *economic instruments* (e.g. waste, water and transport management) and their incentive effects, in line with the user and polluter pays principles.

Air

The Netherlands has successfully *decoupled emissions of most traditional air pollutants* from economic growth, improving urban air quality and reducing the Dutch contribution to transboundary air pollution. For most of the 50 priority air pollutants, emissions have been reduced to (or even below) targets set domestically and internationally to protect human health and the environment. This has been accomplished with a mix of instruments. Substantial reductions in emissions of *toxic chemicals* have also been achieved. Taxes on energy and transport have played a role, as well as *active participation by the industrial sector* in environmental agreements on reducing air pollutant emissions and improving energy efficiency. Air pollutant emission trading schemes are being developed. *Ammonia emissions from agriculture* were reduced by 15% between 1996 and 2002, partly due to the introduction of standards for manure storage facilities and manure spreading techniques. The proposed NO_x emission trading scheme should be implemented.

However, *greenhouse gas emissions* have not yet been decoupled from economic growth. *Ozone, NO_x and fine particles* still contribute to regional problems of photochemical pollution and acidification of ecosystems. Environmental agreements have not succeeded in meeting industry targets for NO_x. New policy measures will be needed to address these concerns, particularly in the energy, transport and agricultural

sectors. Despite some improvements in recent years, final energy consumption per unit of GDP in the Netherlands remains above the OECD Europe average. Measures taken have not been effective enough to increase the use of renewable energy sources. Limited progress in reducing air pollutant emissions has been made by small and medium-sized firms. There has been too little progress in the transport sector. N_2O (nitrous oxide) emissions from agriculture have not been reduced.

Recommendations:

- continue efforts to reduce *emissions of NO_x , particulate matter and NMVOCs* (e.g. from transport, energy and industry) in light of persistent problems with concentrations of NO_2 , PM_{10} and ozone in some areas; implement the proposed NO_x emission trading scheme;
- pursue efforts to reduce ammonia emissions from *agriculture*;
- provide *small businesses* with appropriate enforcement mechanisms to address long-term emission objectives, particularly for ozone precursors and priority substances;
- continue to work towards increased *energy efficiency*;
- expand the use of *renewable energy sources* (e.g. in municipalities and large firms).

Water

The Netherlands has a large delta area at the estuary of several main European rivers. This clearly increases pressure on water pollution and flood management. The Netherlands' performance in reducing pressures on its water environment in the last ten years has been very good. In general, it has more than met the deadlines in the EU Urban Waste Water Treatment Directive for connections to the sewerage system and secondary treatment of waste water; 98% of the Dutch population is served by sewerage networks, all of which are connected to *waste water treatment*. The rate of removal of oxygen-demanding substances at public waste water treatment installations increased from 92 to 96% during the 1990s. Phosphorus and nitrogen removal is widespread. These achievements have required sustained financial efforts, particularly from households. The Netherlands has met North Sea targets for phosphorus and for most micropollutants and heavy metals. The 50% national reduction target for pesticide use has almost been met (47%). The Netherlands had the best overall performance among OECD countries with respect to decoupling pressures on the water environment from economic development and population growth. Strengthening of flood protection along major rivers, which repeatedly threatened to overflow their banks in the mid-1990s, is almost complete. Substantial progress has been made regarding most of the recommendations of the 1995 OECD Environmental Performance Review.

Yet the Netherlands' performance in reducing environmental pressures has still not been adequate to sustain the positive water quality trends of the 1980s and early 1990s. This partly reflects the *high intensity of pressures* on the water environment, which are often several times above the OECD average. These pressures in turn reflect the high intensity and density of economic activities such as agriculture and transport. Improvement of water quality stagnated during the latter part of the decade, mainly due to difficulties in tackling diffuse sources of pollution. *Few surface or groundwater bodies meet basic water quality standards* for several pollutants. The Netherlands did not quite

meet the North Sea reduction targets for nitrogen. The impact of diffuse discharges, such as nutrients and pesticides from agriculture, emergency overflows from combined sewage systems and run-off from paved areas, remains severe. Nitrate standards for shallow groundwater are exceeded throughout the higher parts of the country. Implementation of measures to remedy *groundwater depletion*, which affects one-seventh of the total land area, has fallen short of targets. Further reduction of pressures cannot be achieved without a transition towards *sustainable production* processes, especially in agriculture. To achieve this transition, inter-sectoral economic efficiency should be given greater attention than in the past. If nothing more is done, *sediments* in watercourses contaminated by micropollutants and heavy metals will affect water quality for many decades to come. *Safety issues* remain paramount: expected rises in sea level, increasing discharges and continued land subsidence mean that the struggle to protect a population of which a large proportion lives below sea level can never be won once and for all.

Recommendations:

- strongly pursue *implementation of policies* to allocate “more space for water”, establish ecological networks and better protect areas at risk (e.g. from floods); in particular, integrate water management, nature management and *spatial planning*;
- reinforce actions to combat *groundwater depletion*; complete and implement comprehensive provincial groundwater plans;
- further reduce *nitrogen loads* from intensive agriculture (livestock and crop production) in line with related international commitments (EU Nitrates Directive, North Sea action programme);
- strengthen efforts to achieve further progress in dealing with *emergency overflows* from combined sewers;
- continue efforts to safely dispose of and/or treat *contaminated dredging spoil*;
- continue to modernise the *institutional framework* for water management in line with the EU Water Framework Directive;
- give more attention to *economic analysis* of water management measures in different sectors (e.g. municipal, industrial, agricultural);
- strengthen *inspection and enforcement* relating to illegal discharges into the sewage system.

Biodiversity, nature and landscape conservation

Nature management is subject to comprehensive *national policy planning* (Nature Policy Plan) under the Ministry of Agriculture, Nature Management and Fisheries (LNV). The *National Ecological Network* (EHS) being established will include fragmented protected areas throughout the Netherlands, corridors to connect them, and large bodies of water such as North Sea coastal waters, the Wadden Sea, the IJssel Lake and the Delta. The annual rate of realisation of the EHS is increasing, but it remains below the target set by LNV to meet the objective of completion by 2018. Failure to meet the LNV target was mainly due to land scarcity and high land prices, as the network was largely created through land purchase and restoration by LNV. The emphasis is now moving from land acquisition to the signing of management contracts with landowners. Fourteen national parks have been established, and 50 000 additional hectares were given

protected status in the 1990s. This, too, is below target. National protected areas are managed by the Dutch Forest Service (200 000 hectares) and NGOs (160 000 hectares). Forested areas increased by 23 000 hectares over the last decade. Phosphorous concentrations in surface water have decreased and are now in line with the NEPP target, mainly as a result of industry efforts. *Biodiversity* loss has been halted in some ecosystems, such as breeding habitats for migrating birds on farmland and woodland. Volunteers, often highly specialised, actively contribute to biodiversity monitoring. *Open landscapes* (polders in the west, cultivated grassland on peat soil in the north and west) are still relatively intact, but they are experiencing increasing pressure from urbanisation. Targets have recently been established to protect these areas. Awareness of nature conservation has grown over the decade, especially regarding demand for green areas in and around cities and for recreation in protected areas. The Netherlands has signed and ratified *international agreements* relating to nature and biodiversity.

However, these efforts are not always commensurate with the intense pressures on biodiversity, nature and landscapes from economic activities; in some cases they do not appear to lead to results consistent with national targets. This may require reviewing and possibly revising the institutional setting for biodiversity, nature and landscape conservation. Many species are still threatened, and biodiversity conservation has continued to deteriorate in ecosystems subject to eutrophic deposition and *eutrophication* (e.g. open dunes, heaths and coastal waters). Nitrogen deposition (the main component of eutrophic deposition) is still far above NEPP targets, reflecting high emissions of NO_x from transport and ammonia from agriculture. *Acid deposition* has been reduced but is still above the NEPP target. Overall, only 10% of Dutch natural areas are fully protected against acidification and eutrophication compared with a 2010 NEPP target of 20 to 30%. *Desiccation* due to agricultural drainage still affects 500 000 hectares, and restoration activities have been limited and are below target. Biodiversity is also under strong pressure from pollution by *toxic substances*: intensity of pesticide use remains largely above the OECD average; ambitious reduction targets were set recently. Water pollution by heavy metals and by hormone disruptors, as well as a lack of connections between water systems, affect aquatic life. In *coastal areas* little has been done to protect nature effectively; despite the 1995 OECD recommendation, there are no established marine reserves (plans are in discussion). Mud fishing (bottom trawling) is still practised in the North Sea, which has an impact on sea floor habitats. Residential areas have continued to be developed at the expense of natural areas, leading to the adoption of additional spatial planning regulations. It is unclear whether the objective of devoting one-third of the inland EHS entirely to nature conservation will be met. Further efforts are needed to fully implement the EU *Birds and Habitats Directives*. Amendment of the Nature Conservation Act to fully transpose the Birds and Habitats Directives was submitted to Parliament. Nature management has been integrated into *agricultural policy* with mixed results. While they fall under the same parent ministry, EU farm subsidies targeted at supporting agricultural production are much larger than public expenditure on nature protection. Agri-environmental measures have focused more on controlling diffuse water pollution than on converting farmland to wildlife habitats (mainly meadows), though payments to farmers are being increased to meet the conversion target of 110 000 hectares by 2020.

Recommendations:

- complete establishment of the *national ecological network* according to targets, taking account of requirements of the EU Birds and Habitats Directives;
- achieve the target of *20 to 30% of natural areas fully protected against acidification and eutrophication*, particularly by reducing pressures from agriculture and the waste water industry;
- reinforce *implementation of nature conservation objectives in agricultural policy*, particularly by meeting reduction targets for pesticide use, ammonia emissions and desiccation, speeding up farmland conversion in natural areas, and tackling diffuse water pollution by nitrogen compounds;
- reinforce *implementation of nature conservation objectives in water policy*, particularly by reducing water pollution by toxic substances, developing connections among water systems and setting ecological quality objectives for water bodies;
- enhance *nature protection in coastal areas*, particularly through better control of mud fishing and establishment of marine reserves, in the framework of the OSPAR Convention;
- strengthen efforts to *integrate biodiversity, nature and landscape conservation among themselves and with spatial planning*.

2. Towards Sustainable Development

Integration of environmental concerns in economic decisions

Dutch performance in terms of *reducing emissions and environmental pressures* over the last decade has been strong. This performance should be seen in the context of sustained GDP growth of 35%, and of liberalisation and greater European and international integration of the country's economy. Overall, *pollution abatement and control expenditure* has been growing, from 1.9% of GDP in 1990 to 2.6% in 2000. This share, which is expected to remain stable during the next three years based on existing and proposed policy measures, is large by OECD standards and reflects a high level of environmental pressure and readiness to commit resources to mitigation. There is no evidence that this expenditure has affected the competitiveness of the Dutch economy. Concerning *institutional integration*, there has been good progress with respect to integration of sustainability into the thinking and activities of a range of government and private sector actors (as demonstrated, for example, in the 1997 policy document on Environment and Economy). Considerable reliance is now being placed on some high-level *guiding principles* set out in the fourth National Environmental Policy Plan (NEPP4), some high-level sustainable development principles, and the concept of "transition management" and "transition processes" within a sustainable development goal-setting and backcasting framework. The characteristically Dutch "*polder model*" approach of dialogue between the government and stakeholders to develop environmental policy has been successful. There is recognition of the need to address areas in which progress remains to be made, as shown in environmental and sustainable development planning documents. Concerning *market-based integration*, the Netherlands has expanded its use of economic and fiscal instruments and, overall, is implementing the polluter pays and user pays principles despite the exemption of many companies from environmental taxes (e.g. energy taxes) in an attempt to preserve competitiveness. The recent *ecological tax reform* represents significant progress, with a

shift from taxation of labour and income. The various environmentally related Dutch fiscal instruments now account for 14% of total tax revenue.

However, decoupling environmental pressures from economic growth has proven elusive, particularly for CO₂ emissions, municipal waste and the impacts of urban sprawl, including continuing pressures on biodiversity. Among other residual problems are the levels of particulate matter and ozone, the backlog of contaminated sites, groundwater quality and noise. Also of concern is the *review or postponement of some targets* that have been hard to meet (e.g. for NO_x and ammonia), as well as the risk that some more difficult targets (e.g. for groundwater) may not be met. The Dutch Central Economic Planning Agency has noted that goals with respect to the country's manure problem were not met due to a reluctance to implement policy forcefully enough. The general *planning approach* used in the Netherlands requires a very high degree of co-ordination among national ministries. Environmental plans must be co-ordinated with a number of national sectoral plans, the more so as the Ministry of Housing, Spatial Planning and the Environment (VROM) is responsible for only some environmental policy areas. Integration of environmental policies into other national policies is laid down in the NEPPs. However, *policy integration* has not yet been reflected in markedly better environmental performance in key sectors such as agriculture and transport. The high levels of production and consumption of the Netherlands continue to lead to large environmental effects outside of the Netherlands. Overall, the government's goal of *reaching sustainability by 2010* (i.e. within one generation at the time this goal was set) appears increasingly difficult to achieve, particularly for the agriculture and transport sectors. Strong and continuing political determination and support by the public will be indispensable in this respect.

Recommendations:

- *implement environmental plans* and objectives with determination;
- strengthen *institutional integration*, particularly to ensure that a sustainable development framework is firmly embedded in central, provincial and local government and across key sectors, notably energy, agriculture and transport;
- refine the market based instruments and extend the *environmental tax system*, having regard to simplicity, effectiveness, transaction costs and carrying out cost-benefit analysis;
- couple the *regulatory energy tax* with pollutant emissions (carbon tax) and consider its extension to large companies in the case of non-compliance with environmental targets;
- undertake *environmental assessment* earlier in the decision-making process to influence choices concerning plans, policies and programmes;
- extend the use of *spatial planning and regulation* to serve pollution abatement, nature, biodiversity and landscape conservation as well as risk prevention;
- maintain investment and efforts in environmental *research and development*.

Integration of environmental and social concerns

The Netherlands is making strong efforts to *inform and educate the public* about environmental protection. The *quality of environmental information* is high, and reporting activities and access to this information are well established. The public also has good *access to the courts* concerning environmental matters. Public debate and

public participation in decision-making are quite well developed. Dutch environmental research and development are influential at the national and international levels, with respect to both technical matters and policy issues. A tradition of *openness and transparency* in policy-making and goal setting is maintained for the benefit of civil society. Key documents like the National Strategy for Sustainable Development, the National Environmental Policy Plans (NEPPs) and the annual “balance” reports present environmental issues using a forward looking approach.

However, *environmental employment* represents only 1.3% of total employment, a figure which could be higher if there were a more active environmental employment policy. Local Agenda 21 initiatives have produced mixed results. *Low-income groups* experience above average severe noise nuisance and local air pollution, while their neighbourhoods often do not have as much green space as more prosperous areas. The number of large-scale accidents has increased in recent years; thus so have threats to *external safety*. People living near airports and large chemical installations are particularly exposed to risks of accidents. Health risks related to *air pollutants* have decreased but still remain a problem; 2.5% of the population is exposed to levels of NO₂ above the limit value (4% for fine particles PM₁₀). *Noise nuisance* has remained a health concern in the Netherlands. Natural habitats and valuable landscapes have been lost to urban development, reducing public access to natural resources, recreation and silence.

Recommendations:

- strengthen measures to improve *external safety* in relation to transport (e.g. air traffic, railways, transport of hazardous substances) and chemical installations;
- strengthen efforts to improve the *quality of the living environment* with respect to noise nuisance, air pollution and access to green areas for recreation, especially in the case of low-income groups;
- further maintain a high-quality *environmental information base* and ensure continuity in environmental reporting activities;
- make further efforts to increase *environmental awareness* and sustainable behaviour, particularly regarding car and energy use;
- continue to *promote public participation* in decision-making and goal-setting processes (e.g. at an early stage), both at national and local levels;
- ensure that national environmental policy links up with relevant local *sustainable development initiatives*;
- encourage sustainable development initiatives in the framework of *Local Agenda 21*, particularly in relation to mainstream local activities (e.g. housing, infrastructure, etc.).

Integration of environmental concerns in transport decisions

Until recently, the level of integration of environmental, transport and spatial planning in the Netherlands has been commendable. Environmental concerns have been incorporated into transport policies. Regarding *vehicles and fuels*, air emissions have been reduced in line with EU Directives. The Netherlands has introduced *fuel efficiency labelling*. In 2002 *purchase tax discounts* were granted for the most fuel-efficient (lowest CO₂ emitting) cars. Introduction of more *environmentally friendly fuels* and other technological innovations have contributed to the reduction of some harmful emissions (e.g. lead, SO₂ and NO_x). Despite a significant increase in traffic volume, emission reductions have been notable. With respect to *traffic management*, car-restricted and

bicycle- and pedestrian-friendly town centres have a long tradition and are still favoured in local land use planning. In some cases only delivery vehicles and buses are allowed to enter urban zones. Speed limit enforcement has been stepped up considerably, for safety and pollution reasons. Eco-driving (fuel-efficient driving) has been encouraged through training of drivers and incentives to buy vehicles equipped with devices to enhance fuel efficiency. Innovative *parking policy* is based on pricing and regulations (e.g. a limited number of parking spaces for employees). The level of service provided by the Dutch *public transport* system could serve as a model for a number of other OECD countries. Fuel taxation has been reviewed and revised, and fiscal advantages for those commuting by car have been eliminated. Concerning *infrastructure*, EIA is used with extended consultation.

Recommendations:

- strengthen or revive efforts to integrate environmental and *sustainable development* concerns into transport policy;
- further internalise externalities into transport operation and pricing: strengthen the use of existing *economic instruments* and introduce new ones, such as the suggested *per-kilometre tax* on lorries and cars (with differentiated rates according to time, place and the environmental impact of each vehicle) or other relevant instruments;
- work towards eliminating domestic and international *distortions in competition* among transport modes (e.g. subsidisation, taxation, standards), including within the EU, IMO and ICAO;
- pursue efforts to reduce *noise emissions* from road, rail and air traffic (e.g. emission reduction at source);
- urgently define and implement a package of measures to reduce *CO₂ emissions from freight and passenger transport*;
- continue to improve *accident prevention and preparedness* in the transport of hazardous substances.

However, the Netherlands is not yet moving towards *sustainable transport*. *Integration* of environmental concerns, land use planning and sustainable development in transport policy and planning is not commensurate with the country's ambitious transport development plans and efforts to maintain the Dutch share in international transport. Compared with the early 1990s, there are currently fewer *environmental targets*, and most are less ambitious; some targets have been abolished (e.g. for CO₂ emissions) or postponed (e.g. noise), and others have been extended (e.g. NO_x) or strengthened (e.g. VOCs). *Implementation and enforcement* of environmentally beneficial transport policies and measures have not always been coherent and resolute. *CO₂ emissions from road traffic* have increased dramatically, despite the wide range of economic instruments adopted to discourage private car use. Urban and transport development strategies have not succeeded in reducing traffic volumes for passenger cars. To reduce transport emissions, the Netherlands mainly relies on technological innovations by non-Dutch vehicle and airplane manufacturers. *Noise emissions* from road vehicles, rail and aviation are spreading. The 1998 agreement on lowering the *speed limit* in the Randstad area has not been implemented. There is no political consensus on *road pricing* nor on a per-kilometre tax. Attempts to develop instruments to better control emissions from inland and ocean shipping and aviation have had marginal results while awaiting *common or technology-related standards* and *effective agreements* at international level (e.g. on

taxation of aviation and bunker fuels, emission standards for heavy-duty diesel engines used in locomotives and ships).

3. International Co-operation

The Netherlands has continued to play a leading, proactive role in the development and implementation of international environmental laws reflecting the regional and global interdependencies of its environment and economy. These efforts have been carried out in the interest of the international community, as well as in the Netherlands' own interest. Concerning *climate change*, the Netherlands was very active in helping to achieve progress towards the entry into force of the Kyoto Protocol. It succeeded in bringing about a relative decoupling of its CO₂ emissions from GDP growth, largely due to a 14% decrease in the energy intensity of the Dutch economy between 1990 and 2000. By significantly reducing emissions of NO_x, SO_x and NMVOCs, the Netherlands has more than met its reduction targets under the Oslo, Sofia and Geneva Protocols to the LRTAP Convention. It continues active enforcement of *marine agreements*. It carries out regular surveillance and enforcement in its Exclusive Economic Zone (EEZ) against illegal dumping or discharges from ships. At least 25% of foreign ships calling at Dutch ports are consistently inspected for compliance with MARPOL standards. The Netherlands reduced point source discharges of nitrogen and phosphorous to the North Sea to the extent of being on track to meet its North Sea Conference targets. Partly due to a successful environmental agreement with *offshore oil and gas producers*, the frequency and magnitude of oil spills and flaring have been reduced; fugitive methane emissions have been limited and compliance with OSPAR limits on oil in effluents has improved. Based on its experience with a prior informed consent (PIC) system to regulate exports of dangerous chemicals to developing countries, the Netherlands played a key role in developing the 1998 Rotterdam PIC Convention. It is one of the few countries that consistently meet UN targets for *official development assistance*; it also meets its own national commitment regarding the environmental component of its ODA.

Despite these impressive achievements, the Netherlands could improve its performance in meeting several international environmental commitments. It failed to meet its national target for stabilising CO₂ emissions at their 1990 level by 2000. The ancillary benefits of domestic climate protection measures were not taken into account when preliminary targets were established for realising 50% of the country's Kyoto commitment through domestic measures. The polluter pays principle (PPP) has not been integrated into early plans to use the Kyoto mechanisms. New reduction targets concerning *transboundary air pollutants* under the Gothenburg Protocol and the EU National Emission Ceilings (NEC) Directive will require implementation of additional domestic control measures. Stricter standards established in 2000 under MARPOL Annex VI are likely to necessitate tighter control of atmospheric SO_x emissions in the offshore zone. To comply with the EU Nitrates Directive, the Netherlands will need to strengthen control of *nitrogen emissions* from agriculture. It should accelerate efforts to designate marine protected areas, so as to implement the Habitats Directive fully in its 200-mile EEZ. In line with FAO recommendations, it has attempted to implement vessel decommissioning schemes to reduce *fishing capacity* but with little success thus far. Shared and straddling marine fish stocks in the North and Wadden Seas need to be restored: many of these stocks are classified as "outside biologically sustainable limits." Progress towards *Objective 2000* of the International Tropical Timber Organisation (ensuring that all imported hardwood comes from sustainably managed forests) appears

to have lost momentum. While development assistance projects are expected to comply with host country requirements concerning the application of environmental impact assessment, the Dutch government does not require systematic application of EIA for these projects.

Recommendations:

- take into account *ancillary benefits* of reducing SO_x and VOC emissions when assessing the cost-effectiveness of potential greenhouse gas (GHG) reduction measures, and develop means to implement the polluter pays principle through the Kyoto mechanisms;
- take steps to ensure full implementation and enforcement of new international commitments concerning *port reception and ship-generated wastes and cargo residues*;
- continue to work in international fora to promote management of *shared and straddling marine stocks* in the North Sea following an ecosystem management approach;
- put an end to *illegal trade* in ozone depleting substances;
- co-operate internationally to develop means of ensuring that *timber and wood products imported to the Netherlands* originate from sustainably managed tropical and boreal forests;
- strengthen and generalise requirements concerning *environmental impact assessment*, to apply to all major projects financed through international assistance (ODA and non-ODA);
- ratify and implement recent international *environmental agreements*.



NEW ZEALAND

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. WATER AND WASTE MANAGEMENT**
- 3. NATURE AND BIODIVERSITY CONSERVATION**

Part II
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- 4. ECONOMY AND ENVIRONMENT**
- 5. AGRICULTURE, FORESTRY AND THE ENVIRONMENT**
- 6. ENVIRONMENTAL-SOCIAL INTERFACE**

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INTERNATIONAL COMMITMENTS

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REFERENCES

CONCLUSIONS AND RECOMMENDATIONS*

Since 1996, *New Zealand's GDP has grown by 30%* while the population has increased by 9%. Real per capita GDP is nonetheless 11% below the OECD average. The country is dependent on international trade, with exports contributing 29% of GDP and natural resource-based exports (from agriculture, forestry, fishing and aquaculture) accounting for a large share. Services generate 66% of the value added in the economy, industry 24% and primary production 10%.

With relatively low population density, *natural resource management-related issues* continued to dominate the environmental policy agenda during the review period. A broad reform of environmental management institutions, which was catalysed by the 1991 Resource Management Act (RMA), overhauled the institutional framework for environmental planning and management, and continued the devolution of most policy implementation responsibilities to regional and territorial authorities (collectively known as local authorities). Concurrently, a major reform of local government consolidated the number of subnational authorities from 800 to 90. The full effects of these reforms on environmental management began to be felt only in the late 1990s, as their implementation took years.

Major sources of environmental pressure, including agriculture, transport, tourism and energy production and consumption, expanded during the review period. Energy intensity is now about equal to the OECD average, having fallen by 18% during the review period. While the intensity of water, fertiliser and pesticide use remains on the low side for OECD countries, the review period saw significant increases, with consequent growth in pressures on the environment.

To face these *environmental management challenges*, it will be necessary for New Zealand to i) strengthen national policy guidance, in the form of policy statements and national environmental standards, in the interest of promoting a level national playing field and improving regulatory efficiency; ii) further integrate environmental concerns into economic and sectoral decisions, particularly by using economic instruments to internalise environmental costs of economic activities; and iii) further develop international environmental co-operation.

This report examines progress made by New Zealand since the previous OECD Environmental Performance Review (1996) relative to its established *domestic objectives and international commitments* regarding the environment. It also reviews progress in the context of the OECD Environmental Strategy,** and compared to the recommendations of the 1996 OECD review. Progress has stemmed from environmental and economic decisions and actions by central, regional and territorial authorities, as well

* Conclusions and Recommendations endorsed and approved by the OECD Working Party on Environmental Performance at its meeting on 27 September 2006.

** The following objectives of the OECD Environmental Strategy for the First Decade of the 21st Century are covered in the Conclusions and Recommendations: maintaining the integrity of ecosystems (Section 1), decoupling of environmental pressures from economic growth (Section 2) and global environmental interdependence (Section 3).

as by enterprises, households and non-governmental organisations (NGOs). Thirty-eight recommendations are made that could contribute to further environmental progress in New Zealand.

1. Environmental Management

Strengthening implementation of environmental policies

During the review period, *local authorities* largely assumed the additional environmental management responsibilities devolved to them under the RMA. No operational regional policy statements or regional coastal plans existed at the time of the 1996 OECD review, but by 2006 all regional authorities had issued policy statements, and all but four had coastal plans in place. Overall, *local authorities* have used the RMA-based *resource consent* system to manage point sources of pollution effectively. Investment in water supply and sewerage has led to better sanitation. Local councils increasingly apply *user charges* for landfilling and resource consent processing. A first set of national environmental standards (concerning air quality) was issued in 2004; it includes five standards for ambient (outdoor) air quality, and seven standards banning activities that discharge toxics into the air. Additional government funding since July 2002 and development of a robust case management system have improved the functioning of the *Environment Court* and halved the backlog of cases from the 2001 level. Since 2000, the central government has issued several national strategies to help guide local government in implementing the RMA, and has worked to improve public understanding of RMA processes. After the first national state of the environment report was published in 1997, a project helped define several sets of national environmental indicators. The *Parliamentary Commissioner for the Environment* has provided independent, cross-sectoral analysis that has helped focus environmental sustainability efforts. Environmental expenditure (for pollution abatement and control as well as water supply and nature conservation) has increased in recent years, although it remains rather low (less than 1% of GDP).

Notwithstanding these achievements, there remains *room for improvement* in New Zealand's environmental management. The central government has so far provided little statutory guidance in the form of *national standards and policy statements* to local authorities regarding implementation of the RMA and monitoring of environmental conditions. Recent success in issuing national strategies concerning elements of environmental management is tempered by their non-binding nature, which makes their implementation vulnerable to changes in government. The *Environment 2010 Strategy*, adopted in 1995, was set aside a few years later. Differences in *technical capacity, knowledge, skills* and issues among local authorities translate into differences in environmental management, and businesses complain that the regulatory playing field within the country is not level. The policy mix remains focused on regulatory and voluntary approaches, with *economic instruments* underused. National-level aggregates of *data and indicators* on the state of the environment and environmental pressures are scarce, thus impeding efforts to strengthen outcome-oriented environmental policy-making. Despite recent progress, the *polluter pays principle* is not yet fully integrated into markets for environmental goods and services.

Recommendations:

- accelerate the establishment of *national environmental standards* (e.g. for freshwater, waste and contaminated land) and *national policy statements* (e.g. on coastal waters and freshwater);
- review systems for *charging users for waste and waste water services*, identifying opportunities to strengthen economic incentives for resource conservation and efficiency;
- reinforce the commitment to *outcome-oriented environmental policies*, ensuring that information and data needed to assess policy effectiveness and efficiency are regularly collected and analysed;
- strengthen *monitoring of air and water quality, and waste generation and treatment*, assuring baseline consistency of methods used at local level to facilitate data aggregation and periodic reporting of key environmental indicators at national level;
- assure the effectiveness of *voluntary agreements*, requiring clear environmental performance targets, regular reporting and third-party auditing.

Water

The framework for water resource management was strengthened during the review period, with all but two *regional councils* issuing water management plans. The portion of the population served by *public water supply* that fully complies with drinking water guidelines increased from 50% in 1994 to 83% in 2004. The portion of the population served by public waste water treatment is high (80%), and of that the majority (91%) is connected to secondary or tertiary treatment. National drinking water quality guidelines are aligned with those of the World Health Organization. A 2003 *voluntary agreement* (the Dairying and Clean Streams Accord) reached among the dairy industry and central and regional governments has stimulated investment by farmers in fencing and culverts; restrictions on access of dairy stock to waterways is expected to reduce diffuse nutrient loading of streams. Pollution of surface waters by *point sources* decreased over the review period due to improved treatment capacity and regulation through resource consents. Implementation of coastal management plans has helped reduce pollutant loading to *coastal waters* and thus improved coastal bathing water quality. Since 1995, six rivers have been designated *outstanding water resources* via national water conservation orders, bringing to 14 the number of rivers and lakes for which certain natural values are protected.

However, there is still *considerable need for progress* in water management and related outcomes. The absence of a national policy statement and legally binding national environmental standards for ambient waters has made it difficult for regional authorities to design regulatory or economic measures to limit *diffuse pollution of surface waters*. Over 15% of the population is supplied *drinking water* that does not meet national drinking water guidelines, and the Ministry of Health has declared that it has reached the limits of what it can do with non-regulatory approaches. Water quality in *rivers and lakes* has declined in regions dominated by pastoral farming, where high nutrient inputs and microbiological contamination destabilise natural ecosystems and pose risks to *human health*. In lowland areas, surface waters regularly exceed national water quality guidelines, and consequent damage to aquatic ecosystems is widespread, mainly due to run-off and leaching from pastoral farming and rural septic tanks. With increased demand

for water for irrigation and domestic water consumption, the *first-come, first-served approach* to water allocation needs refinement. Particularly in water-stressed regions, there is a need to improve understanding of sustainable yield levels of key aquifers, and to rationalise allocation of water as an economic commodity. For farmers and households alike, incentives to conserve water are weak, as *pricing* is generally not linked to volume abstracted or consumed.

Recommendations:

- issue a *national policy statement on freshwater quality*, establish *national environmental standards* for drinking water sources, and strengthen national approaches for protecting receiving water quality;
- introduce *market-based instruments* to internalise the environmental costs of non-point source discharges from agriculture (e.g. run-off of fertilisers, urine from grazing stock);
- strengthen and expand the use of *water demand management measures* (e.g. volumetric metering, pricing for full recovery of water management costs, water efficiency standards);
- further expand the *knowledge base concerning sustainable abstraction levels* of key aquifers, and strengthen regulatory control of total allowable abstraction;
- consider introducing *cap-and-trade systems* and other regulatory and market-based instruments to rationalise the allocation of water abstraction rights in water-stressed regions.

Waste

Waste management rose on the environmental agenda during the review period. Publication in 2002 of the *national Waste Strategy* gave needed focus and clarity, as well as national objectives and targets, to a waste management framework otherwise fragmented in its legislation and institutions. In some areas, enhanced co-operation among local councils has facilitated the closing of small substandard landfills and the opening of larger landfills with better environmental performance. During the review period, a range of *technical guidelines for landfills* was established, and the portion of landfills having modern pollution control systems increased (e.g. leachate collection systems at 13% of landfills in 1995, 47% in 2002). Since the Waste Strategy set the objective of assuring full cost recovery for waste disposal, local councils have begun to apply *waste levies* on waste entering landfills. *Recycling of municipal waste* has expanded, with 75% of local councils providing kerbside collection of recyclable materials in 2004, up from 20% in 1996. A voluntary agreement (the Packaging Accord) based on the extended producer responsibility principle has contributed to increased recovery rates for packaging waste. Remediation of *contaminated land* has progressed at priority sites, although further progress on pre-1991 sites is dogged by unresolved financial liability issues.

Despite these recent improvements, New Zealand still faces *waste management challenges*. The rate of *municipal waste generation* continued to increase during the review period, with little sign of decoupling from GDP. The fragmented legislative and institutional framework for waste management has stymied efforts to take a cradle-to-grave approach to materials management. Related legislation mostly deals

with the disposal end of the waste hierarchy, with recycling, recovery and minimisation dealt with solely on a voluntary basis. The absence of national environmental standards for disposal facilities has created an uneven playing field for landfill operators, and thus stunted the development of a market for waste management services. The *economic viability of recycling* of a range of materials is limited by distance from larger markets, and this constraint makes even established recycling activities (e.g. for glass) vulnerable to collapse. *Information on waste management* is still not aggregated at regional or national levels, hampering strategic planning. Implementation of legislation on *hazardous waste management* relies largely on local authorities that may lack necessary technical capacity. As tracking of volumes and movements of hazardous waste is in its infancy, it is very difficult to manage associated environmental risks as called for in the Hazardous Substances and New Organisms Act.

Recommendations:

- develop national regulations specifically concerning the *management of hazardous waste* and introduce mandatory and comprehensive systems for tracking its transport, treatment and disposal;
- expand and upgrade *waste treatment and disposal facilities* (e.g. landfills, hazardous waste platforms, waste water treatment plants), promoting co-operation among territorial authorities where this will lead to economies of scale, and applying the polluter pays principle;
- increase regulatory support for *recovery or recycling* (including deposit-refund systems) of priority waste, such as end-of-life vehicles and electronic goods, building on the extended producer responsibility principle;
- clarify liability arrangements for the *remediation of contaminated sites*, and develop financing mechanisms that apply the polluter pays principle as fully as possible.

Nature and biodiversity

In a global context, New Zealand has a *special responsibility* for biodiversity conservation, since a high percentage of its 90 000 native species are endemic and unique. New Zealand increased the priority given to nature and biodiversity conservation in the review period through *expanded funding and policy measures*. The security of 200 threatened species has improved through effective *species recovery programmes*, and there were no known species extinctions during the review period. Natural processes provide essential “ecosystem services” and form the base for important economic activities (e.g. tourism, forestry, fisheries, agriculture). *Protected areas* have been expanded to cover 32% of the country’s land area and 7.5% of its territorial sea, significantly higher than in most OECD countries. A substantial increase in the area of private land protected under *covenant agreements* has extended the reach of efforts to protect indigenous biodiversity in remnant areas, although not always in accordance with national conservation priorities. Since 1998, *review of land tenure* arrangements in the high-country of the South Island has added 105 km² to public conservation lands and waters, and boosted the representation of tussock grasslands in protected areas. The Biodiversity Strategy (2000) and Biosecurity Strategy (2003), as well as two general policies issued in 2005, gave needed guidance to environmental managers. *Maori tribes* are increasingly taking responsibility for the management of their customary fishing rights.

Nevertheless, nature and biodiversity conservation still faces *major challenges* in New Zealand. Despite sizable decreases in the numbers of certain pests (e.g. rats, possums, rabbits) in some areas, *invasive species* continue to pose serious risks to indigenous ecosystems and species and inflict high economic damage overall. Land use change analysis shows a *net loss of nearly 175 km² of indigenous habitat* between 1996 and 2002. The central government recently decided not to proceed with a national policy statement on biodiversity, a draft of which was presented for consultation in 2001, but instead to pursue biodiversity objectives through a non-statutory approach. In the absence of data on ecosystem conditions and trends, conservation objectives continue to be defined in terms of agency output rather than *performance outcomes*. Efforts to put ecosystem survey and monitoring techniques into use have been slow and sporadic. Conservation of *freshwater and wetland ecosystems* has trailed that of other biotopes, even as pressures on them from diffuse pollution and water abstraction have grown. The rapid and prolonged increase in numbers of *tourists to a few places in national parks* and conservation areas has led to deficits in waste and water capacity and damage to habitats. Although New Zealand's marine environment is very vulnerable to alien species, control of risks from ballast water and vessel hull fouling is in its infancy.

Recommendations:

- issue *national policy guidance concerning conservation of biodiversity* on private land, and ensure that nature conservation objectives are fully reflected in spatial and coastal plans;
- reinforce protection of *wetlands and freshwater ecosystems* and consider introducing economic or fiscal instruments to curb pressures from agriculture and urbanisation;
- strengthen and harmonise *monitoring of major pressures on biodiversity and ecosystems*, both within and outside protected areas;
- further develop partnership approaches to conserving *biodiversity on private land*, prioritising conservation of ecosystems that are under-represented in public conservation lands and waters;
- develop and implement measures to mitigate *environmental pressures associated with increasing tourist numbers* and tourism concessions on conservation lands and waters.

2. Towards Sustainable Development

Integration of environmental concerns into economic decisions

Integration of environmental concerns into economic planning and development progressed during the review period. New Zealand has weakly *decoupled its emissions* of major air pollutants (SO_x, NO_x, NMVOCs) from its economic growth, and has lowered the energy intensity of its economy by 18% since 1996. Cross-subsidisation of electricity has been eliminated and higher end-user prices have strengthened incentives for conservation. *Renewable energy sources* constitute 30% of the energy supply, higher than in most OECD countries. Standards for motor vehicle fuel quality, issued in 1988, were recently revised. *Environmentally harmful subsidies* in the agriculture and fishery sectors are among the lowest in the OECD. The management of fisheries through a system of *individual transferable quotas* has helped avoid stock collapses and served as an example for other OECD countries. The *2003 Sustainable*

Development Programme of Action defined a national approach to sustainable development and set out overarching principles and goals, thus giving needed guidance to territorial authorities. Supporting objectives were formulated in several national strategies (e.g. on biodiversity, waste, energy efficiency) issued since 2001. *Codes of practice* established by business associations in several sectors (e.g. tourism, fisheries, forestry) are facilitating best-practice sharing.

Despite this progress, New Zealand faces a *number of challenges* in integrating environmental concerns into economic activities. No strong decoupling of environmental pressures from GDP growth has been observed. Air emissions from power plants and mobile sources increased significantly during the review period. The use of *nitrogenous fertiliser* has outstripped GDP growth since 1996, with consequent increases in run-off to surface waters. The rate of car ownership has grown very rapidly, and is now one of the highest among OECD countries; little has been done to manage demand for private road transport in favour of less polluting modes. Although still good overall, *air quality* has deteriorated in some urban areas, due mostly to emissions from motor vehicles, home heating and industry. *Economic and fiscal instruments* (e.g. taxes, charges, deposit-refund programmes) are little used to internalise the external environmental costs of sectoral activities, although the country's commitment to using market-based solutions is deep rooted. Sustained growth in demand for electricity has led to increased use of fossil fuels for power generation, with consequent increases in *greenhouse gas (GHG) emissions*.

Recommendations:

- strengthen and extend measures to *decouple environmental pressures* from economic growth, where possible using market-based approaches to ensure that environmental costs are reflected in prices;
- further develop *economic and regulatory measures* to reduce diffuse water and air pollution from agriculture, tourism and transport;
- further strengthen measures to promote *energy efficiency* in the transport, energy and industrial sectors (e.g. energy taxation and pricing, product standards, building codes);
- augment measures to encourage improved *emission performance of motor vehicles* and to internalise the environmental costs of road transport (e.g. fuel taxes, fuel quality standards, inspection of in-use motor vehicles, road user charges);
- ensure that *national sustainable development objectives* are reflected in territorial development plans and resource consents.

Agriculture, forestry and the environment

Considerable progress was made during the review period in integrating environmental concerns into the daily management of agriculture and forestry operations. The *removal of agricultural subsidies* in the late 1980s catalysed the conversion of marginal pastoral land to plantation forests or back to native bush. Environmental risks posed by accumulation of *unwanted, old or obsolete agrochemicals* on farms have been reduced through collection and disposal campaigns by regional councils and the Ministry for the Environment (MfE). Some 320 km² of highly erosion-prone pastureland has been reforested since 1992 through the East Coast Forestry Project, advancing nature

conservation and erosion control objectives. *Conservation of indigenous forests* has been strengthened through the progressive uptake of sustainable forest management practices by private forestry operators, and the permanent conservation of 1 300 km² of state-owned indigenous forests on the West Coast. Forestry and horticulture operations have increasingly adopted *environmental management systems*, some to assure access to markets. The area of land used for organic farming more than tripled during the review period, and an official organic assurance system was introduced. The Dairying and Clean Streams Accord has helped restrict run-off of urine from dairy stock to surface waters. The process of *land tenure review* in the South Island has helped reduce the impact of grazing on fragile high-country ecosystems.

Recommendations:

- further apply *sustainable land and forest management* approaches (e.g. environmental farm planning, nutrient budgeting, application of sustainable forest management practices) and assess their effectiveness in reducing pressures on the environment;
- strengthen compliance with the *environmental conditions set in resource consents and permits* (e.g. concerning disposal of dairy effluents, timber harvest in private indigenous forests) through increased inspection and enforcement;
- define and implement measures to reduce net *GHG emissions from the agriculture and forestry sectors*, prioritising those that also meet other environmental objectives (e.g. flood protection, nature conservation) so as to capture “win-win” opportunities;
- assure independent evaluation of the *effectiveness of voluntary agreements and covenants* in reducing environmental pressures from agriculture and forestry activities.

Despite these advances, the agriculture and forestry sectors still face challenges with respect to better integration of environmental concerns. In contrast to many OECD countries, *GHG emissions* from agriculture (e.g. methane and nitrous oxide) account for some 50% of the national total, and are rising. *Changes in agricultural production* have led to increased intensity of inputs, including fertiliser and irrigation water, with consequent increases in environmental pressures. There is considerable potential to internalise related external costs through use of market-based instruments (e.g. taxes, charges, trading). The use of on-farm *nutrient budgeting* is still the exception rather than the rule, though it is growing. Diffuse pollution from agriculture is associated with elevated levels of *pathogens and nitrates* in lowland water bodies. Farmer compliance with resource consents for the disposal of *dairy shed effluent* is highly variable, with some farmers still spreading manure close to waterways. The scale of environmental pressures generated by intensification of agriculture during the review period, particularly as evidenced by the *deterioration of surface water quality in lowland areas*, warrants consideration of economic or fiscal instruments aimed at rationalising the use of agricultural inputs and encouraging sustainable land management practices. Land use change imagery has confirmed that clearing of native forests continues, in some instances without required resource consents.

Integration of environmental and social decisions

Within a well-developed institutional framework for *sustainable development*, New Zealand has made considerable progress towards integrating and balancing environmental and social concerns. Greater *public participation and consultation* under the RMA has increased stakeholder input to environmental management and policy formulation. *Maori* have become more involved in environmental management through expanded natural resource rights and greater representation on regional and territorial councils. Access to judicial processes has significantly improved with the operation of the *Environment Court* since 1996, and a boost in its funding since 2002 that helped accelerate treatment of cases. Access to justice has been further facilitated through the Environmental Legal Assistance Fund, which provides funding to stakeholders wishing to bring environmental cases to court. Public awareness of environmental issues has increased and *environmental education* has been reinvigorated through the national Strategy for Environmental Education and its implementing guidelines for teachers.

Recommendations:

- expand availability of quantitative *indicators and time series data related to environmental quality*, assuring policy relevance and public access;
- develop and implement a national *environmental health plan* (as called for in the national Health Strategy), setting quantified targets for reducing related public health costs and for minimising differences in exposure among various population groups;
- expand measures to reduce health risks associated with *poor indoor air quality*, substandard housing and unsafe heating;
- strengthen measures to prevent human exposure to *harmful levels of pesticides* through pesticide spray drift, residues in food and improper disposal;
- continue to promote the integration of *environmental education* in school curricula and in occupational training.

Despite these gains, areas for improvement remain. Consistent *environmental indicators and trend data* that can be aggregated at national level are scarce, and the sole national state of the environment report was published in 1997. Although *public consultation* as part of RMA processes is extensive, it could be rendered more efficient in certain cases. Indeed, NGOs, Maori, businesses and other stakeholders complain of “consultation fatigue” and report that they must sometimes drop out of lengthy consultation processes when they become too costly. There is increasing public concern that New Zealand’s “*clean and green*” *image* is waning; nevertheless, surveys show that this concern is not matched by a willingness to take personal action or accept the costs of measures to improve the environment. Poor *indoor air quality* and drinking water that does not comply with guidelines entail health risks, with socio-economically disadvantaged and Maori households disproportionately affected. New Zealand has a high rate of *waterborne disease* compared to other OECD countries. Ambient air quality in large urban areas has deteriorated, posing health risks. In agricultural areas, exposure to *pesticides from spray drift* is a public concern.

3. International Co-operation

New Zealand continues to give *high priority to international co-operation* for environmental protection, both to reduce pressures on shared natural resources and to maintain a level playing field in the context of expanding international economic integration and competition. Since 1996, New Zealand has ratified and begun implementing a number of international conventions related to *marine issues*, as recommended in the previous OECD review. It has also worked actively to promote international co-operation for the conservation of biodiversity and seabirds. A range of measures has been introduced to comply with the UN Fish Stocks Agreement regarding flag state control of fishing vessels on the high seas, and the industry has initiated negotiations with the central government to ban *destructive fishing practices* in one-third of New Zealand's offshore waters. The country has met all of its port state control requirements under the Tokyo Memorandum of Understanding. Concerning *ozone-depleting substances*, New Zealand has complied fully, and often before international deadlines, with phase-out timetables established under the Vienna Convention's protocols. Surveillance at the borders for illegally transported CITES-protected items is strong, although fines and sanctions are sometimes too low to be dissuasive. Within the South Pacific region, New Zealand has provided technical assistance on trade and environment and marine conservation issues. Environmental considerations are systematically taken into account in *official development assistance* projects. Concerning the *Antarctic*, New Zealand produced the first state of the environment report of the Ross Sea Region and worked with the United States to establish the first Antarctic Specially Managed Area. Regulatory requirements for *seabird scaring devices* on fishing boats have helped reduce seabird mortality, although more than 5 000 seabirds per year are still killed as by-catch in New Zealand waters.

Despite these achievements, there is a need for further progress on several fronts. The *GHG intensity* of the New Zealand economy is the fourth highest in the OECD, and GHG emissions continued to grow during the review period. A domestic target for 2000, concerning reduction of CO₂ emissions, was not met. *Carbon sequestration in forests*, a key factor in New Zealand's GHG accounting since 1990, is likely to diminish over time as planted forests reach maturity, and government retention of forestry carbon sink credits may have contributed to the weakening of incentives to expand plantations. The suspension of the *climate change policy package* in 2005 (including its planned carbon tax) has created great uncertainty about how New Zealand will meet its *Kyoto target*. The country has acquired relatively little experience using Kyoto flexible mechanisms, although their use will likely be required to meet the Protocol target. The *energy intensity* of the industrial sector is high, and the carbon intensity of the electricity supply, although still low, is increasing. Low taxation of motor vehicle fuels (or nonexistent in the case of diesel) translates into relatively low prices at the pump, giving little incentive for fuel conservation. To meet the phytosanitary requirements of importing countries, New Zealand still depends heavily on *methyl bromide* (a strong ozone-depleting substance) for the fumigation of export forest products and strawberries. Development of a national *ocean policy* has been slow, and the management of some high seas fish stocks remains challenging. Consideration should be given to increasing domestic or international protection of certain endemic insect species which are heavily affected by international trade.

Recommendations:

- adopt and implement a clear and comprehensive *package of climate change policy measures* (e.g. economic instruments, flexible mechanisms) to meet New Zealand's international commitments, giving consideration to setting sectoral targets; develop strategies for future climate protection commitments in line with guidelines of the Intergovernmental Panel on Climate Change;
- give consideration to allocating *carbon sink credits* and liabilities to forest owners, and ensure that the agriculture sector reduces its GHG emissions through low-cost practice changes and efficiency gains (e.g. energy efficiency improvements, increased biogas recovery);
- review and adjust fines and sanctions for smuggling of *CITES-protected species* or derived products, to ensure that they are dissuasive relative to the potential gains from smuggling;
- finalise and implement the *ocean policy* and pursue the further expansion of marine reserves and the strengthening of regional co-operation for the management of *high seas fish stocks*;
- increase levels of *official development assistance* and continue to mainstream environmental concerns into ODA.

NORWAY

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. IMPLEMENTING ENVIRONMENTAL POLICIES**
- 3. WATER MANAGEMENT**
- 4. WASTE MANAGEMENT**
- 5. NATURE CONSERVATION AND BIODIVERSITY**

Part II
SUSTAINABLE DEVELOPMENT

- 6. ENVIRONMENTAL AND ECONOMIC INTERFACE**
- 7. ENVIRONMENTAL-SOCIAL INTEGRATION**
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CONCLUSIONS AND RECOMMENDATIONS*

In the 1990s, *Norway's GDP* grew by 35%; its GDP per capita increased by 28%, to rank third among OECD countries. Much of Norway's economy depends on the use of its natural resource base. Its economic performance to a large extent reflects the rapid growth of the Norwegian oil and gas industry. Extensive hydroelectricity resources supply a range of energy intensive industries, and per capita electricity consumption is the world's highest. Fisheries and aquaculture registered increases in production of 60% and 120% over the 1990s.

Awareness of national and international environmental issues has long been high in Norway, which is exposed to air and coastal water pollution influenced by emissions from other countries. Other *pressures on its environment* are associated with offshore oil and gas production, fishing, transport, and growing demand for electricity. Norway faces the challenge of optimising the economic benefits of its rich natural resource base while protecting its environmental and social values. Priority environmental issues are presently: biodiversity, eutrophication and oil pollution, waste and recycling, climate change, outdoor recreation, cultural heritage, hazardous chemicals, international co-operation, and environmental protection in polar areas.

It is necessary for Norway to: i) increase the effectiveness of its environmental policies; ii) ensure that it obtains full results from its improved integration of environmental concerns into economic and social decisions; and iii) reinforce its international environmental co-operation. This report examines progress made by Norway since the previous *OECD environmental performance review* in 1993, and evaluates the extent to which Norway's *domestic objectives and international commitments* are being met. A number of recommendations are put forward that could contribute to strengthening the country's environmental performance.

1. Environmental Management

Increasing the effectiveness of environmental policies

In the 1990s, Norway strengthened its environmental regulatory framework with new waste management and nature conservation measures, and with the transposition of EU directives as a result of the 1992 Porto Agreement on the European Economic Area. There has been *decentralisation of responsibility for environmental management* towards the municipalities, particularly with respect to nature conservation and land-use planning. Use of *economic instruments* has evolved; highlights have included introduction of the CO₂ tax in 1991 and extension of its coverage in the late 1990s, taxes on final disposal of waste, recycling deposits on electrical and electronic products, and taxes on environment- and health-damaging chemicals. Environmental Impact Assessment regulations have been revised, with greater coverage of projects. *Land-use planning* has been an important instrument to better protect environmentally and culturally valuable areas, and to support transport management.

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting in July 2001.

The pilot Green Government Project focuses on green procurement, energy savings and waste management in ten government agencies.

The fact that Norway's environmental actions have continued to be based mainly on *ambient quality criteria and cost-effectiveness* has avoided use of funds to realise small environmental benefits at the domestic level. However, this approach is not necessarily consistent with policies based on emission standards, such as some of those adopted within the EU, or with emission reduction targets such as those in multilateral environmental agreements. Despite several achievements in the 1990s (e.g. reduction of SO_x and lead emissions), Norway's performance has been insufficient to meet a number of its own environmental objectives (e.g. concerning NO_x and VOC emissions, nutrient discharges, waste generation, nature protection). Environmental pressures from fast-growing sectors (energy production, fisheries, aquaculture, transport) have increased. Despite this *gap between intentions and results*, good intentions remain, with much conceptual work carried out to broaden and strengthen use of economic instruments (e.g. transferable quotas for air emissions, green taxation) and renewed inter-ministerial commitments regarding a number of environmental objectives. The challenge ahead will be for Norway to show that it can *meet its domestic and international environmental commitments*, even those which are not critical for its own environment.

Recommendations:

- improve the *effectiveness of environmental policies* with respect to a number of priority environmental objectives adopted nationally or internationally;
- adhere to and continue to pursue established *long-term environmental objectives* while closing the implementation gap;
- strengthen implementation of environmental policies and legislation, with appropriate supervision of *enforcement* for both pollution abatement and nature protection;
- continue to extend *use of economic instruments* for environmental management, on the basis of the conceptual work carried out in the 1990s (e.g. tradeable permits, green taxation); consider mechanisms to achieve better results concerning emissions of NO_x and VOCs and nutrient discharges;
- assess further the *economic rationale of exempting* some emitters from paying the full rate of the CO₂ tax, taking into account the environmental and social implications of these rate differences
- continue to provide *environmental information and economic analysis* to support environmental policy developments, including energy prices and environmental expenditure.

Water

In the 1990s, Norway made considerable investments in *waste water treatment* and reduction of nutrient discharges to fresh and coastal waters, partly following international commitments (EU Urban Waste Water Directive, North Sea Conference targets). The proportion of the population connected to *municipal waste water* treatment increased from 59% in 1990 to 80% in 1999, and progress with respect to tertiary treatment has resulted in lower nutrient discharges. Use of commercial

phosphate fertilisers in *agriculture* has been halved since 1980; pesticide use has also been cut significantly. Overall phosphorus inputs to the North Sea have nearly been halved (the North Sea Conference phosphorus reduction target). Oil discharges from *refineries* decreased 92% in the 1990s, reflecting the closure of one refinery and improved effluent treatment at others. *Acidity levels* have improved in lakes and watercourses in southern Norway.

An abundance of water resources has resulted in *water quality* management being given relatively low priority on Norway's environmental agenda. Water quality is not satisfactory in a number of bays/fjords, particularly near Oslo and at industrial or aquaculture sites, and further investment in waste water treatment will be necessary. *Eutrophication* remains a challenge. Nutrient run-off from agriculture has not been effectively reduced. The North Sea Conference reduction target for nitrogen discharges was not achieved. Further efforts are needed to reduce discharges of oil and other substances from *offshore oil and gas operations*. Supply of *drinking water* is not fully satisfactory. Water pricing could provide more accurate signals concerning actual costs of water services (user-pays and polluter-pays principles).

Recommendations:

- reduce eutrophication by decreasing *nitrogen discharges*, particularly from households, agriculture and aquaculture; in particular, strengthen efforts to achieve the North Sea Conference targets;
- continue efforts to reduce *discharges of oil and other substances from offshore oil and gas operations*;
- continue to invest in *municipal waste water treatment*;
- continue to reduce the share of the water supply which is of *unsatisfactory quality*;
- introduce *pricing* of water used in agriculture and industry; install *metering* for new consumers and progressively introduce it for other consumers.

Waste

There were *important developments regarding waste legislation* in Norway during the 1990s. A comprehensive framework now exists for environmentally sound and economically efficient waste minimisation and waste management. With reference to EU waste legislation, Norway has codified all the basic principles (e.g. the precautionary principle, the self-sufficiency principle, the polluter-pays principle and extended producer responsibility) of modern waste management approaches with respect to both infrastructure and practice. Implementation of legislation has occurred rapidly, and numerous collection/return schemes have been introduced for recoverable waste streams (e.g. oil, tyres, end-of-life vehicles, packaging, electrical and electronic scrap). *Material and energy recovery of waste* increased from around 20% in 1990 to some 48% in 1998; the target for 2010 is 75%. Due to intensified recovery activities, the annual percentage of waste going to landfill has been decreasing. However, the volume of waste generated has been increasing. Management of final disposal has improved: emissions from incineration were cut significantly during the 1990s, and methane recovery from landfills increased (with 18% of municipal landfills having installed gas recovery systems).

Waste generation has increased in proportion to GDP growth. This trend is projected to continue until 2010, although Norway has established a general target of "reducing the growth rate of waste generation considerably below the rate of economic growth". Decoupling waste generation from economic growth is Norway's main waste policy challenge. *Methane emissions from landfills* were 182 000 tonnes in 1990 and 190 000 tonnes in 1998, but increased waste generation (and consequent landfilling) is outstripping the positive effects of improved methane recovery. Further remediation is needed for *closed landfills and other contaminated sites*. Environmentally sound management of *hazardous waste* has been a national objective since the early 1990s. Nonetheless, around 20 000 tonnes was still disposed in an unknown way in 1998. A 7% increase in hazardous waste generation between 1996 and 2010 is projected. Meeting the hazardous waste management challenge will require infrastructure improvements.

Recommendations:

- intensify efforts to *decouple waste generation from economic growth*;
- enhance implementation of *extended producer responsibility* schemes in various industrial sectors;
- conduct cost-benefit analysis of *material recovery schemes* and assess their environmental benefits compared to other forms of waste recovery and disposal;
- elaborate plans to ensure that *treatment and disposal of hazardous waste* are organised in an environmentally sound and economically efficient manner, and clearly identify infrastructure needs;
- continue efforts aimed at *remediating closed landfills* and other contaminated sites.

Nature and biodiversity

In response to growing pressures on and concern about nature and biodiversity, Norway strengthened its *institutional framework for biodiversity management* in the 1990s through: legislation (1995, amended Nature Conservation Act; 1993, amended Wildlife Act; 1992, Act on Salmonids and Freshwater Fish; 1999, Fish Disease Act; 1999, Aquaculture Act; 2000, Water Resources Act), national *plans and programmes* establishing objectives and targets (e.g. protected areas and coniferous forest conservation), and the newly created *Inspectorate for Nature Management*. *Policy integration* of biodiversity conservation into sectors such as agriculture, forestry and fisheries has been pursued. For instance, forestry strategies reflecting environmental considerations have been adopted in a majority of counties. Certification of forest management practices now applies to some 70% of the timber traded in Norway. Greater involvement of local governments in managing protected areas should also lead to more effective nature conservation. Norway has ratified most relevant *international agreements* on nature conservation. It adopted the 1997 *national biodiversity strategy* and overhauled its biodiversity monitoring capacities. In 2001, a White Paper on Biodiversity, which is to serve as a national biodiversity action plan, was submitted to the Parliament.

However, *protected areas* cover only 7.6% of mainland Norway, far below the National Park Plan target of 13%, which has been postponed to 2010. Protected areas in the present system lack representativeness, with forest and marine ecosystems particularly under-represented. Habitats suffer from fragmentation due to construction of forest roads. Stocks of several important *marine fish* species in Norwegian waters (e.g. cod, haddock, Greenland halibut) are below sustainable levels. Norway was not able to stabilise or reverse the declining trend of wild Atlantic *salmon stocks and their biodiversity* in its national watercourses during the 1990s, despite measures such as the protection of some watercourses from hydroelectric development, or steps taken to preserve their genetic biodiversity. Protection measures have been strengthened for *large predators* (bears, wolves, wolverines and lynxes) by designating core protection areas, but the populations of these species are still in a precarious state and conflicts with livestock farming are more heated than ever.

Recommendations:

- reinforce and accelerate efforts to *extend the area and representativeness of protected areas* in mainland Norway, meet adopted targets (e.g. doubling protected areas between 1994 and 2010, creating more nature reserves in forested areas), and link to the Natura 2000 network; complete and implement plans for *marine protected areas*;
- continue efforts to maintain or restore populations of *threatened species* (e.g. large predators); strengthen efforts to protect *wild salmon* stocks and their genetic biodiversity;
- continue efforts to integrate *fisheries management* policy with environmental policies, including managing fisheries on a sustainable and multi-species basis;
- increase *support to local authorities* to enable them to face their increased responsibilities in nature and biodiversity management.

2. Towards Sustainable Development

Integrating environmental concerns in economic and sectoral policies

In the 1990s, Norway experienced *high economic growth* (+35%), benefiting in particular from increasing revenues from oil and gas operations. Strong decoupling has been experienced for SO_x and lead emissions and the use of pesticides and ozone-depleting substances. The goal of sustainable management of *non-renewable energy sources* led to the establishment, in 1991, of a Petroleum Fund as a way to transmit wealth to future generations and buffer the Norwegian economy from excessive fluctuations in petroleum revenues. In the area of institutional integration, economic modelling and analysis have been applied to several environmental issues. Environmental concerns are addressed during the *annual budget process*, and *sectoral* environmental plans, targets and reporting mechanisms have been adopted. Concerning market-based integration, Norway has made early and broad use of economic instruments for environmental integration, and has explored in-depth the possibility of introducing a *tradeable quota system* to manage its greenhouse gas emissions. Environmental management and audit schemes are progressing in Norwegian industry.

Despite these quite advanced and sometimes exemplary policies, overall Norway has achieved *only weak decoupling*: a number of pollution trends (CO₂, NO_x and VOC emissions; nitrate in effluents; municipal waste generation) are still increasing in absolute terms, although more slowly than GDP. Sectoral *subsidies* (e.g. 69% of production value in the case of agriculture) and quota systems (e.g. fisheries) should be reviewed systematically for their environmental implications. The many exemptions from environmentally related taxes should be reassessed with respect to their economic, social and environmental rationale. The recent shift in taxation away from car use towards car ownership cannot be considered environmentally beneficial.

Recommendations:

- take further action to more effectively *decouple environmental pressures* from economic growth;
- monitor progress in *sectoral environmental integration* and ensure that the targets set in sectoral environmental action plans (e.g. for energy, transport, agriculture, aquaculture, fisheries) are met;
- ensure *long-term reliability of fiscal policy measures* concerning sustainable management of renewable and non-renewable natural resources, as well as the transmission of wealth to future generations (e.g. through the Petroleum Fund, taxation);
- review and adjust *sectoral subsidies* with negative environmental implications, in order to achieve greater economic efficiency and environmental effectiveness;
- prepare a national *sustainable development strategy*.

Integrating social concerns into environmental policies

The *distributive effects* of environmentally related policy measures are frequently analysed with respect to both *intergenerational* and *interregional equity*. This reflects concerns about management of oil and gas revenues and about population distribution over the national territory. The Petroleum Fund, which has reached an amount equivalent to 30% of GDP, is an important means of transferring assets to future generations. There is extensive public right of access to nature (e.g. fishing, hunting, berry picking), and environmentally sensitive outdoor recreation is well supported. Children below the age of 16 have free fishing rights, even on private property. Norway's strong tradition of *local and environmental democracy* encourages co-operation, stakeholder participation and gender balance. Environmental NGOs, which co-operate on many projects, have standing and appeal rights in environmental court cases. Local Agenda 21 initiatives have recently gained momentum in many communities. Authorities provide high-quality and frequent environmental information, in-depth analysis and environmental indicators. Environment is a component of all types and levels of education; *educational projects* are linked to environmental fieldwork.

Despite this generally positive picture, some developments raise environmental and social concerns. Unsustainable use of renewable natural resources (e.g. fishing, reindeer grazing) threaten the integrity of important ecosystems, as well as the *economic and social viability of certain areas and communities* (fishing communities, indigenous populations, remote rural areas). Use of *fiscal instruments* for environmental management is being challenged as unfair, on the grounds that too much emphasis is

put on their revenue-raising function and not enough on their incentive function. *Mediation mechanisms* are needed to solve local conflicts (e.g. concerning large predators, overgrazing by reindeer), whereas the prevailing approach is still to solve potential conflicts through *sector protection and compensation*, thus avoiding or postponing adjustments. A number of legal adjustments are needed to accompany ratification of the Aarhus Convention, particularly with respect to access to information and participation. NGO standing has recently been limited by reducing options for appealing court decisions.

Recommendations:

- continue efforts to maintain and enlarge the national asset base, and to ensure fair and sustainable *transmission of wealth to future generations*;
- continue to give consideration to the *distributive implications of using economic instruments* (e.g. green taxes, allocation of permits);
- seek societal consensus on managing natural resources (e.g. in fishing, forestry, farming) and biodiversity (e.g. with respect to large predators, reindeer herding), giving attention to the concerns of *indigenous populations and remote communities*;
- ratify and implement the *Aarhus Convention*; introduce the necessary changes to Norwegian legislation concerning access to environmental information, access to courts and participation;
- continue to promote *Local Agenda 21* initiatives and encourage environmentally related co-operation among local communities.

Sectoral integration: energy

Throughout the 1990s, *oil and gas extraction* was Norway's most important industry measured in terms of value added (10 to 15% of GDP every year since 1991) and export revenue (32 to 37% of total export value). Norway has made considerable efforts to limit the negative environmental impacts of energy production and use, applying cost-effectiveness as a primary criterion for evaluating policy options, and protecting some 20% of the country's hydroelectric capacity from development. Measures to reduce *SO_x emissions* have been highly effective, reducing emissions from mobile sources by 58% and those from industrial combustion by 31% during the 1990s. Emissions of *NO_x*, *VOCs* and *CO* from *mobile sources* have also declined significantly, reflecting the fleet's improved average emissions performance (largely due to successful vehicle scrapping programmes and tougher fuel and emissions standards). Norway was one of the first OECD countries to apply a *tax on CO₂*, helping limit growth in *CO₂* emissions in some sectors. It has made relatively widespread use of economic instruments to integrate environmental objectives in the energy sector. Analysis and discussion of a *national system of tradeable GHG emission permits* are at an advanced stage. EIAs are consistently carried out for major energy developments. Energy labelling of a range of consumer products has been implemented.

Norway has not set clear medium- and long-term *environmental objectives for the energy sector*, particularly regarding energy efficiency and GHG emissions. There are no quantitative targets for improving *energy efficiency*. Efforts to promote energy conservation and the uptake of more energy-efficient technologies were limited and poorly co-ordinated in the 1990s, but may improve with the establishment of the new Energy Efficiency Agency (ENOVA) in 2001. *CO₂ emissions* from energy use and production, comprising about 75% of total *CO₂ emissions*, increased by nearly 19% in the 1990s. Mainly for this reason, Norway has failed to meet two preliminary national targets for *CO₂ emission reductions*. Over 90% of *NO_x emissions* originate from energy extraction and use; the growth of these emissions in the 1990s contributed to Norway's failure to meet related international commitments. *VOC emissions* from oil and gas extraction increased by 54% between 1990 and 1998; efforts to control these emissions through a voluntary agreement with producers failed. *Electricity consumption* increased by 13% in the 1990s, with residential and commercial demand accounting for the bulk of the increase.

Recommendations:

- set clear medium- and long-term *environmental objectives for the energy sector* and define mechanisms for their integration in energy planning;
- set quantitative objectives for the new *Energy Efficiency Agency (ENOVA)* and reinforce *measures to encourage energy efficiency*, especially in the residential sector, industry and transport;
- take measures to *moderate demand for electricity* (e.g. review electricity prices, ensure their transparency, etc.);
- implement firm and cost-effective measures to reduce *NO_x, VOC and GHG emissions*, particularly from oil and gas extraction, road transport and ships;
- take account of *ancillary benefits* (e.g. reduced emissions of pollutants other than GHG) in assessing measures to help achieve the Kyoto target.

3. International Commitments

In the 1990s, Norway continued to give high priority to *international environmental co-operation*, implementing bilateral and regional activities with its neighbours (e.g. co-operation with Russia, the Action Plan to Eliminate Pollution of the Arctic) as well as with developing countries. Norway is still one of the world's most generous donors of *official development aid* (0.9% of GNP per year). It actively seeks to promote sustainable development by "mainstreaming" environmental aid into all development aid and by prioritising institutional strengthening. Norway has met all its international commitments to *reduce SO_x emissions*. It was also one of the first countries to ratify the Aarhus Protocols concerning POPs and heavy metals, and played an important role in developing the UNEP Convention on POPs. Although data are still incomplete, early indications suggest that Norway has already made considerable progress in achieving its commitments to reduce emissions of certain POPs. Between 1985 and 1995, Norway reduced *phosphorous inputs to sensitive North Sea ecosystems* by 48%. It has taken early and effective measures to control and reduce the manufacture, trade and use of ozone-depleting substances. Norway has played an active role in international efforts to conserve biological diversity. It actively supported the establishment of the Cartagena Protocol on Biosafety, and was the first country to ratify it.

Despite these achievements, Norway's performance regarding international environmental co-operation has been insufficient in some respects. Concerning *climate change*, its GHG emissions are projected to increase by 22-26% from 1990 to 2010. Plans have been under development concerning how to meet Norway's Kyoto commitment, based on two White Papers presented to the Parliament (the latest in June 2001) and a 1999 report by a special commission on a national system of tradeable GHG emission quotas. Concerning *air pollution*, efforts to meet international commitments to reduce NO_x and VOC emissions have stalled in the face of the rapid growth of energy production and use. With respect to the *marine environment*, the next decades will be very challenging, with the dismantling of aging offshore platforms as well as the scrapping of increasing numbers of vessels from Norway's very large fleet. Ship scrapping is associated with environmental and safety problems in the developing countries where it takes place. Frequency of *inspection of foreign vessels* in Norwegian ports decreased significantly in the 1990s, no longer meeting the requirements of the Paris Memorandum of Understanding on Port State Control. Like other members of the North Sea Conference, Norway did not achieve the agreed 50% reduction of nitrogen inputs to the North Sea between 1985 and 1995. For most pollutants, the *emissions intensity of offshore operations* increased in the 1990s (although Norwegian operations remain relatively clean compared to those of other OSPAR countries). Concerning *fisheries*, key North Sea stocks jointly managed by Norway are still in peril. Re-examination of the international quota-setting process is clearly indicated. Norway therefore faces major and increasing environmental challenges in the areas of climate change, traditional air pollution, the marine environment and marine resources, all relating for the most part to its energy and fisheries sectors.

Recommendations:

- set *national commitments for reducing greenhouse gas emissions*, and develop and implement reduction measures accordingly, independent of the status of the Kyoto Protocol;
- elaborate, and implement with resolve, cost-effective *measures to reduce national NO_x and VOC emissions* (e.g. from offshore platforms, ships, gas-fired power plants and private vehicles), and ratify the *Gothenburg Protocol*;
- take further measures to *reduce fishing fleet capacity*;
- work towards the establishment and implementation of an *international system of fisheries management* in the North and Barents Seas, which is based on an ecosystem approach and includes precautionary management strategies for specific stocks
- ensure that *dismantling of offshore platforms* is carried out in conformity with relevant OSPAR regulations.

POLAND*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR MANAGEMENT**
- 3. WATER MANAGEMENT**
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Part II
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- 7. SECTORAL INTEGRATION: TRANSPORT**

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- 8. INTERNATIONAL COMMITMENTS AND CO-OPERATION**

REFERENCES

* Also available in Polish.

CONCLUSIONS AND RECOMMENDATIONS*

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

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

To meet these *challenges*, Poland will need to: i) expand its environmental infrastructure (e.g. for waste and waste water treatment) and continue implementing its environmental policies; ii) further integrate environmental concerns into economic and social decisions; and iii) reinforce its international co-operation on environmental issues.

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

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

** 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).

1. Environmental Management

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

Implementing environmental policies and strengthening environmental infrastructure

Poland's environmental management is founded on solid environmental institutions and competences. Two *national environmental policies* were adopted in 1991 and 2000 under fast-changing circumstances. The Second National Environmental Policy defines short-term (2000-02), medium-term (2002-10) and long-term (2010-25) objectives for management of natural resources, improvement of environmental quality, strengthening of policy instruments for environmental management, and co-operation on environmental issues of international concern. Together with economic structural changes, these efforts by Poland have contributed to progress on a number of fronts (e.g. reductions of traditional air pollutant emissions, water withdrawal, nutrient discharges and non-municipal waste generation). Poland's *inspection and enforcement* capacity has been preserved (in the national Inspectorate for Environmental Protection), although follow-up by prosecutors could be strengthened. Expenditure on pollution abatement and control, which was between *1.5 and 2% of GDP* throughout the 1990s, has largely been financed by high pollution charges and fines (e.g. for air pollution) redistributed through the *National Fund for Environmental Protection and Water Management* (hereafter referred to as the National Fund for the Environment) and a number of other environment funds operating at regional and local levels. Between 1990 and 2000, Poland expanded its use of *economic instruments* to implement environmental policy and to recover the operational costs of environmental services (e.g. drinking water supply, waste water treatment). *Access to environmental services* varies significantly among regions; related investments should be targeted to ensure that basic social and health standards are met throughout the country. Increases in prices relating to household services (e.g. provision of water, energy and transport) have had a significant incentive effect, although with some regressive distributional consequences. In line with the Aarhus Convention, legal bases have been established for *access to information and to the courts*.

However, despite undeniable progress in reducing pollutant emissions and discharges to the environment, Poland lags behind most other OECD countries with respect to a number of environmental indicators. Having done a great deal to resolve environmental problems inherited from the past, Poland now aims at another level of environmental quality and at environmental convergence with other European countries. Considerable investment in *environmental infrastructure* is therefore still necessary. In particular, an environmental investment estimated between 1.2 and 2.7% of GDP per year will be required over ten years to comply with the terms of EU accession. Financing of this investment remains uncertain despite the support expected from European funds.

Poland must clarify *environmental priority setting* and ensure that cost-effectiveness has a central place in decision criteria. On-going efforts to improve the transparency and accountability of decision-making by environment funds should be sustained. Introduction of the European system of integrated pollution prevention and control (IPPC) and the recent decentralisation of environmental management will necessitate further strengthening of environmental institutions. Consideration needs to be given to use of emissions trading schemes to help reduce Poland's high air pollutant emission intensities. Further efforts are also needed to ensure that local *spatial development plans* correspond with those established at the regional level, and that both types reflect national environmental objectives. Use of quantitative environmental indicators to inform the process of policy formulation, for communication with stakeholders as well as monitoring policy effectiveness, will also be important.

Recommendations:

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

Air

Since 1990 Poland has significantly reduced its emissions of air pollutants, which are now *strongly decoupled* from economic growth. While GDP increased by 43% from 1990 to 2000, SO₂ and NO_x emissions fell by 53 and 35%, respectively. Emissions of other pollutants such as NMVOCs, heavy metals and dioxins have also decreased significantly. This progress reflects: i) economic restructuring; ii) energy efficiency improvements and fuel switching (from coal to oil and natural gas); and, iii) environmental management. *Economic instruments*, including taxes, charges and fines, have played a major role in stimulating emission reductions. Poland has further strengthened *air legislation* in recent years in the context of the EU accession process; by the end of 2003 EU air legislation will have been completely transposed. Ambient air quality standards and emission standards for new and existing vehicles already conform to those of the EU. The *energy sector* has been partially reformed, with a contraction of primary energy supply, significant increases in household energy prices, some fuel switching from coal,

and a new emphasis on renewable energy sources. Internalisation of environmental externalities in automotive fuel prices and vehicle excise duty has progressed, with tax differentiation roughly proportionate to emissions. Air quality monitoring systems have been modernised and pollutant coverage has been extended.

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

Recommendations:

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

Water

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

a major flood in 1997. A number of Polish rivers and lakes (e.g. in the north-eastern and eastern parts of the country) remain in a natural state, providing important wildlife habitats.

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

Recommendations:

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

Waste

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

responsibility has been introduced for some products (e.g. packaging, batteries, tyres). A legal framework for clean-up of contaminated land was recently established.

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

Recommendations:

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

Nature and biodiversity

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

Agriculture has developed specific *agri-environmental schemes*, especially for Natura 2000 sites, despite the failure of the EU SAPARD programme to provide timely support. Poland has ratified most global and regional conventions on wildlife, habitats, landscapes and biodiversity.

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

Recommendations:

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

2. Towards Sustainable Development

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

Integration of environmental concerns into economic decisions

While GDP grew by 45% between 1990 and 2001, Poland *strongly decoupled* its emissions of several air pollutants (e.g. SO_x, NO_x, CO₂), its use of water resources, and its use of agricultural inputs (e.g. nitrogenous fertilisers, pesticides) from economic growth. Municipal waste generation, increasing at only one-fourth the rate of GDP during this period, was also weakly decoupled from economic growth. *Economic restructuring*, industry and energy sector reforms and *environmental policies* explain these trends. The ongoing privatisation process, combined with a high share of foreign direct investment, is accelerating the introduction of cleaner production processes and cleaner products. Poland has established a national policy and institutional *frameworks for sustainable development*. Strategies for economic and sectoral development (e.g. transport, rural development and agriculture) rather systematically integrate environmental objectives. Environmental objectives have also been integrated into certain areas of fiscal policy (e.g. through differentiated taxes on motor vehicles and their fuels). Environmental impact assessment is used to assess and mitigate the negative environmental impacts of major infrastructure projects (e.g. motorways).

Recommendations:

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

Despite this progress, the *emission intensity* of Poland's economy remains among the highest in the OECD with respect to SO_x, NO_x and CO₂ emissions per unit GDP. Further measures are especially needed to reduce emissions from the energy and industry sectors (e.g. from large combustion plants). While there has been some reduction in use of coal, the *subsidisation of coal mining* distorts market signals; this has slowed progress on reducing discharges of saline effluents to surface waters, and on switching by stationary sources to less carbon-intensive fuels. Taxes on fuels used for stationary combustion are very limited so far, providing little incentive to conserve energy or to switch to less polluting forms of energy. The moderate fuel switching that has occurred has mainly resulted from modernisation, reinforced by air emission charges and fines. Pressures from *transport and agriculture* were relatively low between 1990 and 2000 (e.g. compared with the OECD and EU averages), but they are likely to increase markedly with the growth or intensification of these sectors. There has been little *integration of environmental concerns* into non-environmental chapters during the EU accession process. Polish authorities should better integrate these concerns into sectoral reforms and development projects, as well as into spatial planning. Continuing efforts towards efficient pricing of natural resources and environmental services would enable Poland to improve overall economic efficiency; social concerns (e.g. affordability) should be taken into account.

Sectoral integration: transport

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

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

Recommendations:

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

3. International Commitments

Poland has strengthened its *international environmental commitments* in a global context (e.g. ratification of the UNFCCC and its Kyoto Protocol), and in a European context during the EU accession process (e.g. transposition of EU Directives into national legislation). It has reduced its emissions of CO₂ from energy use by 16% since 1990 through economic restructuring, energy conservation and fuel switching. By participating in several pilot Joint Implementation projects, it has contributed to international experience with the *Kyoto flexible mechanisms*. Poland has reduced its contribution to regional transfrontier pollution in recent years, achieving large reductions in its emissions of *acidifying air pollutants* in line with the protocols to the UN-ECE Convention on Long-range Transboundary Air Pollution (i.e. Oslo, Sofia, Gothenburg, Aarhus), which it has signed but not yet ratified. It has considerably reduced pollutant loading to transboundary rivers and to the Baltic Sea. Poland has also updated its legal framework for *transfrontier shipments of hazardous waste* to be consistent with the Basel Convention, as well as strengthening and expanding its enforcement capacity.

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

Recommendations:

- adopt and implement a coherent *national climate protection policy* which identifies priority policy measures based on their cost-effectiveness (e.g. in terms of cost per unit of avoided emissions) and is co-ordinated with energy and transport policies (e.g. taking ancillary benefits into account);
- ratify relevant Protocols to the UN-ECE Convention on *Long-range Transport of Air Pollutants*, and pursue their reduction targets (e.g. for SO_x, NO_x, VOCs, NH₃) through the national air management strategy;
- complete investment in *municipal waste water treatment* stations and strengthen measures to reduce nutrient run-off from agriculture, as necessary, to comply with pollution reduction commitments made in the framework of HELCOM;
- strengthen *monitoring and inspection of fish catches* (in harbours, on ships, by satellite) and work to improve information collection on by-catch and discards in offshore fisheries; take further steps to reduce fishing capacity;
- strengthen enforcement against *illegal trade* in ozone-depleting substances, endangered species and hazardous waste;
- ensure better integration of *environmental concerns into development projects* financed by international and EU funding.

PORTUGAL

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. IMPLEMENTING ENVIRONMENTAL POLICIES**
- 3. AIR MANAGEMENT**
- 4. WATER MANAGEMENT**
- 5. WASTE MANAGEMENT**
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Part II
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- 7. ENVIRONMENTAL ECONOMIC INTEGRATION**
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10. INTERNATIONAL CO-OPERATION

REFERENCES

CONCLUSIONS AND RECOMMENDATIONS*

In the 1990s, Portugal's GDP increased by about 25% and its population by 1%. GDP per capita rose by 23%, but is still more than 25% below the OECD average. Particularly after 1993, *GDP growth* was significantly higher than for the EU as a whole. This growth is associated with structural changes (industrial modernisation, decline in agriculture, rapid urbanisation of coastal areas, development of tourism) and regional disparities.

Pressures on the environment include natural resource use, pollution and the restructuring of land use. Portugal faces the challenge of achieving economic, environmental and social development that is nationally balanced and converges with that of other European countries. In particular, over the last decade, *environmental infrastructure* (e.g. for water supply, waste water treatment and waste treatment) expanded due to major investments: these efforts must continue for Portugal to achieve the high standards set by EU environmental policies. For this purpose, Portugal has used and will continue to use EU funds to help it *converge with other EU members in environmental protection*. Significant investments were also made, and positive results achieved, regarding nature conservation. Portugal has further made considerable efforts, which must be pursued, to integrate environmental concerns into the decision making process (e.g. promoting environmental impact assessment of major projects). Land use plans have now been made for the whole country.

Hence, it is all the more necessary for Portugal to: i) further implement its environmental policies and strengthen its environmental infrastructure; ii) better integrate environmental concerns into economic decisions; and iii) reinforce international environmental co-operation. This report examines progress made by Portugal *since the previous OECD environmental performance review* in 1993, and the extent to which Portugal's *domestic objectives and international commitments* are being met, based on environmental, economic and social criteria. A number of recommendations are put forward that could contribute to strengthening the country's environmental performance.

1. Environmental Management

Implementing more effective and efficient environmental policies

In the 1990s, Portugal made much progress in establishing a revised, modern environmental *legislative framework* (largely but not solely in response to EU environmental directives), in strengthening its *environmental institutions* (including establishing a single ministry and related regional bodies in charge of both environmental and land use matters), in developing *national environmental planning* (e.g. its first national environmental plan, in 1995, and strategic plans concerning water and waste services), in adapting *physical plans* covering the entire country (e.g. national coastal area protection plans, national nature protection plan, municipal land use plans) and in *investing in and programming* water- and waste-related infrastructure, particularly in the context of the 1994-99 and 2000-06 EU Community Support Frameworks.

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting in July 2001.

However, much remains to be done to further develop environmental *investment* (e.g. for water- and waste-related infrastructure and for air pollution abatement and control [PAC] in large energy and industrial facilities), to implement *environmental regulations* effectively (e.g. by increasing compliance rates through strengthened inspection capacities and more effective administrative and penal sanctions, by verifying progress with respect to voluntary agreements and by promoting implementation of the integrated pollution prevention and control licensing mechanism) and to implement the recent national and municipal *physical plans* effectively. In the second half of the 1990s Portugal increased its environmental expenditure to about 1.6% of GDP (including PAC expenditure of about 1.1% of GDP), and it should probably expand this *financial effort* to meet its ambitious environmental targets in the areas of water and waste management. Special attention will have to be given to progress towards fuller implementation of the *polluter pays and user pays principles* in order to assure a shift of financing from taxpayers to polluters and users of environmental services, and to get ready for a likely reduction in EU financing beyond 2006. The use of economic instruments such as charges, deposit-refund programmes and other market instruments should be expanded in all environmental fields, particularly to accompany the development of cost-effective provision of water- and waste-related services.

Recommendations:

- continue implementing the various national plans and investment programmes and review and revise the *National Environment Plan*;
- strengthen the financial and human resources devoted to national environmental inspection to support progress in *compliance with and enforcement of environmental regulations*;
- strengthen financial and human resources to continue support progress in *compliance with and enforcement of land use regulations* in the context of national and municipal land use planning;
- ensure that *voluntary agreements* become more effective and efficient (e.g. with clear targets, reliable monitoring, improved transparency and third party participation);
- continue to strengthen implementation of *integrated pollution prevention and control* licensing mechanisms;
- develop the use of *economic instruments* and full cost recovery in the provision of environmental services, and progress towards full adherence to the polluter pays and user pays principles;
- significantly increase *economic analyses* of environmental policy measures.

Air management

Portugal adopted several *environmental measures* to contain growth in air pollutant emissions in the 1990s. These include mandatory technical inspection of vehicles, voluntary industrial agreements and plans for fuel quality improvements and for reformed licensing of industrial activities. Expenditure on air pollution abatement and control has grown recently, mainly in response to the EU directive on large combustion facilities. Several *energy measures* (gradual introduction of natural gas since 1997, investment in improving energy efficiency, promotion of renewable energy sources) have also contributed to air management, as have a variety of transport tax and energy tax incentives. Progress has been made in reducing *ambient levels* of criteria air pollutants in

urban areas (e.g. Lisbon, Porto) to well below guideline levels, though signs of degradation have been observed in some industrial areas.

However, by the end of the 1990s, Portugal had *not yet decoupled its air pollutant emissions* from economic growth, and had not signed or not ratified the various protocols under the Geneva Convention on Long-range Transboundary Air Pollution. Its SO_x, NO_x, NMVOC and CO₂ emissions all increased in the 1990s. *Ground-level ozone*, although not well monitored, seems to occur seasonally in most regions. Portugal now faces the challenge of meeting its international and domestic commitments: to reduce (by 2010, compared to 1998) emissions of SO_x by 57%, NO_x by 32% and NMVOCs by 63% (assuming the Gothenburg Protocol is ratified) and to increase its GHG emissions by less than 27% by 2010 compared to 1990. Programmes on *energy savings* should be expanded in all sectors; this would have multiple benefits. Overall, air pollution abatement has not received high priority in Portugal and there is little integration of air pollution concerns in industry, energy and transport policies.

Recommendations:

- implement further measures to reduce SO_x, NO_x and CO₂ emissions in order to fulfil domestic and international commitments cost-effectively; continue to design and implement measures to reduce emissions of ozone precursors;
- foster the implementation of the *new integrated environmental licensing* for industrial installations and strengthen related enforcement;
- develop *energy efficiency* programmes in the transport, residential and industry sectors (e.g. for small and medium-sized industries) so as to derive multiple benefits: more efficient energy use, lower fuel import dependence and reduced emissions of both conventional air pollutants and CO₂; implement *fuel quality* improvement plans fully;
- strengthen the guidance function of *environmentally related taxes* concerning transport and energy;
- continue to act to reduce the average age of *vehicle fleets* through improved control of used car imports, enhanced technical inspections and economic incentives for fleet renewal; continue to develop public transport;
- expand air quality *monitoring* (e.g. to include fine particulates and ground-level ozone);
- establish or enhance *air quality management programmes* for major cities.

Water management

The 1990s were marked by very significant efforts and progress in Portuguese water management. The country reinforced its *institutional and legislative capacities* for managing water resources: the Water Institute was formed in 1993 to deal with both quantity and quality issues; river basin councils and a national water council were established and river basin plans and a national water plan are being finalised. All EU water-related directives have been transposed into Portuguese legislation, apart from the revised drinking water directive. The EU water framework directive, adopted during Portugal's EU presidency, is being transposed, implying major revision of water legislation. Portugal also upgraded its *municipal water supply and sanitation infrastructure* in the 1990s. The share of population connected to a public waste water treatment plant rose from 21% in 1990 to 55% in 1999, with a large part of the

investments co-financed by the European Union. In 2000, an *ambitious new strategy* was adopted, aiming to provide 90% of the population with waste water service by 2006. The strategy envisages major reforms: plurimunicipal programmes have been established to improve public water supply, sewerage and waste water treatment services, and will gradually be extended to the whole territory. Water companies are being formed, with increasing use of private capital. Public reservoir management plans have been or are being prepared to improve water quality, co-ordinate the various uses of water and preserve aquatic ecosystems.

Recommendations:

- implement *water management by river basin*, in particular through river basin authorities;
- continue to improve the *efficiency of water and waste water services* by extending the formation of plurimunicipal bodies to the whole territory, by opening the water service supply sector to private operators and private funding and by applying the user pays and polluter pays principles;
- mobilise national and international technical, human and financial resources to achieve the 2006 objective of *90% of population connected* to public waste water treatment;
- promote the use of economic instruments such as *pollution charges* for industry and *withdrawal charges* for agriculture;
- prepare national pollution reduction programmes for all *hazardous substances* discharged into water (e.g. by industry);
- implement environmental impact assessment of large new *irrigation projects*, pursuant to new EIA legislation;
- extend water quality monitoring to *all groundwater sources* used or intended for drinking water abstraction.

Although bathing water quality has remained good and has even improved in some coastal areas, surface water quality has only started improving; widespread *microbiological and organic matter* contamination still exists. Some groundwater is affected by *nitrates* from agriculture and by seawater intrusion resulting from overextraction in coastal aquifers; the nitrogen surplus from agriculture has decreased, but 13% of municipalities exceed the nitrate directive requirements. *Drinking water* quality is barely controlled in the small supply projects that serve about 20% of the population. Quality objectives for water cover only some dangerous substances, and there are not yet national pollution reduction programmes for all these substances. *Pollution charges and withdrawal charges* introduced by law in 1994 have not been put into practice; in particular, little progress has been made with applying the polluter pays and user pays principles to *industry*. Industrial waste water is discharged into water bodies without proper treatment for older plants not connected to public sewerage networks. Continuing determination will be needed to improve the cost-effectiveness of *municipal water and waste water service* provision: waste water charges are rarely included in the water bill; water supply and waste water investments have been heavily subsidised. Financing the new strategy will be a challenge. *Agriculture* exerts increasing pressure on water resources by way of, for example, large irrigation projects; the user pays principle should be applied to improve efficiency and to finance the investment, operation and maintenance costs of irrigation.

Waste management

Since the mid-1990s, Portugal has established a solid *legal basis* for environmentally sound waste management and has developed *national strategic plans* for the management of municipal, industrial and hospital waste. The strategic plans were followed by national action plans concerning municipal waste, hospital waste and industrial waste prevention. Out of 328 *uncontrolled dumping sites*, 272 had been closed by the end of 2000. Municipal waste *recycling* activities gained momentum; they are targeted at waste streams such as packaging waste, used batteries, used tyres and end-of-life vehicles. Charging for municipal waste management services has been increasingly common, as are plurimunicipal services.

However, *waste generation* is growing faster than GDP and private final consumption. The goal of closing all dumps by 2000 was not fully achieved, partly because of treatment capacity issues. Recycling rates are generally far below target for both municipal and industrial waste. *Full cost pricing* is not widely used in waste management. Legal obligations for waste generators to report waste generation, treatment and disposal to the authorities are not well observed yet. Quantitative targets for reduction of waste generation and for recycling and final disposal in individual sectors could be further developed, with special attention to reduction of hazardous waste. A National Industrial Waste Prevention Plan was approved in 2000 to promote waste minimisation. A solution should be found for the final disposal of combustible *hazardous industrial waste*, with expanded public information on treatment options, including co-incineration in national cement kilns, and on environment and health monitoring. Overall, despite good progress since the mid-1990s, much remains to be done to achieve effective and efficient waste management in Portugal.

Recommendations:

- complete closure of uncontrolled *dumping sites* by 2001;
- continue to implement the *national plans on municipal, industrial and hospital waste management*; monitor the performance in implementation, and review and revise the plans accordingly, with special attention to waste prevention efforts;
- where appropriate, adopt *household waste charges* based on waste production rather than on water consumption;
- continue to develop quantitative targets for *industrial waste* stream management; use economic incentives to encourage industrial waste recycling;
- foster the development of a *waste management industry* including co-incineration of hazardous industrial waste in cement plants;
- develop public information on options for *hazardous waste* treatment.

Nature and biodiversity

In the 1990s, nature protection progressed in many ways in Portugal. The extent of *protected areas* increased and has already reached the 2006 national target of 7.5% of the continental territory. With inclusion of the areas designated as Special Protection Areas (under the EU bird directive) and those proposed as Natura 2000 sites, more than 50% of the coastline and 21.4% of the continental territory would be covered.

Overall, Portugal's *coastal and marine ecosystems* have remained in a reasonably good state of conservation; two marine protected areas were established in 1998, accounting for 1.7% of the continental platform, and a third one was created in 2000. Land use and management plans exist for about 50% of protected areas and are in preparation for the remainder, with 100% coverage expected by 2003. Public expenditure and staffing for nature conservation have significantly increased. The country is now fully covered by *municipal land use plans*. *Agri-environmental programmes* have expanded and now involve 23% of farmland, above the 15% EU target for 2000. Maintenance of traditional extensive farming has made it possible to conserve or even, in some cases, increase biodiversity. The total *forest area* has increased; the area covered by autochthonous broadleaf species is stable overall; and environmental concerns have been integrated into the farm forestry programme. Some 21 regional forest management plans are being prepared (due by 2003). Such programmes, which represent considerable progress, need to be consolidated and expanded in view of the pressures on nature and biodiversity from a range of economic activities and changing land use patterns. A comprehensive national biodiversity strategy was published in May 2001 and is under public consultation.

Rapid *development in coastal areas* (urban expansion and tourism) puts major pressure on key habitats while the concomitant population decrease in *inland protected areas* threatens traditional farming and forestry activities, some of which help in maintaining protected landscapes, habitats and cultural values. Commercial *eucalypt plantations* have replaced a significant share of resinous forest ecosystems, sometimes over large areas in unsuited locations; special attention should be given to the protection of Mediterranean forest ecosystems. *Forest fires* have destroyed the equivalent of a quarter of the current forest area. Freshwater ecosystems (e.g. marshland) have declined over the last few decades. Some freshwater fish species are also threatened by river development and water pollution.

Recommendations:

- implement the *national biodiversity strategy*, in particular measures to control rapid urban expansion and tourism development in coastal areas and taking account of the Natura 2000 network;
- finish establishing and implement management plans for the *national network of protected areas*; establish and implement management plans for Ramsar *wetlands* and restore migratory routes between marine and inland waters for migratory fish species;
- ensure that nature conservation is taken fully into account in *implementing regional, coastal and municipal land use plans*;
- explore the possibility of raising private funds for nature conservation to progressively assure its *long-term financing*;
- continue efforts to implement biodiversity conservation in *agriculture, forestry and fisheries*.

2. Towards Sustainable Development

Integrating environmental concerns in economic and sectoral policies

In the 1990s, Portugal experienced a period of rapid economic growth and structural change, with a substantial increase in public and private investment, including for environmental infrastructure. Many strategic plans, action plans and operational programmes apply to economic, sectoral and regional development as well as to environmental management. A coherent, comprehensive system of spatial planning at national, regional and local levels was established, including special plans for coastal zones and forestry. In this context, *institutional integration* of environmental concerns has made significant progress at all levels of public decision making: at strategic, planning, programming, policy making and project design levels. Sectoral ministries such as agriculture and transport have begun to take environmental concerns more systematically into account in policy design and implementation, following appointment of environmental auditors directly attached to the minister. The Prime Minister's Office pays close attention to sustainable development issues. Responsibilities for environmental policy and spatial planning have been merged in a single ministry. Efforts are being made to bring small and medium-sized enterprises into compliance with environmental law through adjustment contracts with branch associations. Many programmes provide incentives to speed environmental investment and stimulate environmentally *sound management practices*.

Recommendations:

- *decouple* pressures on the environment from sectoral activities (e.g. energy, industry, transport, agriculture) through better *institutional and market integration* of environmental concerns in sectoral decision making and practices;
- further strengthen national and local *sustainable development* efforts (e.g. by adopting a national sustainable development strategy);
- integrate environmental concerns in *fiscal* policies and decrease environmentally harmful subsidies;
- promote environmental management systems and eco-efficiency in *industry*, including by linking investment aid to compliance with environmental standards;
- intensify efforts to improve the modal split in passenger and freight *transport*, and to develop sustainable urban transport systems;
- strengthen sustainable *rural development* policies and reinforce mechanisms of cross-compliance in *agricultural policies*;
- strengthen the capacity to *evaluate the environmental impact* of regional and sectoral development schemes.

Despite all these positive developments, Portugal's progress in *decoupling* pollution pressures from economic growth has been weak. Waste generation, car traffic and the related CO₂ emissions have increased at rates higher than those of GDP. Overall, little progress has been made in improving energy efficiency. Monitoring of the local implementation and enforcement of spatial plans is necessary. *Market integration* of environmental concerns has only just begun to progress. For instance, the polluter pays and user pays principles are far from being fully implemented in water and waste

management. Environmentally related taxes are not used to their full potential in guiding production and consumption towards sustainable practices and patterns. Environmentally damaging subsidies are used in various sectors. Additional steps are still needed to assure proper integration of environmental concerns in energy, industry, transport and agriculture.

Integrating social concerns in environmental policies

In the 1990s, Portugal achieved clear progress towards social cohesion and economic and environmental convergence. *Environmental democracy* has progressed significantly: improvements have been achieved in the quality of and access to environmental information; media coverage of environment issues has increased, as has environmental awareness (e.g. regarding waste separation by households); environmental NGOs have grown in size and significance. *Environmental education* is a high priority and is beginning to show good results. *Positive employment effects* have been triggered, in both the public and private sectors, by investment in environmental infrastructure and implementation of environmental laws. Environment-related employment represents about 1% of total jobs. Portugal has set up a remarkable and comprehensive *system of spatial planning* at national, regional and local levels to guide land use development (e.g. in coastal zones).

However, the *distribution of environmental pressures* is uneven across the country: the Lisbon metropolitan area, Porto and coastal zones such as Algarve are threatened by traffic growth, urban sprawl and tourism development; and significant shares of the population still lack satisfactory water supply, waste water treatment and waste treatment services. *Environmental democracy* needs to be further strengthened: most environmental NGOs are weak in membership and funding; and participatory approaches to planning or local development cannot build on a long tradition in local democracy. Intensive leadership and competent moderation are required to launch more effective Local Agenda 21 initiatives. EIA procedures should rely more on public hearings and open participatory processes. Environmental training is further needed to support many local communities in managing environmental projects and enforcing environmental legislation.

Recommendations:

- ensure that *environmental convergence*, both within the EU and within Portugal (e.g. among regions) receives higher priority in the implementation of EU cohesion policies;
- take *distributive effects* into account when privatising environmental services, introducing economic instruments or changing legislation concerning property and user rights;
- foster the development of *environmental democracy* through further improvement in environmental information, increased participation (e.g. in EIA processes) and the development of Local Agenda 21 initiatives;
- continue to raise environmental awareness and competence in environmental management through comprehensive *environmental education*;
- strengthen the management and enforcement *capacities of local authorities*, and develop professional classification profiles for environmental employment.

Sectoral integration: tourism

The 1990s were a watershed decade for Portuguese tourism, with rapid growth in international and national tourism, which together account for 9% of GDP and 6% of employment. The decade saw the success of Expo 98 in Lisbon and an ever greater share for the Algarve region in tourism investment and receipts. A *new approach to tourism* attempts to reposition Portugal in the domestic and international markets and to halt or reverse environmental pressures and damage from tourism in coastal zones. Recent tourism initiatives for inland Portugal are designed to promote sustainable regional and local development, to spread demand away from the coastal areas and, drawing on private sector resources, to preserve the rural architectural heritage. Tourism *policies* are progressing, with: a *National Tourism Plan*; *national programmes of investment* under the Second and Third Community Support Frameworks; *legislation* on topics such as nature tourism, accommodation, and protected areas; a range of *physical planning tools* at national, regional and local levels, with municipal land use plans now covering the whole country; *environmental guidelines* for tourism providers; promotion of more *environmentally friendly tourism* (e.g. eco-tourism, agro-tourism and nature tourism); and application of EIAs to *tourism projects*. To *monitor progress*, an extensive inventory of tourism resources has been made, and tourism-environment indicators are being developed.

Recommendations:

- fully monitor and enforce the implementation of recent *coastal and municipal land use plans* and, in the process, increase municipalities' and tourism professionals' information on and commitment to the integration of environmental concerns into tourism decisions;
- continue seeking to reduce environmental pressures from tourism through the development of *sanitation infrastructure* (water supply, waste water treatment, solid waste treatment) supporting tourism facilities;
- continue seeking to reduce pressures on the environment from tourism and related transport (e.g. by *spreading tourism demand* over time and space);
- put more emphasis on *eco-friendly forms of tourism*, with efforts to include domestic tourists;
- promote the integration of *sustainable tourism in local economies* (e.g. coastal areas that are under intense pressures from tourism, as well as relatively poor inland areas);
- develop the use of *economic instruments* (e.g. access fees, airport charges, taxation of second homes) in line with the polluter pays and user pays principles;
- develop the tourism-environment indicators and the tourism resources inventory as a basis for both providing tourist information and monitoring progress towards *sustainable tourism objectives*.

Nevertheless, tourism authorities and tourism providers alike still rely heavily on the traditional "sun and sand" formula, with environmental pressures (e.g. waste water and solid waste generation and transport-related pressures) concentrated over time and space. The new marketing strategy poses a risk of segregating international and domestic tourists, and in certain aspects (e.g. golf holidays) it may actually exacerbate environmental pressures. The construction of secondary residences and hotel complexes

contributes to the influence of the construction industry and the accumulated pressures on coastal areas. The use of *economic instruments* needs to be extended, in line with the producer pays and user pays principles. Quantified environmental targets for the tourism sector should be developed. While the political will to integrate environmental and tourism policy appears relatively strong at the central level, physical planning implementation is mostly at the local level, where short-term economic considerations and environmental concerns are often seen as directly conflicting.

3. *International Commitments*

Over the 1990s, Portugal made progress with respect to a number of international environmental issues. The country participates in many multilateral or international environmental agreements, its bilateral environmental relations are quite satisfactory and it has transposed EU environmental directives into its legislation; it has also progressed in its environmental convergence within the EU, most significantly in the area of water- and waste-related infrastructure. Portugal plays a positive role in supporting the progress of a number of Portuguese-speaking countries on international environmental issues.

Achievements

Concerning *marine issues*, Portugal was very active in multilateral forums in the 1990s. It ratified the OSPAR Convention on the prevention of marine pollution, and after Annex 5 on the protection of marine ecosystems was adopted in 1998 in Sintra, it created two marine parks. Concerning *LMOs and nature protection*, Portugal worked very actively towards adoption of the Cartagena Protocol to the Convention on Biodiversity so as to encourage better monitoring of trade in LMOs. It has ratified the Eurobats and ACCOBAMS agreements to the Bonn Convention: protection measures have been taken for bats and will be taken for cetaceans. Portugal ratified the Convention to Combat *Desertification* and published a national action programme. Concerning *toxics*, Portugal signed the 1998 Rotterdam Convention on prior informed consent, a step towards committing itself to better control of exports of hazardous chemicals and pesticides to developing countries; it has already achieved the objectives of the Aarhus protocols for several heavy metals and persistent organic pollutants (e.g. cadmium, lead, mercury, dioxins and furans). The Framework Law on the Environment provides for compulsory insurance of activities posing high environmental risk.

Portugal is using *EU funds* effectively, particularly for water supply and sanitation infrastructure. However, some European directives have proved difficult to implement (e.g. in the fields of water quality, nature conservation and EIA), and Portugal has not yet prepared contingency plans for hazardous installations. *Co-operation with Spain* has been reinforced through the signature in 1998 of a convention on water management that significantly widens the scope of previous bilateral agreements and will aid in implementing river basin management, in line with requirements of the 2000 EU water framework directive; bilateral co-operation has also progressed on nature conservation (e.g. creation of the Gerês-Xurés transboundary park). Portugal has become a donor country, with ODA that has stayed around 0.25% of GNP, reflecting instability in most Portuguese-speaking African countries; however, the share of its ODA devoted to environmental projects is relatively low. Portugal also contributes to the GEF.

Progress to be made

Concerning *marine issues*, Portugal needs to protect itself from the dangers associated with the considerable maritime traffic off its coasts. There have been positive developments as regards preventing marine pollution from ships, but Portugal has not yet signed the OPRC and the Salvage convention. Despite efforts made by Portugal, the 1990 Lisbon Co-operation Agreement has not entered into force, pending expected ratification by some other countries. As a result, the International Centre to Combat Oil Pollution in the North-eastern Atlantic (CILPAN) has had to operate with limited capacity. Portugal has not signed several agreements related to compensation in the event of oil spill accident or damage by hazardous or noxious substances along its coasts. Nor has it signed the London Protocol to the London Dumping Convention further restricting waste dumping at sea.

Concerning *climate change*, Portugal has signed the Kyoto Protocol and in 2001 adopted a national strategy to achieve its targets. Meanwhile, its total GHG emissions increased by 18% between 1990 and 1998 and are likely to further increase by 2010, far above its commitments of 27% growth, if the strategy is not fully implemented and effective. More should be done to improve the energy efficiency of the Portuguese economy and to capture related multiple benefits: reduced GHG emissions, reduced emissions of conventional pollutants, economic benefits from more efficient energy use and reduced fuel import dependence. Concerning *ozone depletion*, Portugal has made progress towards phasing out ozone depleting substances, but still imports CFCs from existing stocks in other EU countries. Under the Convention on *Biological Diversity*, Portugal has published a draft of its national biodiversity conservation strategy. While Portugal has not signed or ratified the Helsinki, Sofia, Geneva and Oslo protocols to the Convention on Long-range *Transboundary Air Pollution*, it did sign the more recent Gothenburg Protocol, with stringent, SO₂, NO_x and VOC emission reduction objectives, and is considering ratification.

Recommendations:

- ratify and implement formal international agreements to prevent *marine pollution* from ships (e.g. OPRC, London Protocol to the London Dumping Convention) and those that would enable higher compensation in the event of an *oil spill accident* or damage from noxious substances along the coasts;
- implement the national strategy to achieve *GHG emission* reduction targets and capture multiple ancillary benefits;
- ratify the Gothenburg Protocol and take efficient measures to achieve the SO₂, NO_x and VOC *emission* reduction objectives;
- prepare contingency plans in the event of an *industrial accident*, pursuant to the Seveso directive;
- take measures to reduce imports of CFCs so as to contribute to protection of the ozone layer, pursuant to the Montreal Protocol;
- increase ODA in line with national commitments, as well as the share of ODA devoted to environmental projects.

SLOVAK REPUBLIC*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. THE CONTEXT**
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REFERENCES

* Also available in Slovak.

CONCLUSIONS AND RECOMMENDATIONS*

The Slovak Republic is undergoing two *major transitions*: a major economic transition and preparation for entry into the European Union. Slovakia's Gross Domestic Product fell by 23% before recovery began in 1994; overall, GDP has grown by 11% over the 1990s. Unemployment is higher than in most other European countries in transition. A number of industrial enterprises were privatised and land ownership changed significantly.

During the 1990s, the decline of economic activities such as industry and agriculture, changes in its energy supply, and environmental management have contributed to substantially reducing pressures on Slovakia's environment. The country is in the process of major legislative changes concerning the environment. Notwithstanding this progress, much of the accumulated contamination of the past is still in place and current emissions and discharges remain comparatively high. On several issues, the *road towards environmental convergence* with other European OECD countries will be a long one.

The *challenge* is therefore to: i) strengthen the level of effort to implement environmental policies cost-effectively and expand the environmental infrastructure; ii) better integrate environmental concerns in economic decisions in the context of sustainable development; and iii) meet the country's international environmental commitments.

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

1. Environmental Management

Implementing efficient environmental policies and strengthening the environmental infrastructure

Slovak citizens have a constitutional right to a healthy environment. Accordingly, *environmental legislation* was reinforced through the 1990s (e.g. new Acts on air protection, waste management, nature and landscape protection, environmental impact assessment, access to environmental information). A major effort is ongoing to transpose EU environmental legislation in Slovak law. For instance, a new Act on water protection and water management is being prepared, devolving responsibilities to municipalities and promoting river basin management. *Environmental policies* are founded on solid environmental information (e.g. State of the Environment reports), high quality environmental expertise, and important programming efforts (e.g. National Environmental Action Programmes I and II). To implement environmental law and

* Conclusions and Recommendations reviewed by the Working Party on Environmental Performance at its January 2002 meeting.

environmental policies, Slovakia uses a *wide range of policy instruments*. Regulatory ones are associated to economic instruments and the extensive system of emission charges has generated sustained revenues and landfill charges have provided effective incentives to improve landfill standards. Physical planning instruments were placed under the supervision of the Ministry of the Environment, and land use planning has been developed at the national and regional level since 1998 and is being developed at the municipal level, including disincentives to forestland encroachment. Environmental impact assessments were carried out for 350 projects and led to project revisions or withdrawal (e.g. dams). In 1997 industry introduced environmental management systems; many companies are certified ISO 14000 and a national programme of eco-labelling is well in place. Very significant *financial efforts* were devoted to pollution abatement and environmental protection in the 1990s: after large efforts in the early 1990s to deal with the most urgent pollution problems, the country reduced its pollution abatement and control expenditure to 2% of GDP by the mid-1990s and to 1.5% of GDP in 1999. Its environmental expenditure (i.e. PAC expenditure together with water supply and nature protection expenditure) were 2% of GDP in 1999. This evolution was accompanied by a gradual decrease in state support for environmental investment, and an increasing role of enterprises and municipalities. The devolution of responsibilities of waste, water, and waste water services to municipal governments will create opportunities to apply the polluter-pays principle and the user-pays principle more fully.

However, the *environmental institutional capacities of Slovakia* have gone, in the 1990s, through significant restructuring (e.g. end of the specific regional environmental administrations in 1996, devolution of environmental responsibilities, planned elimination of state funds for 2002). It is important that this restructuring both preserves Slovakia's own environmental "acquis" and strengthens Slovakia's capacities to face the environmental challenges of EU accession. Environmental policy implementation can be significantly strengthened. The implementation of NEAP I has not been assessed. *Enforcement of and compliance with environmental regulations* appears relatively weak; the State Environmental Inspection (SEI) should be strengthened, compliance fines updated and increased, and environmental charges and fines collection rates improved; inspection fees should contribute to cover inspection costs and self-monitoring should be improved. Enforcement responsibilities between the SEI, regional, and district offices should be clarified. Enforcement of administrative procedures are not buttressed by judicial ones; there are no prosecutors specialised in environmental matters, no standing access to courts for recognised NGOs to represent the common interest in environmental cases, and no records of environmental cases. The introduction of legislation on integrated pollution prevention and control in line with the IPPC Directive is intended. *Economic instruments* (e.g. charges) should be given higher incentive effect; increases in cost-recovery levels concerning water supply, waste water services, and waste management is needed. Slovakia has started its *approximation process with the EU environmental "Acquis"*. A major legislative effort is underway. Beyond it, a major task will be to implement this new legislation, particularly in the areas of water supply and waste water related infrastructure and for the control of major risks involving dangerous substances. The National Programme for the Adoption of the "Acquis Communautaire" envisages more than a doubling of environmental investment for the period 2000-08 compared to the late 1990s level. Funding will have to come mostly i) from increased environmental charges for municipal waste water and waste infrastructure and ii) from enterprises for their own environmental investments; there will also be some additional funding: foreign funding (e.g. EU funds) and state support mostly to small and medium enterprises. The completion of a municipal waste

water infrastructure responding to the EU Urban Waste Water Directive may require efforts spread over much more than one decade.

Recommendations:

- strengthen *enforcement capacities*, raise the level of non-compliance fines and introduce inspection fees, increase the educational and incentive functions of the State Environmental Inspection;
- introduce *specialised prosecutors* for environmental cases and standing access to courts for recognised environmental NGOs;
- review and revise the *pricing of environmental services*, in light of the polluter pays and user pays principles, and of economic and social constraints;
- as part of the process of *devolution of power to regions and municipalities*, ensure that both obligations and revenues are adequately phased in;
- increase the use of environmental auditing to assess *environmental liabilities* arising from past operation of state enterprises, particularly within the context of privatisation;
- complete *land use planning* at municipal level (e.g. in the eastern part of Slovakia).

Air

During the 1990s, Slovakia achieved a *decoupling of most air pollutants emissions from economic growth*: while GDP increased by 11%, emissions of SO₂, NO_x, CO, suspended particulates, heavy metals, VOCs, and CO₂ decreased significantly. This reflects i) the decline in industrial output, ii) a decrease in energy intensity and fuel switching (e.g. from domestic brown coal to imported natural gas) as well as iii) some progress in air management. In the short and medium term, Slovakia should be able to fulfil its major commitments with respect to combating air pollution, stratospheric ozone depletion, and climate change. Slovakia has satisfactory *air legislation and institutions*, including air monitoring and good emissions inventories. Legislation on energy efficiency and an action plan on the use of renewable energy sources are under preparation. There are recent *strategies and programmes* for air management. A strategic environmental assessment of the energy policy was recently carried out with broad stakeholder participation. *Emission charges* are in use as well as domestic emissions trading system for SO₂; plans for starting CO₂ emissions trading are well advanced. However, the practical effect of the SO₂ emissions trading system has been limited. The energy intensity of the Slovak economy decreased by about 25% over the 1990s, partly as a result of changes in technology and in *energy prices*. Between 1998 and 2001, electricity and gas prices rose by 90% and 75% respectively, diesel prices by 60% and gasoline prices by 56%.

Nevertheless, *more efficient incentives and enforcement* are needed to reduce the environmental burden caused by air pollution, and to cut down on the frequent breaches of ambient air quality standards in major cities and industrial areas. Total annual revenues of air pollution charges and non-compliance fines dropped, partly due to actual emissions reductions and partly due to somewhat lax enforcement. *Tax breaks and exemptions* on meeting environmental regulations have been subject to controversy and lack full transparency; some of them might be regarded as subsidies to foreign

investors. The financing of air management projects in the first and second National Environmental Action Programmes should be clarified. The *energy intensity* of Slovakia is still 1.75 times higher than the OECD Europe average, even after the closure of plants using the most obsolete techniques. In addition to the major ongoing reforms of the energy sector, there is a great potential to improve energy efficiency in the industrial, residential, and services sectors, through appropriate programmes with quantitative targets. Despite the current excess capacity in electricity supply, the use of renewable energy resources (e.g. installed hydrocapacity, biomass) may be increased. In the transport sector, *freight traffic* increased significantly: 55% for road freight traffic.

Recommendations:

- make the enforcement of *emissions charges and fines* more effective (e.g. through monitoring and reporting on enforcement and related revenues);
- review exemptions from *environmentally related taxes and environmental standards* to industry and energy producers, and ensure they are fully transparent and consistent with fair competition;
- clarify the sharing of *funding* and other responsibilities between the private and public sectors concerning air management projects under the National Environmental Action Programmes;
- include more *quantified targets and timelines* into strategies and programmes dealing with air management, energy, transport, and climate policy;
- continue adjusting *electricity and gas prices* to reflect costs and promote efficiency in the energy sector, taking into account social considerations;
- continue *fuel switching* from domestic brown coal to natural gas and renewable energy sources (e.g. biomass), taking into account employment and environmental implications;
- further *decouple energy use from economic output* in the Slovak economy by improving energy efficiency in different sectors through appropriate incentives and programmes.

Water

Overall pressures on *water quantities* are low and total annual water withdrawal fell due to the decline and restructuring of industrial production, reduced household consumption, and a decrease in irrigated area. *Pollution* loads in surface waters decreased in the 1990s, as a result of a contraction in industrial and agricultural outputs and restructuring of these sectors (e.g. less energy intensive industry and less agrochemical intensive agriculture). Overall, there was a *decoupling* of water withdrawal and pollution discharges from GDP growth. Slovakia has ratified key regional multilateral agreements in the area of water management.

However, river development has contributed to more acute flooding. *Surface water quality* improved very little over the 1990s, although eastern Slovakia, in general, reached quality parity with the western part of the country. Eutrophication of bathing water is a problem. Limit values for *drinking water* quality are often exceeded for some heavy metals and ammonia and there are persistent cases of nitrate pollution. The share of the population connected to *waste water treatment* increased only slightly over the

1990s, reaching nearly 50%. Nitrogenous fertiliser use decreased sharply, but the application rate of fertilisers remains high. A *major water reform* is being considered, to include transposition of EU water legislation (draft of new Act on water protection and water management). This reform is very much needed. Different ministries deal with water quantity and quality issues and water management responsibilities of local authorities are not clearly defined. Water management at the *river basin* level would greatly improve water management planning. A new water *pricing policy* should be established: the national government still sets water prices at low rates for households; various concessions apply to abstraction charges; pollution charges have little incentive function; the user pays and polluter pays principles should be applied progressively to the water sector. The implementation of the Drinking Water and Urban Waste Water Directives will require *large investments*, especially to upgrade piped water supplies and build new treatment plants. Much of investments into water supply, sewerage, and waste water treatment infrastructure is still funded through the state budget and state funds.

Recommendations:

- adopt the proposed *new Act on water protection and water management* transposing EU legislation, and implement the new *institutional framework* for water management;
- prepare water *management plans by river basin*, taking into account flood prevention concerns;
- mobilise financial resources to upgrade and extend the *urban sewerage and waste water treatment infrastructure*;
- apply more fully the *user pays and polluter pays principles*, taking into account social considerations, aiming at full cost recovery for household water services pricing, and eliminating charge concessions and increasing pollution charges;
- identify areas vulnerable to *nitrate pollution* by agriculture.

Waste

The 1991 Waste Act provides the *institutional framework* for waste management. This Act was fundamentally revised in 2001 to incorporate the most relevant EU Legislation. In 1993, the first *Waste Management Programme* already included specific and ambitious objectives regarding waste reduction, recovery and disposal, and cleaning of old, uncontrolled landfills and other contaminated sites. All uncontrolled dumps and landfills were closed down; a network of *landfills* meeting regulatory conditions was created; its present capacity is sufficient for the safe disposal of the waste generated in the country. *Separate collection of municipal waste* is being introduced and a recycling industry is developing. A number of *economic instruments* are in use; in addition to user charges and waste disposal charges the new Waste Act introduced the concept of product charges concerning a number of items which must be collected and processed separately from other waste, or for which increased recovery is considered desirable; the revenues go to a Recycling Fund, which will be used to support the necessary investment and operational costs of recovery activities. Small amounts of *hazardous waste*, for which no treatment facility exists in the country, are exported in compliance with the Basel Convention. Estimation of cost-recovery is not possible on the basis of available information.

The stated objectives in terms of *waste reduction* and *hazardous waste disposal* have not been fully met. No measures were taken to promote waste minimisation and cleaner technologies. The amount of materials separately collected from municipal waste is still rather low. *Separate collection* schemes have failed in a number of cases, due to insufficient consideration of possible outlets for the separate materials. Current incineration plants do not cover the demand for hazardous waste elimination. Moreover, many existing facilities do not meet the technical requirements for air protection. No new large hazardous waste incinerator is under construction. Although a strategy and action plan are under development, no programme has been developed to systematically address old environmental burdens, *contaminated industrial sites* in particular. The *import of waste* destined for recovery operations is still restricted, with only a partial acceptance of the OECD Green List.

Recommendations:

- promote *waste minimisation* initiatives;
- pursue efforts to develop *separate collection of municipal waste* and promote the processing of separated materials as secondary raw material or energy source, including use of the Recycling Fund;
- complete a national *survey of hazardous waste* incineration needs, proceed with the upgrading of technical standards for existing medical waste and other hazardous waste incinerators, and build the required additional *incineration capacity*;
- elaborate a comprehensive programme to map *contaminated sites* of industrial origin, assess the potential risks for the environment and propose remedial measures;
- fully adopt the OECD Green List for the *import of waste* destined for recovery operations.

Nature conservation and biodiversity

Overall, Slovakia's nature and biodiversity are in good condition. Total forest area has remained constant over the decade at 41.5% of the country. There is a rich array of flora and fauna with a number of species not found in many areas of Europe. There is a *well-developed legislative and strategic planning framework* covering nature, with the 1994 Act on nature and landscape protection and the 1997 National Biodiversity Strategy. An extensive network of protected areas exists, covering nearly 22% of the country; almost 800 species of plants and more than 800 animal species are afforded some level of protection. Slovakia has ratified most international conventions on nature conservation and biodiversity. Slovakia also has a budding *agro-tourism and eco-tourism* industry.

There are however, some points of concern. Tourist activities are over concentrated in some areas putting undue pressure on the landscape and animals (e.g. the mountain chamois). A lack of financial and personnel resources, allows for little *oversight of protected areas* and difficulty in implementing management plans. The government's land restitution plan of the 1990s has turned some protected lands over to private owners who now in turn carry out illegal activities on them. A decline in agriculture has negatively affected some species of birds. Poaching of some protected animals is an issue.

Recommendations:

- increase *co-ordination and communication* between the ministries and state agencies involved in land management and nature protection;
- harmonise *hunting legislation* and nature conservation legislation to enhance biodiversity protection;
- develop incentives and voluntary initiatives with *private forest land owners* to integrate biodiversity conservation in forest management plans and forestry practices;
- enhance *protection of wetlands* and other key biotopes in grassland and forests;
- pursue efforts to develop *agro-tourism and eco-tourism* enterprises, including in under-used areas of the country.

2. Towards Sustainable Development

Integrating environmental concerns in economic and sectoral decisions

Following a period of GDP contraction, Slovakia's GDP was by 2000, 11% higher than its 1990 level. During the 1990s, Slovakia succeeded in *decoupling a number of environmental pressures from economic growth*. Pollutant emissions into air, discharges into water, and water abstractions were cut by as much as 30% to 70%; however, municipal waste generation increased at a rate close to the one of GDP. This was not only due to the *contraction of industrial production* (-16%) and energy use (-22%), but also to *changes in production and consumption patterns and sectoral structural reforms*; for instance, fertiliser and pesticide use were reduced massively, mostly as a result of changes in agriculture production methods and agricultural land ownership; the energy sector went through major policy reforms and experienced increased energy efficiency, changes in energy supply mix, significant shifts in energy prices, overall translating in important environmental benefits. This was also due to *environmental policies* based on the 1993 strategy, which defined short, medium, and long-term objectives and key policy principles in environmental management. *Integration of environmental concerns in sectoral policies* was uneven, but institutional and market-based integration occurred in a number of instances, in the energy, transport and agricultural sectors. Excise taxes on fuels were introduced in 1994; leaded gasoline was phased out in 1997. Reduced vehicle tax for commercial cars equipped with catalytic converters encouraged changes in the composition of the car fleet. Reduced VAT applies to environmentally friendly fuels and equipment, income tax concessions to environmental services, and exemption from real estate tax to protected areas. Strategic Environmental Assessment of policies and programmes was usefully applied for the review and revision of energy policy in 1998. Overall, agricultural support has declined and agri-environmental payments are provided for converting arable land into permanent grassland and to support organic farming, although most direct payments to farmers are related to input use; a code of good agricultural practices has been completed. Most of these economic and sectoral changes have contributed to the strong decoupling achievements of Slovakia. A Sustainable Development Council was established in 1999, as an advisory body. A sustainable development strategy was approved by the government in October 2001.

Looking ahead, further progresses in the integration of environmental concerns in economic development are feasible and necessary. First, through *enhanced interministerial co-operation* concerning strategic planning, investment programming, annual budgeting, and project assessment; the latter applies also to foreign direct investments which should, inter alia, follow environmental charters and guidelines applying to multinational companies. Secondly, further promote the integration of environmental concerns in *agriculture, energy, and transport* sectors through market based integration and appropriate economic signals (e.g. reducing environmentally damaging subsidies, enhancing the incentive effects of current economic instruments and taxation). Given its high growth, the *transport* sector is of particular concern; road taxes only apply to commercial vehicles and not to private motor vehicles; modernisation of public passenger transport should be further pursued. Given the far ranging structural changes in these sectors during the ongoing economic transition of Slovakia, it is of the utmost importance to include environmental concerns and win-win strategies in their design. Thirdly, the possibility of introducing a *green tax reform* should be further investigated, including an energy tax and a tax on the sulphur content of diesel oils. Fourthly, as households have already faced important price changes concerning their energy needs (heating, lighting, transport fuels) and will have to face further price changes concerning, inter alia water supply, waste water services, and waste services, attention should be given to the progressivity of these changes over time and to the *poorest segments of the population*. This will in turn bear on the capacity of investments in environmental infrastructure of Slovakia, in the context of both its economic transition and its accession process to the EU. This will require strategic decisions balancing economic, environmental, and social progress of the country and will imply a very high profile for environmental criteria in the EU accession negotiations.

Recommendations:

- enhance *inter-ministerial co-operation*, to foster the institutional integration of environmental concerns in economic and sectoral policies;
- extend further *strategic environmental assessment* in sectors, such as energy, transport, tourism, and agriculture; continue environmental planning and programming efforts;
- enhance *market-based integration of environmental concerns* in sectors such as transport, energy, and agriculture;
- further investigate possibilities to introduce *eco-taxation*, e.g. by shifting the tax burden from labour to the environment;
- develop and implement *pricing of environmental services* (e.g. water supply, waste water treatment, solid waste management), progressively moving towards full-cost pricing, with appropriate attention to social concerns and the balance between economic, social, and environmental progress.

Environment-social integration

Concerning *environment and health*, pollution was recognised as a main reason for the degradation of human health in Slovakia. A 1997 action plan for environment and health identified policy priorities, specific policy objectives, and action schedules. The plan, which was updated in 2001, also covers occupational health. In the 1990s, life expectancy rose for a number of reasons, including significant improvements in pollution prevention and control. Concerning *environmental information*, a national

monitoring and information system is in place. The environmental administration provides information actively on the Internet and through published reports (e.g. yearly state of the environment reports). Environmental NGOs are knowledgeable and have an important role to play especially in nature protection, EIA, and access to public information.

Nevertheless, life style improvements (relating to food, exercise, alcohol, tobacco, drugs) and environment related risks must receive more emphasis in future *health policies*. In particular, a quarter of the population still lives in areas with the poorest environmental quality. Progress in the effectiveness of *environmental monitoring* should continue, independent of institutional boundaries, with emphasis on multiple benefits and without compromise on information quality and timeliness. There are social and ethnic disparities concerning access to environmental services (e.g. drinking water, waste services) and environmental quality (e.g. environmental living conditions in black spots). *Public participation* and *access to courts in relation to environmental issues* are still largely unknown procedures to citizens; they should become an integral part of *environmental democracy*. However, the government has taken steps to increase awareness among citizens of their own legal rights. *Environment and employment* issues have not received proper attention: jobs could be offered by a more efficient and extensive use of renewable energy sources (e.g. forest biomass), by increased farm tourism and organic farming, and by nature conservation and management. Despite prevailing economic difficulties, environmental issues have remained high on the political agenda, because of their importance in the EU accession process rather than high *environmental awareness*.

Recommendations:

- continue to implement the action plan on *environment and health*;
- further review the effectiveness of *environmental monitoring* systems, regardless of institutional boundaries without compromising on the quality and timeliness of environmental information;
- continue to improve *access to environmental information*, public participation in decision-making, and access to justice in environmental matters;
- continue to foster *public environmental awareness* with a mix of instruments;
- explore possibilities of creating *environmentally related jobs* (e.g. biomass, eco-tourism, nature conservation).

3. International Commitments

Slovakia is now a party to most worldwide and relevant regional *environmental agreements* (REFERENCES II.A and II.B). The country is financially contributing to the UNEP, Montreal Protocol, Biodiversity Convention and CITES. Slovakia has promoted bi- and multilateral co-operation with its *neighbouring countries* and participates in the Danube basin management multilateral process. Slovakia is now a *member of the OECD* and the Council of Europe: this had important effects in policy areas such as chemicals control, waste management, industrial accidents, public participation, and protection of endangered species. Slovakia easily fulfilled its commitments on *transboundary air pollution* (LRTAP), with considerable decreases in the emissions of classical air pollutants (e.g. SO_x, NO_x, suspended particulates, and VOCs). Concerning *climate change*, Slovakia has prepared two national reports to the meetings of the Contracting Parties. CO₂ emissions have been reduced and are well below their 1990 level in 2000; they may also be 8% below the 1990 level in 2010.

However, Slovakia has not yet adopted a co-ordinated national strategy to combat climate change. Postponing the removal of all direct subsidies and cross-subsidies relating to electricity prices, partly for social reasons, has delayed further improvements in *energy intensity* and consequent reduction of greenhouse gas emissions. With a substantial increase in car and truck traffic between Slovakia and other European countries, sustainable transport is a concern. In the context of the *EU accession process*, EU legislation has already started being transposed into the national law. However, the remaining legislative task is still considerable, and concerns a number of topics dealt with by different ministries. Increased emphasis on *implementation and enforcement* of environmental law is much desirable in this respect. *Implementation* of some EU legislation will need *time, because of the cost of creating a new environmental infrastructure and of the social constraints*: Slovakia has requested transition periods for a number of EU environmental directives.

Recommendations:

- ratify and implement relevant *international agreements*;
- continue the transposition of *EU environmental legislation*, with appropriate resources, and strengthen the implementation and enforcement of related new legislation and commitments;
- set national commitments for reducing *greenhouse gas emissions*, and develop and implement policies and measures accordingly, and improve energy efficiency;
- contribute to the effective implementation of international agreements concerning the *Danube and its river basin*, as well as the Black Sea;
- continue co-operation in the field of the environment with its *neighbouring countries*;
- make full use of opportunities for *foreign assistance and foreign direct investment*, with the aim of strengthening environmental infrastructure and contributing to the solution of international environmental problems.



SPAIN*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR MANAGEMENT**
- 3. WATER MANAGEMENT**
- 4. NATURE AND BIODIVERSITY MANAGEMENT**

Part II
SUSTAINABLE DEVELOPMENT

- 5. ENVIRONMENTAL-ECONOMIC INTERFACE**
- 6. ENVIRONMENTAL-SOCIAL INTERFACE**
- 7. SECTORAL INTEGRATION: TOURISM**

Part III
INTERNATIONAL COMMITMENTS

- 8. INTERNATIONAL CO-OPERATION**

REFERENCES

* Also available in Spanish.

CONCLUSIONS AND RECOMMENDATIONS*

Spain's *GDP has grown* by 36% in the last ten years. It is now the ninth highest in the world. GDP per capita has also risen and is now closer to the EU 15 average, partially owing to EU support. In many instances economic growth has led to increased pressures on the environment in Spain, in terms of both pollution and use of natural resources (e.g. water, land). This partly reflects a 52% increase in international tourist arrivals, and housing construction at a rate of 700 000 new dwellings per year (the *tourism and construction sectors* accounting for 11% and 9% of GDP, respectively). The population density of the *coastal regions and the islands* (where almost 60% of the population lives) is five times as high as in the interior regions. In some tourism areas population density can triple in the summer. Economic integration into the EU has led to 77% growth in road freight transport. Despite a significant decline, the unemployment rate is over 11%, among the highest in the OECD area.

Over the review period, *decoupling* of some environmental pressures from economic growth (e.g. for SO_x and NO_x emissions, water abstractions) has been achieved and much progress has been made in developing environmental infrastructure (e.g. water supply, waste water treatment). Environmental legislation has evolved very significantly, and some regions implement very advanced environmental policies. However, Spain faces important challenges with respect to high energy intensity, high water use intensity, and increasing CO₂ emissions and municipal waste generation. *Priority environmental issues* include natural resource management (e.g. water management), biodiversity conservation, climate change and air pollution, sustainable tourism and waste management. Under the Constitution, the *autonomous regions*, which present considerable differences in their physical, social and economic conditions, have a major role to play in implementing environmental policy.

To meet these challenges, it will be necessary for Spain to: i) thoroughly implement its environmental policies, improving their cost-effectiveness and inter-regional co-ordination; ii) further integrate environmental concerns into economic and sectoral decisions; and iii) pursue its international environmental co-operation. This report examines progress made by Spain *since the previous OECD Environmental Performance Review* in 1997, and the extent to which the country's *domestic objectives and international commitments* are being met. It also reviews progress in the context of the *OECD Environmental Strategy*.** Some 46 recommendations are made that could help strengthen Spain's environmental progress in the context of sustainable development.

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 1 July 2004.

** Objectives of the 2001 OECD Environmental Strategy covered in these Conclusions and Recommendations include maintaining the integrity of ecosystems (Section 1), decoupling environmental pressures from economic growth (Sections 2.1 and 2.3), the social and environmental interface (Section 2.2) and global environmental interdependence (Section 3).

1. Environmental Management

Implementing more efficient environmental policies

Within the overall Spanish constitutional framework regarding the distribution of environmental competencies, *environmental legislation* has evolved positively and significantly over the review period, partly in response to EU Directives. Major national laws have been enacted, including on packaging waste (1997), waste (1998), environmental impact assessment (2001), integrated pollution prevention and control (IPPC) (2002) and forest (2003). The autonomous regions have also adjusted their legal frameworks. The Sectoral Conference on the Environment and Sustainable Development and the new *network of environmental authorities* are important co-ordination mechanisms (between the central government and the autonomous regions), including for transposition of EU Directives and distribution of EU funds. Many of the environmental efforts of national and regional administrations have continued to focus on *programming environmental infrastructure* investment and its financing, including through EU structural (e.g. water supply and waste water infrastructure) financing. Enforcement activities have increased. Product charges on packaging wastes have been developed and landfill taxes on municipal waste were recently introduced. Progress has been made with voluntary eco-labelling of products. Spanish firms have greatly expanded their participation in *environmental management systems*. Voluntary approaches have been adopted countrywide in several industrial sectors; their environmental effectiveness and economic efficiency should be monitored. Regional and local fiscal powers, including for environmentally related taxes, have recently been increased.

Recommendations:

- strive for implementation of the *polluter-pays and user-pays principles* to improve the efficiency of environmental policies and secure financing of environmental services, including in the context of fiscal powers devolution;
- review the policy mix supporting environmental management; increase the use of *economic instruments*; strengthen *enforcement mechanisms* for both pollution and land use regulations (e.g. administrative and penal sanctions); monitor the effectiveness and efficiency of voluntary approaches;
- speed up the development of a *national environmental strategy* with appropriate multistakeholder consultation, measurable and timebound environmental objectives and targets, and related indicators;
- increase the use of *economic analysis* to improve the efficiency of environmental policies; eliminate environmentally harmful subsidies in the water sector.

During the review period *environmental expenditure* increased somewhat. It nevertheless remains relatively low compared to that in other comparable OECD countries: pollution abatement and control expenditure represents about 0.8% of GDP (below the EU and OECD averages). Spain's environmental policy continues to be hampered by *reliance on subsidies*, government transfers and other forms of financial assistance. Spain makes limited use of environmental taxes and other *economic instruments* to influence behaviour, as it is widely believed that they could affect competitiveness and employment. There is considerable scope to *improve efficiency* through full recovery of the costs of supplying environmental services such as water and

sewerage. Some municipalities do not charge for waste services; less than a third of waste collection and treatment costs are recovered countrywide. Increasing the use of economic instruments (e.g. water services pricing) to *finance environmental services* is a matter of urgency in view of the expected decline of EU funding. Penal infringements and confinement sanctions for poor implementation of environmental legislation remain limited.

Air

Spain has taken many steps to address air pollutant emissions and strengthen its air quality management system. *Sulphur dioxide* emissions from the energy and transformation industries and *carbon monoxide* emissions from mobile sources have been reduced. Use of cleaner vehicles has helped control the growth of nitrogen oxides emissions from *road transport*. Purchase of new (cleaner and more efficient) vehicles and scrapping of industrial vehicles (at least seven years old) and private cars (at least ten years old) was promoted with a lower registration tax. Lead emissions decreased drastically following the ban on leaded fuel. Further *technology and fuel quality improvements* should follow adoption of EURO I-III emission standards and of fuel specifications. In the context of Local Agenda 21, some municipalities have begun to use strategic environmental assessment (SEA) tools to evaluate transport plans and programmes. Reduced VAT on rail and bus tickets encourages use of public transport. Liberalisation of the *energy* sector has occurred more rapidly than indicated by EU timelines. Compulsory purchase of domestic coal by electricity producers is set to decrease. Significant efforts have been made to develop cogeneration and *renewable energy sources*, particularly wind energy, although this has entailed price support mechanisms. Notable progress has been made in reducing dioxin and furan emissions from the waste sector. The quantity and quality of ambient air data have been improved through expanding and upgrading the air quality monitoring network.

Despite this progress, pressing air quality challenges remain. In particular, *concentrations of ground-level ozone* and *particulate matter* threaten human health and the environment. Of special relevance to ozone formation are emissions of non-methane volatile organic compounds (particularly from increased solvent use) and NO_x emissions from road transport. Data show that particulate matter concentrations are high relative to limit values at many locations and are therefore likely to have adverse health effects. Spain has not met its international NO_x and VOC reduction targets. *Emissions of SO_x, NO_x, NMVOCs and NH₃*, some of which are trending upwards, considerably exceed national emission ceiling (NEC) targets for 2010. Moreover, a 38% increase in CO₂ emissions has contributed to an overall increase in total greenhouse gas emissions. More national and local air quality management planning and enforcement are needed, especially to address impacts on air quality associated with *transport*. Further market-based integration of environmental concerns in transport decisions should be fostered through use of economic instruments. Efforts to reduce *emissions from stationary sources* should be encouraged, with priority attention to regulating older, more polluting sources (e.g. through implementing the IPPC and LCP Directives) and related investments. Measures to increase *energy efficiency* on both the demand and supply side are also needed. Further attention should be given to air quality issues in the context of *structural changes in the energy sector* (e.g. deregulation, privatisation).

Recommendations:

- strengthen efforts to *improve ambient air quality* (e.g. ozone and particulate matter concentrations) and to reduce air pollutant emissions (e.g. SO_x and NO_x from power generation, NO_x and VOCs from transport, VOCs from solvent use, ammonia from agriculture); strengthen efforts to meet national emission ceiling targets for SO_x, NO_x, VOCs and NH₃;
- improve *air quality planning and management* through better integration of air quality policies in regional/local planning (especially transport planning); strengthen air quality enforcement authority and capacity at all levels of government;
- reduce *greenhouse gas emissions in conjunction with other goals*, such as meeting the air emission reduction objectives for 2010, energy security, energy efficiency and greater use of renewable energy;
- improve the *integration of air quality concerns in transport decisions* with respect to both freight and passenger transport, including reduction of energy consumption (e.g. through increased use of public transport, cleaner and more energy efficient vehicles, application of economic instruments), review of fuel pricing strategies (e.g. reducing the diesel tax differential, creating further incentives for use of cleaner fuels); develop and thoroughly implement more rigorous *inspection and maintenance* of in-use vehicles;
- improve the *integration of air quality concerns in energy decisions* (including promotion of greater energy efficiency and investments to reduce emissions from power plants, refineries and industrial facilities), with a focus on large combustion plants and integrated pollution prevention and control; continue developing and using renewable energy sources.

Water

Some notable improvement occurred in the *quality of Spanish rivers* and streams during the review period. Good water quality was recorded for up to 62% of the total length of Spanish rivers in 2002, compared with 52% in 1995. Spain has a very good record concerning the quality of *coastal bathing waters*. These successes are largely due to progress made in treating point sources of pollution: 61% of the volume of urban waste water was treated in accordance with the EU Urban Waste Water Treatment Directive in 2002, up from 41% in 1994. The massive investment effort on water-related infrastructure is partly supported by large EU financing. Spain is more advanced than most other OECD countries in reuse of treated waste water. A *new Water Act* has been enacted, driven partly by EU Directives. It contains some important tools for improving the sustainability of water management, such as the principle of cost recovery, provision for water trading, the requirement that water used in irrigation be metered and the creation of ecological reserve flows in rivers. Preparation of a *number of water related plans and investment programmes* (sometimes approved following many years of debate) is one of the crucial developments in Spanish water management; they include the National Hydrological Plan, the National Irrigation Plan, the National Sewerage and Waste Water Treatment Plan and management plans for all the *major drainage basins*.

Despite this progress, water management in Spain is still *far from sustainable*. Water quality in many rivers continues to be poor (particularly in the lower reaches, where naturally low flows are depleted by water abstractions for human use in irrigation, industry and water supply). Minimum flow requirements would more fully acknowledge the needs of aquatic species. *Eutrophication* remains a problem in many reservoirs. A number of *groundwater aquifers* are contaminated and are still over-exploited, leading to saltwater intrusion in coastal areas. The management framework for the coastal zone needs strict implementation to address adequately the many development pressures in these areas. Much remains to be done to further extend *municipal waste water treatment*. It is unclear how much progress has been made with industrial waste water treatment. A definitive pollution licence has not yet been obtained for a large share of municipal and industrial discharges. Basin authorities are unable to recover 20% of the cost incurred for the supply of bulk water to irrigators. Notwithstanding new legislative provisions concerned with cost recovery, *water prices* remain low and the pricing system is not used sufficiently for demand management. Above all, Spain will need to complete the *shift from demand forecasting to true demand management* to successfully implement the letter and spirit of the new Water Law and the EU Water Framework Directive. In that context, the National Hydrological Plan and its financing should be reviewed from environmental and economic perspectives.

Recommendations:

- further strengthen *demand management* with respect to all types of water use (e.g. agricultural, municipal, industrial) by ensuring that existing instruments (such as water pricing, trading, metering) are effectively implemented and are achieving their purpose; in particular, ensure that there is full payment of charges and cost recovery for service delivery;
- implement the Water Act's *minimum reserve flow requirements* in such a way that river habitats are restored and effectively protected;
- review and revise the *National Hydrological Plan*;
- complete the national plans concerning *sewerage, waste water treatment and sewage sludge*; further improve the operation of the pollution licensing system and promote effective and efficient management of *urban water services* (e.g. water supply, waste water collection and treatment) through rigorous monitoring of drinking water quality, adoption of formal quality assurance systems and strategic planning by utilities;
- carry out *modernisation of existing irrigation systems* to achieve the improvements in water use efficiency proposed in the National Irrigation Plan; firmly implement measures to reduce the *environmental impact of agriculture* on water quantity and quality;
- expand the mix of measures to halt over-exploitation of *groundwater* resources;
- improve recognition and understanding of the relationships between water and *economic variables* with: i) *better data* on expenditures, prices and financing; ii) systematic analysis of the *microeconomic conditions* facing key water users; and iii) a systematic *review of subsidies* for water supply and treatment infrastructure, aiming at cost-effectiveness and long-term financing of the maintenance and upgrading of facilities.

Nature and biodiversity

Pursuant to the Convention on Biological Diversity (CBD), a *national biodiversity strategy* was launched in 1998. This strategy establishes the basis for developing sectoral action plans. Biodiversity conservation is an integral part of forest planning (2002 Forest Plan and 2003 Forest Act), wetland management (1999 Strategic Plan for Wetlands, 2002 wetland restoration programme, 2004 national wetland inventory) and the forthcoming National Action Programme to Combat Desertification. Concerning *protected habitats*, virtually all parks and reserves are now subject to the Natural Resource Management Plan. The *Master Plan for the National Parks Network* supports co-ordinated planning and management by parks. Better tourism information is contributing to growth in the number of national park visitors. Transfer of responsibility for nature management to the autonomous regions has led to a marked increase in the total amount of protected area. Spain is making a considerable effort under *Natura 2000*; it has proposed that close to 25% of the territory of Europe and of Spain itself (mostly forest land belonging to municipalities) be protected. *Species* monitoring has been strengthened and a nature data bank has been created. Conservation strategies have been adopted for endangered species whose natural area of distribution lies in more than one autonomous region. Recovery plans for 44 threatened species have been launched. Efforts have been made to control invasive species. *Outside protected areas* efforts have been made to integrate nature conservation concerns in the *forestry sector*, particularly at the regional level where reforestation is supervised by regional nature conservation departments. Total wooded area has increased; forest fires and defoliation have decreased. *Organic farming* is being developed. Drovers' routes are being recovered. *Regional spatial planning laws* have been enacted in most autonomous regions and regional spatial planning strategies are being prepared. At the *international level* Spain actively participates in *major conventions on nature conservation*, notably the Barcelona, Bonn and Ramsar Conventions as well as the CBD and CITES. Over half its protected area is classified as of international importance. Under *Natura 2000*, 18 *marine reserves* have been established and over 600 000 hectares of protected marine areas have been proposed.

Recommendations:

- extend the total size of *protected areas* and ensure that they are representative of the main habitat types, in the context of implementing the *Natura 2000* network and as part of development of regional spatial planning strategies; prepare *management plans* for all parks and reserves and guidelines for the development of the *Natura 2000* network;
- foster *co-ordination of nature management among the autonomous regions*, possibly through reinforcing the role of the National Nature Protection Commission; provide a legal basis for ecological corridors;
- enhance *nature conservation along rivers*, particularly in the context of the creation of a public hydrological domain;
- improve integration of nature conservation concerns in the *agriculture sector*, through a sectoral action plan under the national biodiversity strategy and greater reliance on (and more targeted use of) agri-environmental payments;
- set a target for protection of remaining natural *coastal areas* from urban development; accelerate implementation of the 100-metre dune and beach protection zone;
- ensure conformity of *regional hunting laws* with the EU Birds Directive.

Despite this generally very positive picture, lack of *co-ordination between authorities in different regions* leads to discontinuities in the protected area network. There are strong contrasts between the amount of area protected in different autonomous regions; the *representativeness of protected ecosystems* needs to be improved, possibly in the context of Natura 2000. Less than 10% of Spain's territory is protected, compared with the OECD average of 14.6%. Little has been done to restore *ecological corridors* (a protection category not included in the 1989 Nature Law). Protection of *coastal ecosystems* remains limited overall, although actions are being taken to delineate the public marine-terrestrial domain. Sensitive coastal waters still need to be delineated under the EU Urban Waste Water Treatment Directive. The *share of threatened species* remains high, especially in the case of freshwater fish and mammals. Catalogues of endangered species have still not been compiled in four autonomous regions. Regional hunting legislation sometimes does not conform to the requirements of the EU Birds Directive. Nature conservation concerns are as yet poorly integrated in the *agriculture sector* as well as in spatial planning. Compared with other EU countries, Spain has been late in implementing agri-environmental measures. Only 4-5% of total EU support for Spanish agriculture consists of agri-environmental payments, and over three-quarters of these payments are coupled with extensive agricultural (cereal) production. These concerns are also poorly integrated in the *water sector* (e.g. it is unclear whether creation of a public hydrological domain will improve nature conservation along rivers). *Financing* of nature conservation essentially relies on budgetary transfers (some EUR 50 million per year) and little on economic instruments (e.g. entrance and hunting fees). Public funds available for coastal protection (EUR 150 million per year), forest management (EUR 200 million per year) and agri-environmental policy (EUR 300 million per year) have scarcely been used to enhance biodiversity conservation. The share of tourism receipts devoted to nature conservation remains insignificant. It is not clear whether subsidies available to populations living near national parks have been targeted to environmental outcomes.

2. Towards Sustainable Development

Integration of environmental concerns in economic decisions

Spain continues to make progress in *decoupling* environmental pressures from economic growth (e.g. by reducing SO_x emissions and controlling the growth of NO_x emissions, nitrogen fertiliser use and water abstractions). *Integration* of environmental concerns in sectoral policies has also progressed, particularly in the *energy sector*. *EIA procedures* (e.g. for transport projects) have led to stricter conditions or project modifications. In some industries (e.g. coal, fishery) a process of restructuring and *phasing-out of subsidies* has begun.

However, further efforts are needed to *decouple* CO₂ emissions and the generation of municipal waste from economic growth. Rapid expansion of passenger and freight transport is of particular concern. Concerning *institution-based integration*, much remains to be done at the strategic, planning, programming and possibly budgetary levels. A *national sustainable development strategy* is being developed in consultation with several ministries and autonomous regions, although there has not yet been significant civil society involvement. There is still considerable fragmentation or lack of integration among various sectoral or regional environmental plans and programmes. EU financial assistance has mainly contributed to infrastructure supply and there is a risk of oversupply (e.g. road infrastructure). It has also contributed to some extent to a bias

against demand management in environmental policies. A clear vision of how to ensure future *financing* of environmental policies should be developed, given the expected decline in EU funding. *Strategic environmental assessment of plans and programmes* (e.g. for transport, tourism, irrigation) also needs to be developed. Concerning market-based integration, *fiscal instruments* have been used to some extent to internalise externalities but mostly to reward environmentally friendly behaviour and investments, impeding economic efficiency. These instruments should be used more widely to tax activities that have negative impacts on the environment, possibly within the context of a neutral *fiscal reform* (e.g. increased energy taxation might be balanced by decreased labour taxation). Energy, transport and water prices in general might be reviewed from the point of view of environmental and economic efficiency to obtain the benefits of win-win situations.

Recommendations:

- further *decouple* environmental pressures from economic growth to reduce pollution intensity and improve the resource efficiency of the economy;
- finalise the *Spanish sustainable development strategy* with the involvement of civil society;
- further strengthen *policy co-ordination and integration* among all levels of government as an important component of achieving environmental objectives;
- develop *strategic environmental assessment* (SEA) of sectoral programmes and plans with appropriate public participation; in particular, *integrate* further environmental considerations in agricultural policies and physical planning;
- at project level, continue and further strengthen the use of *environmental impact assessment* (EIA);
- continue to phase out *environmentally harmful subsidies* (direct and indirect) in the coal, agriculture and fishery sectors;
- review existing *environmentally related taxes* (e.g. on energy and transport) with a view to restructuring them in a more environmentally friendly manner, possibly in the context of a fiscal reform better balancing energy and labour taxation;
- further promote *local development initiatives* (e.g. in the context of Local Agenda 21) integrating economic, social and environmental concerns in coastal, urban and rural development.

Integration of environmental and social concerns

Employment in the environmental sector increased more rapidly than GDP in the review period. About 250 000 people have environmentally related jobs; several environmental programmes are directly linked to employment creation. Positive steps have been taken to further develop formal *environmental education* at the primary, secondary and university level as well as in vocational training. *Environmental information* (e.g. data, reporting) is generally of high quality and easily accessible. Spain is working on a new law on public access to environmental information that would transpose the 2003 EU Directive and has signed the 2003 PRTR Protocol to the Aarhus Convention. Some 700 municipalities have initiated a Local Agenda 21 programme. The general public is kept informed about key environmental issues through media coverage. *Environmental awareness* in Spain is quite high.

However, there has been lack of communication between NGOs and the national environmental administration despite attempts to improve matters (e.g. the Environmental Advisory Council, development of a sustainable development strategy). Though it is compulsory by law, *public participation* in national environmental decision making is generally weak; it is stronger at the territorial level (e.g. in EIA, municipal planning). Spain has not yet ratified the 1998 *Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters*. Access to the courts by NGOs and others remains limited due to high procedural fees, which partly explains why Spain is one of the EU countries with the greatest number of complaints with respect to presumed inadequate implementation of EU environmental Directives. Further development and use of *environmental indicators* (e.g. outcome indicators), at the national and regional levels, should be beneficial since Spain will gradually move away from investment programming towards more planning-oriented and strategic environmental management.

Recommendations:

- continue to consider *employment* implications in environmental decisions and policies;
- continue to promote *environmental education* nationally and regionally in formal and vocational education;
- renew and broaden communication between national and regional environmental authorities and civil society (e.g. NGOs, trade unions) and increase *public participation* (e.g. in the preparation of sustainability strategies, plans and programmes, EIA and SEA procedures);
- ratify and effectively implement the *Aarhus Convention*;
- further develop and use *environmental indicators* at national and regional levels, including to monitor progress towards meeting environmental objectives.

Sectoral integration: towards sustainable tourism

The *Integral Quality Plan for Spanish Tourism 2000-06* (PICTE), launched in 2000, has increased environmental awareness and enhanced mechanisms for co-operation among all public and private actors at the national, regional and local levels. At the local level the 200 projects that address sustainability issues in tourism municipalities, and the 100 plans aimed at improving the quality and sustainability of mature and emerging tourism destinations, deserve special recognition. Several autonomous regions have approved *tourism laws and action plans for environmental management of tourism*, notably in coastal areas. The Balearic Islands and Canary Islands have implemented strict regulatory measures (since 1999 and 2001, respectively) to control the growth of tourism and the number of visitors (quantitative tourism). Spain is actively developing and promoting rural accommodation and new tourism products to *diversify tourism activity*, even out seasonality and reduce some environmental pressures at destinations where very intensive tourism takes place. *Growth in the extent of protected areas* contributes to nature and biodiversity conservation in fragile ecosystems. Environmental tourism quality systems have been adopted by 26 parks. Numerous *voluntary efforts by the tourism industry* (particularly hotels) should produce significant water and energy savings in the near future. Further implementation of Spain's new

system of environmental tourism indicators will be instrumental in measuring and analysing future progress in tourism sustainability.

Despite the progress already made, most of these initiatives will need to be consolidated, strengthened and sometimes accelerated to respond to environmental pressures caused by continued tourism development. A *national sustainable tourism development strategy* would be very useful to further support environmental management by autonomous regions and municipalities in tourism areas. Implementing such a strategy would require allocation of *additional human resources* to address sustainability issues, including at the national level. In *coastal areas*, despite the existence of some strict regulatory measures concerning recovery of degraded areas, further efforts are needed to improve the state of the environment and preserve and/or recover coastal public domain. Minimising environmental pressures associated with the development of infrastructure, residential tourism and construction in coastal areas will be critical.

Recommendations:

- strengthen efforts to improve the environment in coastal areas, protect it from pressures related to development of infrastructure, construction and tourism, and promote *integrated coastal management in tourism*;
- pursue efforts to integrate environmental concerns in the tourism sector by establishing a *national strategy for sustainable tourism development*; introduce quantitative and qualitative targets;
- *strengthen the leadership of the national tourism administration in regard to environmental management*, promote further inter-ministerial co-operation (transport, nature, construction) and increase allocated resources;
- further develop sustainable tourism management *information, guidance and training addressed to autonomous regions and municipalities*;
- implement the *Spanish system of environmental tourism indicators* and develop its analytical use to measure progress and performance with respect to sustainability;
- further promote voluntary *sustainable management initiatives by the tourism industry*;
- explore (with all the economic actors involved) the *use of economic instruments* to preserve and valorise environmental assets in tourism areas.

3. International Commitments

Spain has already ratified many agreements focused on *marine issues*. It has been particularly active in protecting the *Mediterranean Sea* (e.g. under the Barcelona Convention and the UNEP Mediterranean Action Plan). Concerning oil spills, progress has been made by Spain under the Convention on Oil Pollution Preparedness, Response and Co-operation. The National Plan for Special Services for Saving Human Life at Sea and Controlling Pollution was approved in July 2002. Co-operation with Portugal has been strengthened in the framework of the Albufeira Convention. Spanish *official development assistance* (ODA) has been reformed: a new Law on International Development Co-operation and a four-year Master Plan (with environmental protection as one of three main priorities) have been adopted. A Spanish Co-operation Strategy for the Environment is intended to guide objectives-setting by co-operation players and to link their actions with international environmental agreements. Although the *national*

Climate Change Strategy has not yet been adopted, many plans with direct or indirect impacts on GHG emission reductions have been adopted (e.g. the Plan for Developing Renewable Energies for 2000-10, planning of development of the electricity and gas sectors for 2002-11, the Energy Efficiency Strategy for 2004-12, the Plan for Improving Transport Infrastructure for 2000-07). Concerning *ozone depleting substances*, methyl bromide consumption decreased by 75% between 1995 and 2003.

However, there is room for progress in these areas. Concerning *marine issues*, Spanish fishing vessels, together with vessels under other flags, exploit some species which are outside the safe biological limit. The 1990 *Lisbon Co-operation Agreement*, which provides a framework for close co-operation by the EU, France, Morocco, Portugal and Spain to protect the coasts and waters of the northeast Atlantic against pollution by oil and other hazardous substances, is not yet in force. Ratification of the 1989 International Convention on Salvage is pending. The Spanish fleet was on the "grey list" of the Paris MOU in 2000-02, indicating some problems with meeting MARPOL standards. *ODA* fell from 0.3 to 0.25% of GNI between 2001 and 2003. Concerning climate, *GHG emissions* increased by 38% between 1990 and 2002 and the outlook for the next few years is pessimistic. The national Climate Change Strategy has not yet been approved. Marginal abatement costs could differ significantly between sectors, leading to Spain meeting the overall abatement target at a higher cost than necessary. Although over 400 proposed climate change-related measures are under consideration, their cost-effectiveness has been analysed in only some cases. Concerning *NO_x emissions*, Spain has failed to meet the Sofia Declaration and Sofia Protocol reduction targets. Its ratification of the Aarhus and Gothenburg Protocols to the LRTAP Convention is pending.

Recommendations:

- adopt the *national Climate Change Strategy* and monitor its implementation; identify further possible needs for reinforcing it to meet the Kyoto target and the terms of the EU burden-sharing agreement; analyse the cost-effectiveness of its measures and amend it as necessary;
- further strengthen *protection of the marine environment* from oil spills, and improve the system of liability for damage related to transport of hazardous substances by sea; ratify the 1990 *Lisbon Agreement* on protection of the coasts and waters of the northeast Atlantic against pollution by oil and other hazardous substances; complete the ratification process for the *Protocol on (marine) Pollution Incidents by Hazardous and Noxious Substances* (HNS Protocol) and the new amendment to the emergency *Protocol to the Barcelona Convention*;
- increase total ODA, up to the UN objective of 0.7% of GNI, and *ODA devoted to environmental projects*;
- ratify and implement the *Aarhus and Gothenburg Protocols* to the LRTAP Convention.

SWEDEN

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. IMPLEMENTING ENVIRONMENTAL POLICIES**
- 3. WATER MANAGEMENT**
- 4. NATURE CONSERVATION AND BIODIVERSITY**

Part II
SUSTAINABLE DEVELOPMENT

- 5. ENVIRONMENTAL-ECONOMIC INTERFACE**
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- 7. HEALTH AND ENVIRONMENT**

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CONCLUSIONS AND RECOMMENDATIONS*

Environmental issues and sustainable development have remained high on Sweden's agenda, in a context of *low population* and *moderate economic growth*. Environmental issues in Sweden also have a *strong international aspect* because of regional economic and environmental interdependencies (e.g. regarding Baltic Sea pollution, transboundary air pollution and Nordic co-operation), because of Sweden's 1995 entry into the European Union and because of its strong commitment on global environmental issues such as climate change, persistent organic pollutants (POPs) and environmental aid.

Environmental progress in Sweden continued over the review period, benefiting from solid institutional and regulatory frameworks, extensive use of economic instruments and significant planning and legislative reform (e.g. the Environmental Code). The influence of EU environmental legislation has increased. Today, *priority environmental issues* are identified in 15 ambitious, long-term, strategic environmental quality objectives (EQOs): reduced climate impact, clean air, natural acidity only, a non-toxic environment, a protective ozone layer, a safe radiation environment, zero eutrophication, flourishing lakes and streams, good-quality groundwater, a balanced marine environment, thriving wetlands, sustainable forests, a varied agricultural landscape, a magnificent mountain landscape and a good built environment. A 16th EQO, on biodiversity, is under preparation. A number of these objectives have both domestic and international dimensions.

To meet the challenges represented by the EQOs, Sweden will need to i) implement more efficient environmental policies, ii) further integrate environmental concerns in economic and other policies (e.g. health, energy, transport, forestry, agriculture) and iii) further strengthen its international environmental co-operation. This report evaluates Sweden's performance in meeting its *domestic objectives and international commitments* concerning environmental management, especially since the 1996 OECD Environmental Performance Review. It also reviews the country's progress with respect to objectives of the OECD Environmental Strategy for the First Decade of the 21st Century**. Forty-four recommendations are made with the aim of helping further strengthen Sweden's environmental performance in the context of sustainable development.

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 30 June 2004.

** Objectives of the 2001 OECD Environmental Strategy covered in these Conclusions and Recommendations include maintaining the integrity of ecosystems (Section 1), decoupling environmental pressures from economic growth (Sections 2.1 and 2.3), the social and environmental interface (Section 2.2) and global environmental interdependence (Section 3).

1. Environmental Management

Implementing more efficient environmental policies

Building on already very effective and innovative environmental policies, Sweden has achieved a range of environmental results over the review period in line with many of its domestic objectives and international commitments. The country has further strengthened its *environmental legislative and planning frameworks* and extended the use of economic instruments. This progress builds on the priority given to environmental protection by the government, the parliament, civil society, enterprises and the public. Objective setting is driven primarily by welfare concerns, environmental expertise and ultimately legislative processes, with economic analysis given a role at the implementation stage. In 1999, Sweden reformed its environmental legislation with the adoption of the *Environmental Code*. This comprehensive framework law not only consolidates previously fragmented legislation but also introduces environmental courts, environmental sanctions and ambient quality standards, clarifies the role of environmental impact assessment (EIA) and transposes the EU water framework directive and integrated pollution prevention and control (IPPC) directive, among others. EU environmental legislation has an important influence on Swedish legislation. The *Environmental Code* also spells out several principles relating to environmental policies. The 15 *EQOs* adopted by the parliament in 1999 provide long-term strategic orientation while their *interim targets* serve as environmental medium-term planning tools, accompanying decentralised implementation of environmental policies. Sweden has strengthened its position as a front-runner in the use of *economic instruments*, introducing new ones and increasing the rates of several taxes and charges. An ambitious *tax shift* has been initiated, involving higher rates of environmental taxes and charges, offset by reductions in labour taxation; the shift is expected to amount to SEK 30 billion over 2001-10. Overall there is little use of subsidies to protect the environment, as Sweden adheres strictly to the polluter pays and user pays principles. In particular, municipalities charge households the full cost of environmental services. Swedish *business plays a proactive role* in developing environmental management systems, eco-labelling and certification, environmental reporting and other voluntary actions.

However, because Sweden's "administrative pluralism" means the *regional and local levels* play key roles in the decentralised implementation of environmental policies, results will follow legislative and planning changes only if environmental governance at these levels receives sufficient guidance and resources, and the regional and local authorities strengthen their own environmental efforts. *Uneven implementation* could compromise the achievement of environmental objectives. *Long permit processing periods* mean high transaction costs and may hinder investment that would be beneficial for both economic development and environmental protection. Highly decentralised enforcement and inspection entails a risk of development interests too often overriding environmental considerations. Follow-up and evaluation of the effectiveness of *inspection and enforcement* are insufficient; while the new environmental sanctions and prosecutors could potentially strengthen enforcement, so far they have been used mostly for minor infractions. Co-ordination between the *Environmental Code* and other legislation should be enhanced (e.g. to clarify and streamline licensing and to co-ordinate EIA and planning procedures). *Efficiency in using market-based instruments* could also be enhanced: although such instruments are used extensively in Sweden, the levels of several environmental charges and taxes are still insufficient to induce changes in behaviour, and

numerous exemptions to environment-related taxes are made; in the international context (both regional and global) what is required is a mix of credible national actions and an effort to capture the benefits stemming from differences in marginal abatement costs between Sweden and other countries as regards such issues as the Baltic, acid precipitation and climate change. The *efficiency of mixes of policy instruments* still needs more attention. Though Sweden's overall record in transposing *EU environment directives* is among the best, implementation of some directives (e.g. on water, nitrates, dioxins, habitats and IPPC) deserves particular attention.

Recommendations:

- assure *implementation of the Environmental Code* across the country, strengthening guidance from the central government to regional and local authorities;
- evaluate the environmental effectiveness and economic efficiency of different policy instruments and *mixes of policy instruments* nationally and internationally, and adjust policies accordingly;
- review, and revise as needed, state, regional and local *inspection and enforcement* roles, improving the monitoring and evaluation of environmental inspections, focusing enforcement on the areas with the greatest compliance problems and strengthening administrative and judicial sanctions;
- give greater importance to *environmental concerns in spatial planning* by harmonising the provisions of the Environmental Code and the Planning and Building Act and by improving municipalities' implementation capacity;
- further encourage the use of standardised *environmental management systems* by companies.

Water

During the review period, water management evolved significantly, with a strengthened local framework (the Environmental Code and transposed water-related EU directives) and clearer strategic and planning frameworks (e.g. EQOs and interim targets). Sweden also further improved its already very advanced *urban waste water treatment*, which includes tertiary treatment for phosphorus in 95% of the treatment plants. It has so far equipped 36% of treatment capacity with nitrogen removal, including three-quarters of coastal stations between Stockholm and the Norwegian border. Sweden met the 2000 deadline of the EU waste water directive for secondary treatment. It also met the overall 50% phosphorus reduction target of the Helsinki Declaration and the North Sea Conferences. *Nutrient surpluses* from agriculture were steadily reduced through a range of measures, such as limitation of stock numbers, the planting of catch crops on arable land over winter and construction of manure storage facilities. *Acidification* of sensitive lakes in south-western Sweden was reduced from 90% to 79% during the 1990s. Sweden also promulgated a comprehensive set of receiving water quality criteria, including for aquatic habitats, to guide local decisions on pollution permits.

Nevertheless, water quality problems are far from being solved, partly due to continued transboundary deposition of contaminants and the extreme sensitivity of the Swedish environment to acidification and nutrient enrichment. *Integrated river basin management* and the use of water quality criteria, in line with the EU Water Framework

Directive, are only just starting. *Eutrophication* of both inland and marine waters needs further attention (as recent European Commission legal action on waste water treatment in northern and central Sweden demonstrates) and will remain a problem for decades to come, given the inertia of the natural systems. Continuing restrictions on consumption of both *freshwater and marine fish* indicate that the same is true for persistent contaminants (e.g. dioxin and mercury in the Baltic). Despite reduction of agricultural inputs, measures taken so far to reduce the environmental impact of *agriculture* will not be sufficient in terms of the relevant EQOs. For *efficiency's* sake, further progress is necessary on reducing nitrate surpluses from agriculture, since much reduction has already been achieved from municipal and industrial sources. The use of herbicides has risen again in recent years. Not all groundwater source areas intended for current and future drinking water supplies are adequately protected. Sweden also faces *continued investment* to renew older sewerage and sewage treatment infrastructure, to manage combined sewer overflows and storm water run-off from roads and to deal with phosphorus discharges from isolated dwellings (one-fifth of the total load). Remediation of old mine tailings and other contaminated sites will also be demanding financially.

Recommendations:

- approve and implement the action strategy for management of *land, water and the built environment*;
- pay particular attention to the needs of *aquatic habitat* and river basin management in implementation of the Water Framework Directive;
- consider the need for further *nitrogen removal* in sewage treatment in inland and coastal areas and *phosphorus removal* in individual rural treatment systems;
- take further measures to reduce the impact of *agriculture and forestry* (e.g. nitrates, pesticides) on water systems and better protect streams and riverbanks in land use practices related to agriculture and forestry;
- deal with combined *sewer overflows* and urban storm water run-off;
- ensure that *groundwater reservoirs* used for drinking water extraction are adequately protected, including through more assertive municipal actions.

Nature and biodiversity

Over the review period, Sweden gave nature conservation and biodiversity a considerably *higher priority* than before, as recommended in the previous OECD review. Funding contributing to nature conservation has strongly increased, with public funding doubling at national level and rising at local level and with considerable EU agri-environmental support to improve environmental performance in agriculture, combined with higher funding of forest protection and increased sustainable forestry practices. The area of *site protection* has increased to 8.1% of the national territory. More *environmentally sound forest management* practices have gained ground, and a comprehensive regulatory framework has been established to this effect. The National Forest Policy of 1998 sets environmental protection and wood production as the two equal, overarching priorities for forest management. Voluntary protection of forests has become more widespread. Large forest companies practice ecological landscape planning and green accounting, and over half of the country's productive forests now have certification from the Forest Stewardship Council or the Programme for the Endorsement of Forest Certification Schemes. The cutting of forests containing red-listed species has decreased significantly.

Recommendations:

- further improve the *knowledge base* for nature conservation and biodiversity management (e.g. inventory of key habitats, indicators, economic analysis), especially regarding aquatic and marine ecosystems;
- further increase the extent of *protected areas* and their representativeness (e.g. non-mountain forests, marine and freshwater ecosystems);
- further develop *sustainable forest management* and monitor voluntary protection of forests;
- finalise and implement a programme for *integrated coastal zone management* and strengthen local planning authorities' capacity in coastal zone protection;
- strengthen the management and restoration of *streams, wetlands and meadow lands* within a broader landscape policy;
- further increase access to nature for all inhabitants and awareness of the *related health and well-being* benefits; encourage ecotourism.

Despite these efforts, however, nature conservation and biodiversity face major challenges. *Biodiversity in the marine environment* has received insufficient attention: there are only eight exclusively marine nature reserves; species decline seems to be accelerating; the country lacks a coherent, integrated policy on marine issues; and co-ordination among the many institutions responsible for marine environment needs to be enhanced. *Coastal areas* in general, and archipelagos in particular, are subject to strong development pressures, and exemptions to coastal protection are sometimes granted too easily. *Overfishing* has reduced populations of cod and Baltic herring to well below sustainable limits, and inadequate control of releases of fish threaten local stocks, notably in freshwater environments. Statutory *protection of forests lags behind targets*, and the representativeness and permanence of voluntary protection are uncertain. Pressures for more intensive exploitation of productive forests jeopardise the achievement of protection targets. The vast majority of protected areas are still in the mountainous regions of the north-west, while southern areas and aquatic habitats remain under-represented. The *knowledge base* required for the development of protection measures, as well as for monitoring and follow-up of such measures, is insufficient, especially as regards aquatic environments. Progress in the establishment of *freshwater protected areas*, the protection and restoration of *wetlands* and the drawing up and implementation of *species protection programmes* has been slow. *County and municipal authorities* lack the personnel to carry out nature protection measures and related *cultural heritage* protection measures, and face tensions among stakeholders.

2. Towards Sustainable Development

Integration of environmental concerns into economic decisions

Sweden gives high priority to sustainable development nationally, in Europe and globally. It adopted a *national sustainable development* strategy in 2002, with a secretariat in the prime minister's office. The environmental component of sustainable development is well developed in the EQOs and practical interim targets, which help all levels of government move from aspiration to implementation. Sweden's overall progress in *decoupling* environmental pressures from economic growth was remarkable over the review period, with significant improvements in emission intensity, energy intensity and material intensity. This progress reflects, in part, institution-based and market-based

integration efforts. Sweden makes impressive use of *market-based instruments* in a wide range of areas, including the integration of environmental concerns in energy, transport and agriculture. The ongoing *green tax reform* is a logical extension of earlier use of economic instruments. Real efforts are being made to promote sustainable consumption and production, not only through economic instruments but also through policies favouring integrated product policy and green procurement. Overall pollution abatement and control expenditure has remained around 1.1% of GDP and broader environmental expenditure around 1.5%.

Recommendations:

- in deciding on any *further green tax reform*, give more consideration to using the lowest-cost opportunities to abate GHGs, while also taking into account long-term perspectives;
- reinforce efforts to remove remaining *environmentally harmful subsidies*;
- review and revise transport prices to reflect all externalities, including damage associated with particulates, ozone and noise; implement *road congestion charges* in Stockholm and extend them to other major urban areas;
- pursue efforts towards enhanced *energy efficiency* (in a range of sectors, including energy-intensive industry and the existing building stock); review in particular flexible mechanisms to maximise off-site life cycle energy saving opportunities;
- strengthen institution-based *integration among ministries and agencies*, with particular attention to the integration of environmental concerns in industry, energy, transport, forestry and agriculture policies;
- introduce cost-effective *demand management measures* to decouple growth in municipal waste generation and road traffic from economic growth, in line with Objective 2 of the OECD Environmental Strategy.

Sweden's decoupling progress has been less than satisfactory when it comes to municipal waste generation (whose growth was higher than that of GDP) and traffic volumes. While the decision to try a road congestion charge in Stockholm is significant and positive, growth in *transport* may still have a bigger future environmental impact than any other sector. Incomplete internalisation of externalities translates into transport subsidies. Moreover, road users are not subject to charges that fully reflect the (long-term marginal social) cost of the capital they use. Regarding the target of reducing greenhouse gas (GHG) emissions by 4% by 2008-12 from 1990 levels, no allowance is made for the *use of flexible mechanisms*, though it is clear that this omission will not rule out working with other EU countries in the EU emission trading programme or in clean development mechanism and joint implementation projects; the government is considering establishing an objective that includes flexible mechanisms. While a shift to renewable energy sources is highly desirable, all energy production involves external costs (which should be internalised), so promotion of *energy conservation* should be prioritised over subsidisation of even the most environment-friendly types of energy use. In seeking to promote renewables, analysis of policies' *comparative cost-effectiveness* and distributive impacts needs to be better assured.

Integration of environmental and social concerns

Swedish environmental policies promote growth of the country's environmental industries, thereby contributing to *job creation*. Concerning *environmental democracy*, Sweden has well-established mechanisms for public participation and consultation on environmental decisions. Under the Environmental Code, recent improvements have broadened public access to courts, giving civil associations and citizen groups a right of appeal against many government decisions related to the environment, but excluding planning decisions and most infrastructure projects. Local Agenda 21 is actively implemented, contributing to local environmental improvements and raising awareness on sustainable development issues. A vast amount of environmental information is freely accessible by all interested parties and the general public. The system of *environmental education* is very well developed at all stages, from day care to adult education. Concerning *distributive issues*, Sweden has guaranteed public access to nature and recreational resources. A number of regional and rural development programmes incorporate environmental sustainability considerations. The ongoing changes to the tax structure also have a distributive effect.

However, Sweden has not yet ratified the *Aarhus Convention*, and its practices concerning access to courts need further improvement. There is insufficient cost-benefit analysis and *economic information* (e.g. on environmental expenditure, environment-related employment and energy prices) to support environmental management. The system of environmental indicators may require simplification and streamlining. Local Agenda 21 activities focus too much on local authorities and not enough on stakeholder and public participation. Issues of concern to the Sámi people related to land, water use and hunting rights in the north remain largely unresolved. Little attention has been given to distributive aspects of pollution exposure.

Recommendations:

- continue active *environmental employment* policy, making it longer term and focusing on specific economic sectors;
- develop *economic information* and analysis to support environmental management; streamline the system of environmental indicators;
- ratify the *Aarhus Convention* and make the country's environmental information access, public participation and access to justice practices consistent with the convention's requirements;
- further develop *public participation* and encourage citizen initiatives at regional and local levels (e.g. in EIA and Local Agenda 21 processes);
- reinforce environmental sustainability aspects of current and future *regional and rural development programmes*;
- enhance co-operation on *economic, social and environmental dimensions* of sustainable development within and between local, regional and national levels;
- strengthen research on and analysis of *social disparities* in access to nature and in pollution exposure.

Health

Sweden was one of the first OECD countries to publish a *national environment and health action plan*, and has since integrated its objectives into national policies related to environmental management and public health. Important *results* have been achieved, including reductions in pesticide use, releases of heavy metals to the environment and human intake of hazardous substances such as POPs and lead. Implementation of recent *regulations* on ventilation systems and radon concentrations in buildings has helped reduce health risks posed by indoor air quality, especially in new buildings. Although most objectives have been based purely on concern for public health and the *precautionary principle*, Sweden has used some *economic instruments*, such as a charge on NO_x and a tax on pesticides, to increase the cost-effectiveness of its policy measures. Improvements in *registration and labelling* of chemical products are expected to translate into reduced health risks from chemical handling and use, albeit probably at high cost. Sweden gives high priority to supporting *scientific research* that explores the links between environmental exposure and health effects, and has contributed to international understanding of a range of environmental health issues, with a special focus on children's health. Also at the international level, Sweden has shown leadership on chemical management issues and was instrumental in developing the OECD chemicals programme and the recent *Stockholm Convention on POPs*.

Recommendations:

- step up measures to meet *environmental and public health objectives*, with appropriate attention to cost-effectiveness and the precautionary principle;
- continue efforts to reduce health risks associated with *indoor air quality*;
- reduce *ambient air concentrations* of fine particles and tropospheric ozone, with due attention to cost-effectiveness;
- continue efforts to limit health risks associated with *exposure to chemicals* (e.g. chemicals in products, including construction materials) in the most cost-effective way possible;
- designate and protect more *green spaces in or near urban areas*, prioritising areas that can offer recreational services while protecting nature;
- develop *environmental health indicators* for monitoring progress towards national objectives and informing policy decisions; further improve *communication with the public* regarding health risks stemming from environmental exposure;
- take steps to more systematically incorporate national-level environmental health priorities into *local-level* planning and action.

Despite this clear progress, Sweden could still take further measures to improve its performance with regard to environmental health, in particular concerning reducing exposure to air pollutants, chemicals and noise and increasing access to green spaces for city dwellers. Systematic attention should be given to *cost-effectiveness* when choosing instruments to achieve environmental health objectives. Limits concerning *exposure to noise* are frequently exceeded in some areas, and the most important source, traffic, is expected to continue to increase. There is a need to improve *communication* with and education of the public concerning perceived health risks, particularly in cases where research has not quantified the extent of real risk (e.g. concerning exposure to electromagnetic radiation). Statistics show that the percentage of *green areas* is declining in municipalities with more than

10 000 inhabitants (where some 84% of the population lives) despite a national objective of increasing urban populations' access to green areas in the interest of *promoting physical exercise and general well-being*. Combined with a more sedentary lifestyle, the decline in access to nature can be expected to contribute to growing public health problems, such as obesity and heart disease.

3. International Commitments

Sweden has continued to play a very *active role in international co-operation* for environmental protection at both the global and European levels. It is one of the few OECD member countries that are on track to meet their *commitments under the Kyoto Protocol* to limit GHG emissions: while Sweden's commitment is to limit growth in national emissions to 4% between 1990 and 2008-12, it has stabilised its emissions since 1990. Furthermore, in 2001 it set two national GHG emission reduction objectives that go much farther than its Kyoto commitment. Its level of CO₂ emissions per unit of GDP is among the lowest in OECD countries. It has met its commitments under the protocols of the *Convention on Long-range Transboundary Air Pollution*, achieving significant reductions of emissions of SO_x, NO_x, heavy metals and organic pollutants, and came close to meeting its Sofia Declaration target. Recognising that *seagoing ships* represent a significant source of acidifying emissions, Sweden has experimented effectively with economic instruments to encourage the use of low-sulphur fuel and installation of NO_x abatement equipment on ships. In addition, through improvements to municipal and industrial waste water treatment capacity, Swedish discharges of a range of heavy metals were reduced between 60% and 90% in time to meet the *1995 HELCOM target*, although further action is still necessary. Sweden has taken strong measures to protect marine ecosystems and reduce fishing pressure in its national waters. Despite large government budget cuts in the late 1990s, it has held its level of *official development assistance* (ODA) at more than 0.7% of gross national income, thus meeting the UN target, and environmental aid is estimated to represent at least 10% of its total ODA. Sweden's performance in implementing international agreements relating to transboundary shipments of hazardous waste and the phasing out of ozone-depleting substances is very good overall.

There is room for Sweden to improve its *implementation of international commitments* and international co-operation. Although it has successfully used a range of economic instruments to implement its climate policy, Sweden does not systematically use economic analysis to identify the most cost-effective options. As its *GHG abatement costs* are quite high in some areas, the use of economic analysis to identify the most cost-effective options could help reap savings. Like other Baltic Sea countries, Sweden missed the original 1995 HELCOM targets for reducing nutrient inputs to the *Baltic Sea* and appears unlikely to meet the 2005 target for nitrogen unless additional measures are launched quickly; funding remains an issue. Although Sweden generally meets the annual target of inspecting 25% of foreign ships calling in its ports (under the Paris Memorandum of Understanding on *Port State Control*), a recent study suggested that steps should be taken to enhance the environmental aspect of inspection. Like other Baltic Sea fleets, Swedish *fishing fleets* continue to exploit several key stocks at what are considered unsustainable levels. Unless ways to enhance regional co-operation for responsible and sustainable management of shared fish stocks can be identified, Sweden is unlikely to reach its national target of ensuring that commercial fish catches do not exceed recruitment by 2008. Levels of certain *POPs in Arctic and Baltic ecosystems* are high, and are beginning to degrade the value of some natural resources

(e.g. the northern Baltic herring fishery). While Swedish legislation on *ozone-depleting substances* does not allow exports of used products or equipment (e.g. refrigerators or freezers) whose operation relies on the supply of CFCs, halons or other ODS, some exporters are still not complying with the legislation. Sanctions on illegal trade in species protected by CITES remain low compared with the possible gains from trafficking.

Recommendations:

- adopt and implement a *national marine strategy*, in particular, take further measures to reduce *nitrogen loading to the Baltic Sea* so as to meet the HELCOM target for 2005, as well as related national targets; step up preventive actions and sanctions concerning oil spills; take measures to strengthen *regional co-operation for fishery management*, working through the International Baltic Sea Fishery Commission and the EU; develop a ship scrapping plan;
- build on the recent International Maritime Organization designation of the Baltic as a “particularly sensitive sea area” and continue to promote regional action to decrease *emissions to air of SO_x, VOCs and NO_x from ships* in the Baltic, with an emphasis on economic instruments;
- within the national climate protection programme, give priority to the most *cost-effective instruments* to promote energy conservation and the use of renewable energy sources, and review exemptions (e.g. *energy-intensive industry*, peat use);
- strengthen customs control of international shipments so as to prevent the exportation of equipment containing (or outfitted to use) CFCs, halons or other *ozone-depleting substances*;
- continue to integrate environmental concerns systematically into *development assistance* while maintaining or increasing overall levels of ODA;
- increase environmental assistance and technology transfer to *countries bordering the east of Baltic proper*, so as to promote the achievement of shared environmental objectives (e.g. regarding nutrient loads, acid precipitation, flexible mechanisms on climate change);
- step up inspection and enforcement against *violations of CITES* in control points, and raise applicable fines to enhance their deterrent function.

SWITZERLAND*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
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- 2. AIR, NOISE AND WATER**
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- 7. INTERNATIONAL CO-OPERATION**

REFERENCES

* Also available in Italian and in German.

CONCLUSIONS AND RECOMMENDATIONS *

This report examines Switzerland's progress *since the previous Environmental Performance Review* by the OECD in 1998, and the extent to which the country has *met national objectives and honoured international commitments*. The report also reviews Switzerland's progress in the context of the *OECD Environmental Strategy*.^{**} Some 46 recommendations are made that could contribute to further environmental progress in Switzerland.

Switzerland's environment is subject to *severe pressures* (pollution, extraction of natural resources, spatial restructuring), due in particular to industry, agriculture, transport and tourism. These pressures stem from very high population densities and a high level of economic activity, and from Switzerland's location at the heart of Europe.

For over 30 years, the ambitious environmental policies promoted by the *Confederation* have been implemented by the *cantons* and the *communes*. They have been based on a prescriptive approach, sustained government funding and active public opinion that is deeply concerned about the environment (especially following certain major industrial accidents, the environmental impact of intensive farming, the deforestation debate and the 1987 floods). These policies have yielded remarkable results in combating pollution and natural hazards. More recently, and during the period under review, environmental policies have focused on *partnerships* with economic interests and civil society as a whole, on application of the *polluter pays principle* and on *prevention* (e.g. in risk management and management of natural resources).

Despite the progress made in factoring the imperatives of sustainable development into sectoral policies, including energy, transport and agricultural policies, it is still difficult to translate the concept of sustainable development into *consumption patterns*, e.g. the *consumption of space, transport and recreational activities*. There has been continued regression with regard to *biodiversity*, nature and landscapes. Concerns about sluggish or weak economic growth, and about *international competitiveness*, are tending to lessen the priority given to environment-related issues in the short term.

1. Environmental Management

Strengthening the implementation of environmental policies

In many respects, Switzerland's performance in fighting pollution is *among the best* of any OECD country. This is the result, in particular, of an ambitious, long-term legislative and institutional policy regarding the environment. The federal Law on the Protection of the Environment (LPE), revised in the mid-1990s, stresses the *principles of co-operation, causality* (the polluter pays and user pays principles) and *prevention*. On

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 26 September 2006.

** The objectives of the OECD Environmental Strategy for the First Decade of the 21st Century covered in these Conclusions and Recommendations are: 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).

the whole, there is *very good co-operation among all stakeholders*, including civil society (e.g. environmental NGOs, businesses, farmers' associations), as well as between the Confederation and the cantons and communes. The *cantons* implement most environmental policies and related measures and supervise environmental actions at the local level. The federal authorities (including the Federal Council) also formulate wide-ranging planning documents that incorporate environmental issues. Economic *instruments* (e.g. charges for water and waste management services) are being used with growing effectiveness within the framework of *greater internalisation of external costs*. A number of environmental taxes and budget-neutral fiscal measures have been explored and/or adopted (e.g. the VOC incentive tax, the proceeds of which are returned to households via health insurers). The creation of the Federal Office for the Environment (FOEN) on 1 January 2006 demonstrates the determination to expand *sustainable management of natural resources* (forests, nature, water) and to encompass the management of natural hazards and technological risks. Government and business spending on the environment (pollution abatement and nature protection) has remained stable at around *1.4% of GDP*. These outlays have yielded *economic benefits* with regard to i) health (avoided expenses, improved productivity at work) and ii) the Swiss economy in sectors such as tourism, engineering, electrical equipment, the environmental industry and agri-food (thanks to Switzerland's ecology-friendly international image). All these changes are taking place within an economy that is very open to trade with the European Union and the rest of the world.

Recommendations:

- step up efforts to promote *more sustainable consumption patterns* by adopting appropriate regulatory and economic instruments, and through adequate demand management;
- continue efforts to implement the *principle of causality* (the polluter pays and user pays principles);
- further improve the effectiveness and efficiency of environmental policies with improved *monitoring of the environment* and its interactions with the economy (environmental data and economic analysis), expanded use of *economic instruments* and documentation of compliance with environmental legislation;
- continue efforts to strengthen co-ordination between the Confederation and the cantons, so as to implement *harmonised and efficient environmental policies* throughout the country (e.g. by adopting an integrated system for authorising industrial activities, along the lines of the European Union's IPPC approach);
- adopt strategies that are more highly integrated to *manage natural hazards and technological risks*, taking into account other sectoral policies (e.g. regional planning, transport, forests); accelerate completion of cantonal cadastres of *contaminated sites* and begin to decontaminate priority sites.

However, Switzerland is faced with numerous environmental challenges resulting from non-point source pollution (e.g. of agricultural origin) and unsustainable consumption patterns (e.g. in transport, recreational activities and land use). Its biodiversity and landscapes are threatened. There is a need to focus on the *actual results* of environmental policies and to strengthen co-ordination among different levels of government, based on reliable data. An integrated and harmonised system should be devised for authorising industrial activities. Switzerland's overall *enforcement of environmental legislation* is not being documented. Companies with plants in more than

one canton sometimes face different environmental regulations and/or enforcement levels. *Regional development* policy has not been able to contain rapid growth on the outskirts of cities. Thus, there has been considerable construction of farm buildings and transformation of existing structures *outside designated zones*. Greater use should be made of economic instruments (e.g. the CO₂ tax) to increase the effectiveness of environmental policies and sustainable management of natural resources. Even though progress has been made regarding water and waste, the polluter pays and user pays principles are not applied sufficiently in the realms of climate, air, noise and the protection of nature.

Air

Since the first review, there have been further reductions in concentrations of the main air pollutants, and air quality has continued to improve. The results obtained by Switzerland are *among the best* in any OECD country (e.g. lowest emissions of SO_x and NO_x per unit of GDP). Thanks to strict management and significant financial support, the *public transport system* (interurban, suburban and urban transport) is one of the most highly developed networks in any OECD country, giving public transport a large share of the modal split. With regard to transalpine transport, the *Overland Transport Agreement* promotes a shift from road to rail in order to cope with the growth in heavy vehicle traffic. Recent data show a nearly 30% increase in combined transport, while heavy vehicle traffic decreased by around 10% in the last three years. This agreement, like the continuous modernisation of *railway infrastructure* and the introduction of a distance-related *heavy vehicle fee*, can be seen as a model. Switzerland's energy intensity is lower than that of any other OECD country. Launched in 2001, the *SwissEnergy* programme has helped to reduce energy consumption by 6.5% and CO₂ emissions by 7%. In addition, the share of *renewable energy sources* in the total energy supply has increased to 17.5%.

Recommendations:

- implement further measures to combat *fine particulates and ground-level ozone* from transport (on-road and off-road vehicles), industry and households, and *ammonia* generated by agriculture (e.g. by adopting tougher emissions limits, promoting innovation and increasing the use of particulate filters on diesel engines);
- further exploit the *multiple benefits* associated with air quality, climate change and energy efficiency objectives;
- continue to *internalise the external environmental costs of road passenger transport* (e.g. by introducing distance-related incentives or combining energy labels with a bonus/malus system applicable at the time of purchase);
- pursue a *freight traffic shift* from road to rail through targeted investment, financial support for public transport and intermodality, and extension of the heavy vehicle fee;
- pursue implementation of the *SwissEnergy* programme; consider increasing taxes on gasoline and diesel fuel to improve internalisation of external costs; further promote energy efficiency in buildings and industrial installations.

However, in recent years it has become more difficult to *maintain the levels achieved* or to make *further substantial improvements*, due mainly to budget restrictions. Important challenges remain: *PM₁₀*, *ground level ozone*, *NO₂*, ammonia and greenhouse gases (e.g. CO₂). High levels of particulates are one of the most serious threats to the health of people living in cities and near major traffic routes. Ambient air quality standards for ozone are frequently exceeded in summer. The massive *increase in mobility* offsets the effects of pollution abatement measures and technological progress. Incentives to promote sustainable mobility and environmentally responsible consumption patterns and production may help to improve air quality. The two essential elements in this regard are *green tax reform* and a policy to make transport bear the external costs of air pollution.

Noise

Switzerland has long been *in the forefront* of noise abatement efforts. In addition to government investment, the country is stepping up development and implementation of the best possible technologies to reduce sonic emissions. The use of *technical and operational measures* to eliminate or reduce these emissions and protect the population from noise is well advanced. A *clear strategy*, based on six principles, provides orientations for further progress. During the review period, *some progress* has been observed in respect of noise emissions from transport (e.g. from individual heavy vehicles, aircraft and railway rolling stock) and noise abatement measures (e.g. noise barriers, road repairs). Modal shift policy has also contributed to a reduction in the number of people exposed to severe noise pollution. Switzerland uses *cost-benefit analysis*. Countrywide, the external costs of transport noise (e.g. health impacts and loss of property value) are estimated at CHF 1 billion per year. In general, neighbourhood noise (over which the communes have jurisdiction) is not seen as a serious problem.

However, the *population's exposure to noise* is being exacerbated by increasing traffic volumes, which offset the benefits of technological advances and of stricter noise abatement measures. Consumption patterns are the main reason for this increase. People who live near airports are exposed to more *aircraft noise* due to increases in air traffic as well as airport expansion. There should be continued harmonisation of the noise monitoring being carried out by cantonal and federal authorities. Financing problems are one reason for the postponement of some noise reduction measures. The *basic noise policy objective* set forth in the federal Law on the Protection of the Environment (LPE) is relatively modest. Noise pollution should be reduced at natural sites and in recreational areas. The *polluter pays principle* is not being fully applied, and *economic instruments* ought to be used more extensively.

Recommendations:

- establish a *countrywide integrated noise monitoring system*;
- expand efforts to establish *noise limits* (e.g. for motor vehicles, aircraft and household appliances) and take further measures to reduce noise from *road transport* (e.g. economic instruments, speed limits, construction of noise barriers);
- *extend the concept of noise abatement* to encompass natural sites and recreational and residential areas.

Water

Switzerland's performance is still among the best of any OECD country. The quality of *drinking water* remains high, as does that of national and international lakes (e.g. Lake Constance and Lake Geneva). Nearly 97% of the Swiss population (and much of Swiss industry) is connected to *wastewater treatment*. Wastewater undergoes advanced (tertiary) treatment in the watersheds of the lakes and the Rhine. This level of performance is the result of many years of continuous capital investment in water-related infrastructure (supply, sewerage and wastewater treatment) operating at high standards. Between 1990 and 2003, the recovery rate for the cost of waste water treatment (sewerage and wastewater treatment) increased from 43 to nearly 70% following the incorporation of the polluter pays principle in federal legislation (in 1997). In addition, *water pricing* helps finance the *renewal of sewerage systems* (many of which are a century old) and the incineration of wastewater sludge (a legal obligation since 2006). The loads of industrial pollutants have been estimated and their environmental costs internalised in the water prices charged to businesses connected to public sewerage systems. The first national inventory of groundwater quality was made public in 2004. The cantons routinely monitor the ecomorphology of watercourses (i.e. the extent of their artificialisation). *Institutional integration* of issues involving water quality and volume has been facilitated by the merger in 2006 of much of the Federal Office for Water and Geology with the Federal Office for the Environment, Forests and Landscape, when the Federal Office for the Environment was created.

Recommendations:

- promote *integrated water basin management*, in particular by combining objectives for water quality and for the quantity of water resources, as well as the objectives of nature conservation and guaranteed minimum space for watercourses so they can perform their ecological functions;
- make further progress in *financing the upkeep and renewal of water treatment infrastructure*, including through pricing measures;
- establish funding mechanisms for the *renaturing of watercourses*;
- prepare national *flood management* plans by water basin, in co-operation with the cantons; help avert flood risks by implementing the recommendations of cantonal master plans for land use;
- identify sources of *micropollutants* from cities, industry and agriculture; introduce preventive measures in line with the polluter pays principle; continue to reduce *non-point source pollution from agriculture*, especially in small lakes and in groundwater;
- harmonise *water quality monitoring* by the cantons and the Confederation.

Nevertheless, non-point source pollution from agriculture and excessive concentrations of inputs are found in inland lakes and aquifers. Little has been done to address growing concerns about the presence of *micropollutants* (e.g. endocrine disruptors and drugs) in water. Despite recent severe flooding in the country, land use planning has not paid enough attention to flood prevention, despite legal obligations to do so (e.g. with regard to flood-prone areas). Only rarely does the hydroelectricity sector meet its obligations (in force since 1992) to maintain a *minimum flow in rivers*, or "residual flow", and few fish ladders have been installed at dams, which has had adverse consequences for aquatic ecosystems. The renaturing of rivers (i.e. returning them to a

more natural state) and the restoration of nature along river banks suffer from lack of funding, other than what is allocated to protect against flooding. *Water basin management* is progressing, but without any legislative or strategic framework at the federal level. Industry does not seem eager to assume *responsibility for environmental problems arising from accidental spills* to rivers, insofar as Switzerland has not signed the Kiev Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters.

Nature, landscapes and biodiversity

Switzerland has set up a very high-quality biodiversity *monitoring network*; based on systematic scientific work, this network measures the dynamics of biodiversity and is used in particular to update “red lists” of endangered species. *Planning documents* regarding the landscape, nature and forests (e.g. the “Swiss Landscape Concept”) have been adopted and the corresponding plans implemented. Progress has been made towards *sustainable forest management* and wetland conservation. The Swiss Landscape Fund, which provides financial support for projects to protect and promote the landscape, has been extended until 2011. The process for developing a *natural parks system*, including the creation of a Regional Natural Park (PNR) category, is about to be completed; dozens of PNR projects are already being prepared. Roughly 40% of farmland consists of semi-natural habitats (ecological compensation areas and Alpine pastures) that help preserve the biotope for the fauna and flora.

Recommendations:

- prepare and adopt a *National Biodiversity Strategy* (which could succeed the Swiss Landscape Concept), along with corresponding plans of action; set precise objectives and timetables which anticipate, *inter alia*, the effects of climate change;
- limit consumption of agricultural and natural space; contain dispersed urbanisation by enhancing the integration of biological and landscape diversity goals into spatial planning by cantons and communes, based on *reform of the federal law on regional development* and adjusted property taxation;
- clarify the *federal inventory of natural landscapes, sites and monuments* so that landscapes can be factored more rigorously into cantonal and communal planning;
- set up *Regional Natural Parks*, peri-urban natural parks, a national ecological network and a second national park; extend international *networks of protected areas*, such as Ramsar, Man and the Biosphere, and World Heritage sites, and establish the Emerald Network (Bern Convention); expand *financial resources* to invigorate policy for the development of protected areas;
- strengthen sustainable *forest management*; expand forest reserves and ensure the “public good” function of forests;
- do a better job of evaluating, taking into account and remunerating *services rendered by ecosystems*.

Nevertheless, as the updated “red lists” show, the *erosion of biodiversity* has not been curbed; on the contrary, most of the species monitored (e.g. flowering plants, amphibians and reptiles) have regressed since the lists were last published. Little progress has been recorded in identifying meadows and dry pastures to be protected by

the inventories of nationally important biotopes. Urbanisation, tourism activities and transport infrastructure exert increasing pressure on natural and agricultural areas. The diversity and quality of landscapes continue to be threatened by progressive urbanisation, building outside construction zones, and the commoditisation and increasing uniformity of buildings. Forest reserves should be expanded, and the environmental services rendered by *forests* should be financed. Spatial planning cannot stem the *consumption of new land*, which is proceeding at a rate of one square metre per second. The federal landscape inventory lacks clarity and effectiveness. Moreover, delays have been recorded in the adoption of certain inventories (e.g. dry grassland) and in the implementation of the Emerald Network, despite the work carried out by NGOs. A *National Biodiversity Strategy* ought to be drawn up and adopted. Without such a strategy, it is difficult to see how Switzerland can possibly meet its own objectives and honour its commitments (e.g. with regard to the Earth Summit in 2002, the Convention on Biological Diversity and pan-European biodiversity objectives).

2. Towards Sustainable Development

Integration of economic and environmental decisions

While concerns about sluggish or weak economic growth and the international competitiveness of its economy are very real, Switzerland has made significant progress in *decoupling* environmental pressures and economic growth, in particular with regard to conventional air pollutants (SO_x, NO_x), water abstraction and the use of fertilizer and pesticides. The two *sustainable development* strategies at the federal level (1997 and 2002) have spurred better collaboration among federal government agencies and have been accompanied by evaluation and monitoring procedures. Indicators of sustainable development have been adopted at the federal level and developed by certain cantons and cities. The federal authorities prepare *sectoral strategy or planning documents* that cover environmental issues. Progress has been made in *internalising external costs* in waste management and water treatment, and in *integrating environmental concerns* into policies for sectors such as agriculture (required ecological services) and transport (shifts of passenger and freight traffic from road to rail). The economic instruments implemented since the previous review, such as the VOC tax and the heavy vehicle fee, have proven effective.

However, problems related to decoupling remain, in particular with regard to *road transport* and the *consumption of space* by dispersed urbanisation and by infrastructure. The federal strategy for sustainable development has few quantified objectives (apart from that of limiting urbanisation to 400 square metres of built-up area per capita), is disconnected from sectoral strategies and needs to be better implemented, e.g. with respect to the consumption of transport, recreational activities and space. A *long-term vision* is lacking in the environmental policy area. The *green tax reform* recommended in the previous review and by the 2002 federal strategy for sustainable development has yet to be introduced. The taxation of energy, in particular gasoline, is still too low and cannot prompt changes in behaviour. The gasoline price differential between Switzerland and the neighbouring countries should be reduced to encourage savings on fuel consumption and cut back on emissions resulting from “gasoline tourism.”

Recommendations:

- implement the *green tax reform* called for in the 2002 federal strategy for sustainable development; identify and eliminate subsidies and tax provisions that are potentially detrimental to the environment (in particular, eliminate the planned deductibility of expenses for commuting by car);
- formulate a pro-active, long-term *environmental policy* vision;
- improve the use and *integration of strategic instruments in the areas of transport, energy, the environment and regional development*, from a sustainable development standpoint;
- promote the use of environmental indicators and indicators of sustainable development in government strategies, paying special attention to *regional development and land use planning*;
- associate the federal *strategy for sustainable development* with sectoral strategies; set quantified objectives; encourage the *cantons* to implement strategies for sustainable development in liaison with their sectoral policies.

Agriculture

The interconnections between agriculture and the environment have been even more central to Swiss agricultural policy since a referendum held in 1997. Except for the nitrogen balance at national level and the protection of lowland biodiversity, *agri-environmental objectives* have on the whole been achieved, including those of the “Agricultural Policy 2007” programme. Agriculture’s *negative effects* on the environment (e.g. from phosphorus and greenhouse gases) have been reduced in most areas, with some exceptions remaining. The *positive effects* (e.g. with regard to biodiversity, landscapes) have been increased. The use of *natural resources* seems to have become more efficient. Monitoring and evaluation activities have been expanded, as has scientific and quantitative analysis of policy impacts. As a result, new programmes, including “Agricultural Policy 2011”, are being prepared based on more solid information. Professionals and NGOs contribute actively to this effort and often take initiatives themselves in the agri-environmental area.

However, the overall level of support for agriculture (as measured by the “producer support estimate”, calculated by the OECD) remains very high. The form of this support is nevertheless shifting in a direction favourable to the environment, as *direct payments, essentially targeting environmental services*, are increasing to the detriment of price supports, which have been a major source of distortions. This policy shift ought to be continued so as to improve the competitiveness of Swiss agriculture and support the pursuit of environmental objectives. Problems involving *specific regional pollution* (e.g. ammonia, nitrates, pesticides, etc.) persist and ought to be addressed by actions that are targeted more precisely. In a number of cases in recent years, the pace of pollution abatement seems to have slowed. Despite progress in monitoring and evaluation, certain areas are not yet covered by reliable indicators, and on some points evaluations still do not agree. The *integration of various other policies* (e.g. regional, forestry) with agricultural policy is still insufficient, and the cantons’ implementation of the regional programmes of federal policies, as well as their participation in monitoring and evaluation, are still unsatisfactory. The environmental components of activities along the entire agri-food chain (e.g. transformation, marketing) are not well understood, nor is *consumer demand*, and labelling techniques are not always uniform.

Recommendations:

- pursue *agricultural policy reform* in order to enhance economic competitiveness and, at the same time, ecological efficiency; in this context, continue to give high priority to meeting agri-environmental objectives;
- continue to *reduce pollution of agricultural origin*, in particular through targeted and regional actions;
- maximise *agriculture's beneficial effects* on the environment, especially with regard to biodiversity and the landscape;
- develop a market conducive to trade in more environmentally friendly products by applying the principles of integrated product policy to the entire *agri-food chain*, and by heightening consumer awareness;
- continue to develop *monitoring and evaluation*, especially in areas for which indicators are insufficient, and base the formulation of future objectives on extensive analysis and on close co-operation among all the parties involved;
- bolster co-ordination between *agricultural and other policies* (e.g. environmental, regional, forestry) and between actions taken by federal and cantonal authorities.

Integration of environmental and social decisions

In Switzerland, *environmental democracy* is based primarily on the practice of holding referenda, on the accessibility of environmental information to all interested parties and to the general public, and on appeals to the Federal Supreme Court by environmental NGOs. *Environmental education* is dispensed at all levels, from elementary school to adult education, and it is characterised by innovative approaches and great thematic richness. The economic consequences of pollution-related *health* problems have been studied, as have the effects of environmental measures on *employment*.

However, Switzerland has not yet ratified the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (*Aarhus Convention*), and practices concerning dissemination of information, access to the courts and public participation will need to be harmonised with this convention. Public participation in *environmental impact assessments* (EIAs) is limited. Draft legislation on public access to information is in the pipeline. In general, there are insufficient countrywide, harmonised *monitoring and economic data*. The *use of indicators* is still only partial. Efforts to set up a *national environmental data network* need to be continued. Although local Agenda 21 programmes now cover 30% of the population, there is a need to develop them further, especially in sparsely populated areas. Scant attention has been paid to the *redistributive aspects* of exposure to pollution. While protection of the environment continues to be the Swiss population's top priority for the future, it is not being given high priority at present. *Recreational traffic* is one of the main problems that Swiss transport and environmental policy ought to address, as it accounts for a high proportion of automobile traffic and is growing rapidly.

Recommendations:

- ratify the *Aarhus Convention* and ensure that practices at the federal and cantonal levels concerning access to environmental information, public participation, and access to justice comply with obligations under this convention; ensure that NGOs have access to the courts and can participate in decision-making related to EIA procedures at an early stage;
- continue efforts to disseminate *environmental information*; continue to ensure high-level *environmental education* at all stages;
- fully implement the ongoing *Environment-Health action plan*; formulate and implement complementary measures that are cost-effective;
- make further efforts to achieve *sustainable mobility and recreational activity*, in particular by integrating protection of the environment, nature and landscapes into transport and regional planning at all levels; extend *Agenda 21* programmes to rural and scarcely populated areas.

3. International Co-operation

Switzerland has an effective system for co-ordinating international environmental activities, based on formal consultations (at federal level and between the Confederation and the cantons) and on various processes for informal consultations. It maintains extensive co-operative relations with *neighbouring countries and the EU* as a whole, including with regard to harmonisation of environmental legislation. It has transposed the provisions of a number of *multilateral environmental agreements*, including: the Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol) and its amendments, the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention), the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, the Stockholm Convention on Persistent Organic Pollutants (POPs), the Convention on Biological Diversity and the International Treaty on Phytogenetic Resources for Food and Agriculture. It actively promotes environmental protection and sustainable development in *international fora*. *Swiss official development assistance*, as a percentage of gross national income, has been increasing (0.44% in 2005). ODA for environmental purposes and other environmental expenditure at the international level (e.g. for activities in the countries of Eastern Europe, Caucasus and Central Asia) have been substantial. In addition, some CHF 250-300 million per year is collected by *NGOs and the private sector* (e.g. the Swiss Alliance of Development Organisations) and is invested primarily in international co-operative activities with strong environmental relevance.

Nevertheless, there is room for improvement. Concerning *climate change*, there are problems meeting targets for reducing emissions of *CO₂ and other greenhouse gases* (internationally agreed targets as well as domestic ones). It is true that Switzerland has low energy and CO₂ intensities. Likewise, it has adopted voluntary measures that have to some extent reduced CO₂ emissions, although these have been insufficient. The *CO₂ tax* envisioned in the federal law on CO₂ has yet to be implemented. Switzerland is

also having trouble meeting the targets established for several *air pollutants* (e.g. PM₁₀ and NO_x from automobiles) under the Convention on Long-range Transboundary Air Pollution. *It has not ratified* the Aarhus Convention and its Protocol on Pollutant Release and Transfer Registers, the Protocol on Strategic Environmental Assessment to the Espoo Convention, the Water and Health and Civil Liability Protocols to the Water Convention, or the Protocols to the Convention on the Protection of the Alps. Even though Switzerland is in fact prepared to comply with the provisions of certain multilateral environmental agreements, reluctance to enter into binding international agreements has recently increased, reflecting a lack of consensus across the country. Certain international commitments have not been fully met at the cantonal level.

Recommendations:

- take steps to meet Switzerland's targets under the Kyoto Protocol, including introduction of a CO₂ tax;
- implement the measures needed to further reduce *emissions of NO_x, VOCs and PM₁₀* so as to meet the targets in the Ordinance on Air Pollution Control and the Convention on Long-range Transboundary Air Pollution;
- improve *implementation of the provisions of multilateral environmental agreements (MEAs)*, including at federal and cantonal levels;
- expand *Alpine co-operation*, in particular concerning transport, energy and tourism;
- ratify and implement *recent MEAs* to which Switzerland is not yet a party;
- further increase overall *official development assistance (ODA)* and improve reporting on ODA in the area of environmental protection (e.g. water).

TURKEY*

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR MANAGEMENT**
- 3. WATER MANAGEMENT**
- 4. NATURE AND BIODIVERSITY MANAGEMENT**

Part II
SUSTAINABLE DEVELOPMENT

- 5. ENVIRONMENTAL-ECONOMIC INTERFACE**
- 6. ENVIRONMENTAL-SOCIAL INTERFACE**

Part III
INTERNATIONAL COMMITMENTS

- 7. INTERNATIONAL CO-OPERATION**

REFERENCES

* Also available in Turkish.

CONCLUSIONS AND RECOMMENDATIONS*

This report examines Turkey's progress since the previous OECD Environmental Performance Review in 1999 and the extent to which the country has met its *national objectives and international commitments* regarding the management of the environment and natural resources. The report also reviews Turkey's progress in the context of the OECD Environmental Strategy,¹ and compares to the recommendations of the 1999 OECD review. Progress has stemmed from environmental and economic decisions and actions by national and territorial authorities, as well as by enterprises, households and non-governmental organisations. 45 recommendations are made that could contribute to further environmental progress in Turkey.

In the review period, the *2000/2001 economic crisis* was followed by an impressive recovery and Turkey presents one of the strongest economic growth rates among OECD countries in recent years (7.5% of yearly average growth since 2002). Turkey has also been undergoing structural changes (further privatisation of enterprises, price liberalisation, integration in the European and global economy). However, the share of the informal sector in the Turkish economy remains high. Turkey's *population* has reached 73 million² and remains one of the fastest growing in the OECD. Per capita income is the lowest among OECD countries. Major migrations from rural areas to urban, industrial and tourist areas continue. Turkey is surrounded by Armenia, Azerbaijan, Bulgaria, Georgia, Greece, Iran, Iraq, Syria as well as the Aegean, Black, Marmara and Mediterranean seas.

Turkey confronts the challenge of ensuring that economic growth is associated with environmental and social progress, namely sustainable development. It has experienced *increasing environmental pressures* from energy, industry, agriculture, transport and tourism. They translate in a range of environmental challenges concerning air quality, water services, water resources, waste management, soil erosion and nature protection, as well as marine issues. A range of institutional and legislative elements of environmental reform have been put in place, largely as pre-accession efforts of *convergence with the EU environmental acquis*. The national development planning effort is remarkable. Although current emissions and discharges per capita remain low compared to OECD per capita averages, much of the necessary *environmental infrastructure* must still be created in urban and industrial areas. Environment has had a relatively low priority in Turkey. Strengthened environmental efforts from national government, municipalities and the private sector are required to achieve environmental convergence with other OECD countries. Turkey is a founding member of OECD, and adheres to all the environmental Acts of the OECD Council.

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 3 June 2008.

¹ The following objectives of the OECD Environmental Strategy for the First Decade of the 21st Century are covered in the Conclusions and Recommendations: maintaining the integrity of ecosystems (Section 1), decoupling of environmental pressures from economic growth (Section 2) and global environmental interdependence (Section 3).

² Refers to 2006 present population. Resident population in 2007 was 71 million.

Looking to the future, to face its *environmental challenges effectively*, it will be necessary for Turkey to i) strengthen environmental policies and their implementation where appropriate; ii) further integrate environmental concerns into economic and sectoral decisions and iii) further develop international environmental co-operation.

1. Environmental Management

Strengthening the implementation of environmental policies

In the review period, the *EU harmonisation process* has become the main driving force in a major national environmental reform. It translates in a large number of *new environmental legislation and regulations*. The 2006 “comprehensive amendment” of the 1983 Environmental Law, and the new Law on Municipalities contributed to the clarification of environmental responsibilities amongst the various levels of administration. *Enforcement capacities* have been strengthened by new regulations and the creation of a separate division in the Ministry responsible for co-ordination of enforcement efforts. Integration of environmental concerns in *land-use planning* is progressing, though challenges related to unregistered operations remain. Industry is being engaged in voluntary approaches, notably in cement and chemical sectors. Turkey is the OECD country which has the largest revenues from environmentally related taxes (i.e. energy and transport taxes): 4.8% of GDP and 25% of total tax revenue, although these taxes were not designed for environmental purposes. *Public-private partnerships* have been strengthened, including the establishment of Organised Industrial Zones that provide comprehensive environmental services to industry. Estimates of pollution abatement and control expenditure (PAC expenditure) have increased from 1.1% to 1.2% of GDP.

Despite progress in aligning with the EU environmental legislation, transposition is still waiting for several pieces of legislation concerning air, water and nature protection, and several standards are not consistent with EU limit values. *Allocation of environmental responsibilities* among government institutions could benefit from review and revision. Environmental concerns have been too often superseded by development interests in local decision-making. *Implementation and enforcement* remain challenging; a special autonomous environmental agency should be established to drive and conduct environmental inspections at national and territorial levels with appropriate resources, as well as training and monitoring support systems. The *permitting system* needs particular attention, as the current media based procedure is not sufficient, burdensome and needs regular renewal provisions. Despite the introduction of environmental charges, as well as fuel and motor vehicles tax differentiation, the use of a variety of *economic instruments* for environmental purposes (including specific taxes, charges, emission trading systems) in Turkey should be considered to meet objectives of efficiency and financing, with due regard to social issues. Low landfill charges hamper the recycling industry. A number of unregistered installations, mostly small and medium size, operate without environmental management systems. Adoption of environmental management systems *in industry and public organisations* as well as development of public-private partnerships should be promoted. Turkey faces the challenge of mobilising substantial *financial resources* for environmental investment, especially to work towards its new environmental objectives. This will require engaging *private and public fundings* for environmental improvement, to match external resources provided by the new EU instruments for accession, and strengthening the *capacity of provincial and local*

authorities to prepare detailed projects and implement them. This will also require moving progressively to the *full implementation of polluter pays and user pays principles*.

Recommendations:

- continue to *harmonise the national environmental legislation with the EU environmental acquis*, following the EU Integrated Environmental Approximation Strategy, with particular attention to framework Directives and EU emissions and quality standards;
- strengthen the *permitting system*: moving from media based permitting to integrated pollution prevention and control, distinguishing large and small/medium size installations; using periodic permit renewals to gradually introduce stricter emission standards; and promoting best available technology;
- strengthen the *enforcement system*, through: an autonomous environmental agency in charge of inspection at national and territorial levels, increased resources for inspections and compliance monitoring, and increased training for inspectors; integrate environmental concerns (i.e. pollution, natural resources, nature concerns) at all levels of *land-use planning*, and strengthen land-use plans enforcement;
- develop the use of economic instruments, seeking *an effective and efficient mix of instruments*, with due regard to social issues; promote the implementation of the *polluter pays and user pays principles*, with a progressive shift from public to private funding, and a time limit for environmental subsidy schemes;
- develop *public-private partnerships* and industry-driven environmental initiatives with appropriate involvement of the Turkish Business Associations;
- strengthen the *emergency preparedness and response* system (e.g. establishing a commission to support the implementation of legislation concerning natural and industrial disasters, extending institutional co-ordination, acquiring appropriate equipment, performing regular drills and simulations);
- increase the *capacity* of provincial and municipality authorities to prepare and implement environmental infrastructure projects, including those with EU funding; continue the reform of the Bank of Provinces to increase the efficiency in transfers of public funds to municipalities and in municipal investments.

Air

During the review period, Turkey achieved a strong *decoupling of SO₂ and CO emissions from economic development*. The use of high-sulphur coal in residential heating has been prohibited, and its substitution by gas (mostly from Russia and Iran) has expanded in urban areas. Turkey has also developed significant lignite washing capacity. Energy intensity has improved, and air quality concerns have been better integrated into *energy policies*. The new Energy Efficiency Law and the Law on Utilisation of Renewable Energy Resources for Generating Electricity aim to promote energy efficiency and the use of renewables. There are lower tax rates for natural gas, LPG and bio-diesel. Part of these changes were brought about by the new regulations on *air emissions from stationary sources*. All coal fired power plants have been equipped with flue gas desulphurisation units. In the *transport sector*, several new regulations on emissions from motor vehicles and quality standards for motor fuels have promoted vehicle fleet renewal, with an increasing proportion of the car fleet being equipped with

catalytic converters. The use of leaded gasoline was banned in 2004. Turkish *gasoline and diesel prices* (at current exchange rates) are among the highest in OECD member countries, due to relatively high taxes and the supply conditions in the region.

However, much remains to be done. In some urban and industrial centres, ambient *air pollution* by SO₂, NO_x and particulates exceeds national air quality standards. Information about ambient air quality is limited, particularly regarding NO_x and O₃. Although SO_x standards for emissions from medium-sized solid fuel plants were strengthened during the review period, *emission standards for power plants* using high-sulphur oil are still lenient compared to EU regulations. After a notable drop in 2000-01, both *road freight and passenger traffics* have increased rapidly and are a major source of air pollution, including in urban centres. *Taxes* on some motor fuels and vehicles still do not reflect their impact on air quality. For example, the tax rate for high-sulphur diesel fuel is lower than for fuel with a low sulphur content. *CO₂ emissions* have continued to increase. There are cross-subsidies concerning electricity prices. Even though Turkey is the first country in Europe that uses solar energy for heating (e.g. water heating) on a wide scale the large potential for use of heat from *renewables* (geothermal, solar, thermal and biomass) has not been effectively utilised. Despite major upgrading of the *rail network*, railway freight traffic has not increased and railway passenger traffic has decreased.

Recommendations:

- strengthen regulatory *standards*, including those for air emissions and fuel quality, to bring them in line with EU legislation, and ensure that they are *implemented* effectively and efficiently;
- continue to promote the use of *cleaner fuels* for motor vehicles and for residential uses;
- develop the use of *economic instruments* to reduce air emissions from stationary and non-point sources; review and revise, as appropriate, existing taxes on fuels and motor vehicles to support air pollution reduction objectives;
- continue, and strengthen, efforts to improve *energy efficiency* in the energy, transport, industry, residential and services sectors, to capture related multiple benefits, including those of reduced air pollution and reduced GHG emissions;
- strengthen efforts to integrate air quality concerns into *transport* policy, including modal shift from road to public transport (e.g. railways), with appropriate cost-benefit analysis of investments and co-operation among levels of government and relevant sectors; extend the use of cleaner motor vehicles;
- continue and strengthen efforts to improve the *information base* for air management: including additional pollutants in the air emission inventories; extending ambient air quality monitoring; adopting and implementing the draft Regulation on Air Quality Evaluation.

Water

Ensuring availability of water for the economy and the population was among the highest priorities in the 8th and 9th National Development Plans of Turkey. These plans also included a number of other objectives related to water management, which are gradually being met. For example, all *river basins* have now their water management

plans, and water quality problems are being addressed. Investment in *water supply and waste water infrastructure* has increased, with funding from municipalities and the Bank of Provinces. The rate of connection of the population to waste water treatment plants has increased to reach about 40%. Out of 19 larger municipalities, 16 have waste water treatment plants. Almost all *irrigation infrastructure* (95%) was transferred to user associations and their operation is becoming more efficient. In line with the EU legal framework, a number of regulations have been adopted relating to: discharges of dangerous substances into water, quality of surface water intended for the abstraction of drinking water, protection of water against nitrate pollution from agriculture, urban waste water treatment, and the use of water for aquaculture and bathing. The MoEF is now responsible for both water quality and water quantity management.

Recommendations:

- adopt a *comprehensive water law*, balancing the demand and supply side of water resource management;
- further develop *water resource management by river basin*, addressing both quantity and quality issues; establish basin councils to reinforce co-operation and partnership among authorities and water users (municipalities, industries, farmers), on the basis of pilot projects;
- promote better *water supply and waste water infrastructure*; encourage water saving and investment to reduce water losses;
- promote *adequate pricing of water services*, for household, industry and agriculture, with attention to efficiency, cost-recovery, and affordability;
- strengthen efforts to promote compliance with waste water legislation for *industry* (e.g. appropriate permitting, responses to non-compliance);
- reduce water pollution from *agriculture* (e.g. identification of nutrient vulnerable zones, action plans to address pollution, codes of good agriculture practices, effective inspection and enforcement);
- continue efforts to promote *water monitoring*, promote the analysis of health and economic impacts of water pollution.

However, *surface water quality* has remained low in many water bodies, or deteriorated due to insufficient pollution control, reaching alarming levels for surface waters in some large municipalities. Despite some progress, still approximately 53% of total *waste water from industry* is discharged into rivers and coastal waters without any treatment, often containing mercury, lead, chromium and zinc. *Groundwater quality and levels* are of concern, as groundwater is often contaminated by leakages from waste water and waste dumps, and increasingly used by households and agriculture. Unaccounted water uses and losses (e.g. unbilled uses, illegal uses, leakages) is about 55%. Although *prices* for drinking water have increased, with the attempt to recover operational costs, water for industry and agriculture, as well as waste water services continue to be underpriced. This results in inefficient use of water, excessive demands for water infrastructure and heavy indebtedness of municipalities. Nitrate and pesticide pollution from agriculture is continuing. Two thirds of agricultural land is prone to erosion. *Large scale hydraulic engineering works*, such as dams, remain a main feature of water management responding to objectives of economic development and population needs.

Nature and biodiversity

The area of forest and other wooded land has increased to 27.2% of the national territory. *Afforestation* efforts, partly to combat soil erosion, have reached 250, 350 and 400 million planted seedlings respectively in 2005, 2006 and 2007, a major contribution to the UNEP goal of at least 1 billion tree planting worldwide each year. *Legislation* concerning biodiversity has improved, as have related institutional co-operation and co-ordination. The total extent of *protected areas* has increased during the review period and now accounts for 5.3% of Turkey's total land area. Turkey has further strengthened the protection of these areas through management plans. *Public participation* has become an important part of nature inventories, conservation projects and management plans. Considerable progress has been achieved in public awareness and education related to nature conservation (e.g. large-scale programmes in schools, summer camps and training for various groups including prayer leaders and the military). Initial economic measures have been adopted to promote *environmentally friendly agriculture*, especially to address problems of salinity of soils and to support organic agriculture. Turkey has ratified all the main *international conventions* on nature conservation, except the Bonn Convention on the Conservation of Migratory Species of Wild Animals.

Recommendations:

- prepare and adopt a *framework law* to cover all areas of nature and biodiversity;
- finalise, approve and implement the *National Biodiversity Strategy and Action Plan* prepared in 2006, including time-bound targets, as proposed by the CBD; set objectives with regard to integration of biodiversity considerations into *agriculture* and other sectoral policies;
- create *protected areas*, so as to reach the 10% domestic target by 2010; establish them in an interconnected network; complete, adopt and implement management plans for all protected areas;
- continue afforestation and *sustainable forestry* efforts; continue and expand all *erosion* combating efforts;
- improve *coastal management*; set and implement an objective for strict protection of sensitive parts of the coast; integrate nature conservation in tourism development;
- finalise the inventory of endangered species; publish the corresponding *Red List*; improve *statistics and indicators* on biodiversity;
- continue to promote *education* and *awareness* concerning nature conservation.

However, some parts of Turkey's *rich biodiversity* are threatened and will face increased pressures in the future. This is largely due to the effects of tourism, urbanisation, industrial and agricultural developments, as well as those of major infrastructure projects in rural areas. *Protected areas* should be extended and connected with each other. Turkey should consider strict protection of parts of its natural coastline, including beaches, deltas and wetlands. The Ministry of the Environment developed a *National Biodiversity Strategy and Action Plan* in 2001, and is in the process of adoption of an updated 2006 version. There are a number of separate laws to protect and regulate biodiversity, habitats and landscapes, but no *overall framework legislation*. Monitoring and inventories are carried out by MoEF, research institutions, universities and by NGOs,

but few country-wide *inventories* are available. These include incomplete inventories of endangered species and corresponding red lists that still need to be completed and published. *Erosion* is widespread. Further efforts are needed to integrate nature and biodiversity concerns within agriculture, forestry, and land use planning.

2. Towards Sustainable Development

Integrating environmental concerns into economic decisions

Within a strong national *economic and development planning* founded on National Development Plans (NDP), increasing integration of environmental concerns has been achieved in several sectors, thus providing some progress in the practice of sustainable development. High road fuel prices and taxes (among the highest among OECD countries) provided incentives to reduce the use of petrol and diesel fuel and to renew the motor vehicle fleet. Turkey's *energy intensity* improved as did its *resource intensity*. *Lignite*, which generates significant pollution when used for energy production, does not receive direct subsidies any more. The structure of *agriculture subsidies* has changed promoting more environmentally friendly practices. *Absolute decoupling* took place for municipal waste generation and the use of fertilisers. The regulatory framework for *environmental impact assessment* of projects has been strengthened and steps launched for the introduction of strategic environmental assessment of policies.

Recommendations:

- establish a “*green tax commission*” to review and revise the full range of economic instrument of relevance for the environment (i.e. taxes, charges, trading, others); consider a comprehensive green tax reform, possibly in a revenue neutral perspective; review *motor vehicle related taxes*; introduce taxes on polluting products and inputs (e.g. detergents, batteries, pesticides, fertilisers, CFCs);
- reduce *environmentally harmful subsidies*, in particular in the agriculture and energy sectors, with appropriate measures to deal with competitiveness and distributive implications;
- expand *economic information* on the environment (e.g. environmental expenditure, environmentally-related taxes, resource prices, employment); develop *economic analysis* (e.g. cost-benefit analysis of environmental projects);
- undertake strategic *environmental assessment* concerning transport and agriculture policies;
- maintain a focus on *sustainable development* within the government, and the country more broadly, through an interministerial committee and associated advisory council that provide for broad participation by private sector institutions and the public.

However, Turkey is facing a number of environmental challenges due to unsustainable production and consumption patterns. The overall *material intensity* of its economy is still among the highest in the OECD area, as are the *pollution intensities* (e.g. SO_x and NO_x emissions per unit of GDP). This partly reflects the structure of its economy (e.g. with the highest imports of scrap metal in the world and their conversion into exports of metal products to the middle-east, with high imports and production of

cotton and high exports of cotton products to Europe). Efforts to speed up economic and social development do not always take environmental concerns into account, especially at *sub-national level*, where environmental priorities are not high. Environmentally harmful subsidies, especially in the energy sector, continue to promote polluting activities. With rapid economic growth, a continued increase in motor vehicles ownership and traffic, as well as in municipal and industrial waste generation can be expected. Waste management will require significantly larger collection and treatment infrastructure. While Turkey's preparations for, and immediate follow-up to the 2002 World Summit on Sustainable Development, were widely complimented, the effort to *integrate sustainability into sectoral policies* has been implemented via a EU project and should be developed through further steps.

Integration of environmental and social decisions

Important efforts have been made to increase *access of the public to information in general and to environmental information in particular*. Annual *state of the environment* reporting at provincial level has been supplemented by nation-wide reports. Environmental *information units* formed in government agencies, together with the state of the environment reports and national environmental statistics produced by the Turkish Statistical Institute inform the public about environmental issues. *Public participation* in the management of protected areas, in rural development and in EIAs procedures have become common and the number of environmental NGOs has increased. Initiatives to raise *public environmental awareness*, including training courses on environmental issues and environmental information dissemination have been developed for rural communities, the armed forces and prayer leaders. Several court cases for non-compliance and for environmental or health damages have proceeded. During the review period, significant progress in extending *environmental education* to all levels of the formal system was made, particularly for pre-school, primary and secondary schools.

Turkey continues to experience important *regional disparities*, with poverty affecting more rural areas of Eastern and South-eastern Anatolia, and suburbs of metropolitan areas. Even though a number of *regional programmes* support economic development of disadvantaged regions, their environmental and sustainable development content is often not sufficient. Studies of the relations between *public health* and environmental services are few and links between health and environmental policies should be developed. Large health related benefits could be derived from improved environmental conditions, including increased labour productivity, reduced health expenditure, and increased well being of the population. Environmental concerns should be integrated in technology development and innovation and could stimulate *employment*, especially in industry. *Environmental NGOs* face challenges, including establishing themselves, co-operating with other NGOs and raising funds. Turkey has not yet become a party to the Aarhus Convention.

Recommendations:

- develop a white paper on the *health-environment* interface; develop and implement a national action plan on health and environment; further implement the national children's environmental health action plan;
- reduce the share of people without *access to environmental services*, (e.g. water supply, water sanitation and waste services) to improve health and the quality of life, in particular for low income households;
- integrate environmental and sustainable development concerns in *regional development* programmes, with particular attention to rural and disadvantaged regions;
- promote environmental policies which contribute to *increased income and job creation*, especially in rural areas and poorer districts of large cities;
- continue to monitor the implementation of the right of *access to environmental information* and of *access to courts* concerning environmental issues, and correct implementation as needed ;
- continue to strengthen *environmental education*; develop further efforts by public authorities and environmental NGOs to increase *environmental awareness*.

3. International Co-operation

Turkey significantly expanded its engagement within the international community in the field of environment over the review period. It is currently a party to most *key regional and global environmental accords* and programmes, and has made effective use of a variety of international mechanisms to acquire technical and financial assistance in support of its national environmental priorities. Its *co-operation with the EU* on pre-accession convergence efforts has helped keep Turkey's international environmental commitments and responsibilities before national policy makers. It met its commitments under the Montreal Protocol to phase out *ozone-depleting substances* four years ahead of the target date, which was especially noteworthy given its policy of rejecting international pollution reduction targets based on its "special circumstances" (i.e. Turkey's low per capita income level requires it to emphasise economic growth). It has made impressive improvements in the area of *maritime safety* by establishing a high-tech Vessel Traffic Services system for the Turkish Straits, and developing oil spill contingency plans at the regional and (in some instances) municipal levels, supported by increased manpower, training and equipment. A progression of increasingly stringent regulations for the management of transboundary movement of *hazardous wastes* has brought Turkey into compliance with the Basel Convention and OECD rules. Good progress has been made in pursuing national follow-up to the Conferences of the Parties on the UN Convention on Biological Diversity and the UN Convention to Combat Desertification, and in responding to obligations under the UN Framework Convention on Climate Change, which Turkey ratified in 2004. Turkey has recently initiated a procedure of accession to the *Kyoto Protocol*.

Despite some advances in regional co-operation to address *marine pollution* in the Black, Mediterranean, Aegean and Marmara seas and some improvements of water quality in some areas, water quality is under heavy pressure in Turkey's coastal waters, particularly from the discharge of untreated or lightly treated municipal and industrial waste water. Although *marine fisheries* management has been improved by a series of new regulations (on fishing practices, closed areas and seasons, and controls on

equipment), the state of a number of fish stocks is of concern. With respect to *industry*, lack of inspection and enforcement capacity and political commitment is constraining the country's ability to improve environmental conditions in the workplace, and to reduce the potential for environmentally damaging industrial accidents; expanded efforts are needed to promote environmentally sound industrial growth by attaching effective environmental criteria and conditions to foreign direct investment, export credits, and the requirements of Turkish industry operating in other countries. The chemicals area has been cited in recent EU analyses as falling considerably short of EU legislation and requirements for the sound management of potentially toxic chemicals involved in international trade. Recognising efforts already accomplished (e.g. training programmes, brochures) Turkey's response to CITES requirements for controlling *trade in endangered species* has been limited, and needs further strengthening of inspection by customs agents. Turkey has not lived up to its commitments for data provision and action under the ECE Convention on Long-range Transboundary Air Pollution.

Recommendations:

- continue to strengthen national actions in support of *multilateral and regional environmental accords* and programmes in which Turkey participates, and to utilise fully the technical and financial support available from the international community through these mechanisms;
- maintain progress in contributing to international efforts to address climate change by preparing a comprehensive *National Climate Change Action Plan*, with clear goals, priorities and milestones, which also sets out responsibilities for all sectors of Turkish society; and consider setting nationally-determined voluntary targets (e.g. for energy use, renewable energy, afforestation and greenhouse gas emissions). This would maintain momentum in pursuing the national strategy and provide an important signal to other countries of Turkey's commitment and intent;
- continue efforts leading to *accession to the Kyoto Protocol*;
- strengthen national policies, guidance and requirements governing the *environmental performance of industry*, both in Turkey and elsewhere. This would entail a "greening" of foreign direct investment and export credit decisions, as well as rigorous application to Turkish industry of the environmental aspects of the OECD Guidelines for Multinational Enterprises;
- maintain an open, active dialogue with neighbouring countries on issues related to *transboundary rivers*, with a view to ensuring sound management of water quality and quantity and increasing co-operation among riparian countries;
- accelerate efforts to protect Turkey's *coastal waters* from land-based pollution, given the substantial risk to economic growth, tourism and public health if water quality degradation is allowed to persist;
- introduce a dedicated environmental component into Turkey's expanding *development assistance* programme, including the possible establishment of an Environmental Focal Point in the International Co-operation and Development Agency to oversee and co-ordinate environmental assistance efforts, as well as help ensure the environmental soundness of the overall ODA programme.

UNITED KINGDOM

1. CONCLUSIONS AND RECOMMENDATIONS

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REFERENCES

CONCLUSIONS AND RECOMMENDATIONS*

The United Kingdom has experienced almost a decade of *steady GDP growth*, exceeding both the OECD and EU averages. Since the early 1990s, per capita GDP has grown 20% in real terms. This expansion was primarily driven by rapid growth in services (e.g. transport, communication, finance and business services). Services now exceed 70% of total output, while industry's contribution has dropped to 25% of GDP, despite growth in the high technology and light manufacturing sectors. This dematerialisation of the economy, along with changes in energy supply and an increasingly mobile lifestyle, has helped reshape UK production and consumption patterns in ways that eased some traditional pollution pressures and raised some new environmental challenges.

Since the early 1990s, the UK has made noteworthy progress in *decoupling* a number of environmental pressures from economic growth. It achieved strong decoupling for major air pollutants and CO₂, for water withdrawals and for agrochemical consumption. This progress reflects both the reshaping of the economy and the strengthening of UK environmental policies in the EU context. The UK is committed at the highest level of government to environmental protection and sustainable development. Yet, it could still improve its ranking among OECD and EU countries with respect to a number of indicators of environmental pressure intensity. Today, *priority environmental issues* include diffuse pollution, waste management, soil and water management, landscape and biodiversity conservation, and climate protection.

To meet these challenges, the UK will need to: i) expand its environmental infrastructure (e.g. for waste and waste water treatment) and continue implementing its environmental policies; ii) further integrate environmental concerns into economic and social decisions; and iii) reinforce its international environmental co-operation. This report examines progress made by the UK *since the previous OECD Environmental Performance Review* in 1994, and 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 51 recommendations are made that could help strengthen the UK's environmental performance in the context of sustainable development.

1. Environmental Management

Implementing environmental policies

Since the 1994 review, the UK has made noteworthy progress in achieving a number of its *environmental objectives* and in expanding its *environmental infrastructure*, although at the pace allowed by relatively limited pollution abatement and control expenditure. Targets related to emissions of conventional air pollutants, persistent

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting in June 2002.

** The objectives of the 2001 OECD Environmental Strategy covered in these Conclusions and Recommendations are maintaining the integrity of ecosystems (Section 1), decoupling environmental pressures from economic growth (Section 2), the social and environmental interface (Section 2) and global environmental interdependence (Section 3).

organic pollutants and heavy metals, and to quality of drinking and surface water, were reached. Large-scale investment in waste water treatment infrastructure has accompanied privatisation of water services in England and Wales. The UK has extended the range of its environmental objectives, partly in response to EU and other international commitments, and partly as a consequence of its own sustainable development commitments. The mix of policy measures used has become more balanced, with more use of economic instruments in recent years, and continued effective use of regulation and land use planning. Regulation of significant point sources of industrial pollution has been carried out in an *integrated pollution control* (IPC) framework since 1990, with cost-effectiveness as a guiding principle (BATNEEC). Lesser industrial point sources and urban waste water treatment are subject to media-specific regulatory regimes. Modifications to the pollution control system, initiated to conform with provisions of the EU directive on integrated pollution prevention and control (IPPC), are encompassing previously excluded installations and introducing additional objectives of pollution prevention and resource efficiency. For water supply and waste water treatment, the *polluter pays and user pays principles* are applied fairly consistently in England and Wales, although less so in Scotland. The UK has developed and begun to apply new economic instruments such as a landfill tax, an aggregates levy, a climate change levy and emission trading systems. A reform is under way to enhance integration of environmental objectives with land use planning.

Notwithstanding the revival of environmental management in the late 1980s and the real progress just described, there is considerable *margin for further environmental progress*, as the UK is in the middle range of EU or OECD countries for many environmental indicators, has not yet achieved a number of its environmental objectives and still presents a deficit of environmental infrastructure (e.g. waste and waste water treatment infrastructure). Municipal waste generation has continued to parallel GDP growth, with recycling and recovery rates trailing those of comparable EU countries and landfilling rates remaining high. Developing the infrastructure necessary to implement best practices concerning *hazardous waste disposal* will require considerable investment. There is a need to further develop policy instruments to address *diffuse pollution concerns*, particularly as regards agriculture and urban runoff; the nitrogen surplus of the UK, although reduced, still exceeds the EU average by nearly 50% and the number of declared nitrate vulnerable zones is still insufficient to comply with the nitrate directive. Measures to conserve marine habitats and biodiversity should be reinforced. Significant expansion in *inspection and enforcement* will be required to accommodate the extended scope of IPPC regulation. Pollution abatement and control expenditure continues to represent 0.8% of GDP, and will probably need to be increased to meet future infrastructure investment requirements. The use of cost-benefit analysis to support decision making is part of the administrative culture in the UK, but limited information on costs and benefits makes it difficult to assess the cost-effectiveness of the IPC system. Also, the extended efficiency criteria have to be made compatible with the international and sustainable development objectives that are increasingly shaping the UK's environmental policies. In summary, considerable effort and investment will be necessary for the UK to consolidate and extend implementation of environmental policies.

Recommendations:

- strengthen *inspection and enforcement* and related monitoring efforts, as necessary to implement revised environmental regulations;
- review present *systems of charging users* for waste and waste water services, identifying opportunities to strengthen economic incentives for resource conservation and efficiency;
- review *environmental expenditure* and increase investment in environmental infrastructure (e.g. waste and waste water treatment facilities);
- develop and apply *economic and regulatory instruments* so as to meet reduction targets for diffuse pollution, particularly from agriculture and transport;
- continue to integrate environmental concerns into *land use planning*.

Air

In the 1990s, urban air quality continued to improve in the UK. Very strong *decoupling of emissions of conventional air pollutants from GDP* was achieved: while GDP rose by 26%, emissions decreased by 68% for SO_x, 42% for NO_x, 34% for NMVOCs and 33% for CO. This achievement mainly resulted from energy intensity gains, large-scale fuel switching (e.g. from coal and heavy oil to gas) and improved pollution control devices such as catalytic converters on gasoline cars and flue gas desulphurisation systems at coal-fired power stations. SO_x and NO_x emissions from large combustion plants were reduced below the EU's 1998 limits several years early. This brought the UK energy and emission intensity figures closer to EU averages, but room for further progress exists. *Large reductions in emissions of toxic chemicals* were also achieved (e.g. by 77% for polycyclic aromatic hydrocarbons [PAH], 70% for dioxins and furans, 73% for heavy metals). The sale of leaded gasoline was banned at the beginning of 2000. A statutory *national air quality strategy* with quantitative, dated targets for eight air pollutants has been implemented and regularly reviewed. An area-wide air quality management system introduced in 1997 launched a more holistic approach to addressing local air quality problems. Parking regulation and pricing continue to be effective traffic management tools in UK cities. Integration of air quality concerns into *energy and transport policies* has further progressed with measures such as promotion of combined heat and power generation, the automotive fuel duty escalator, reform of company car taxation, and the differentiation of vehicle excise duty based on CO₂ emission factors and of motor fuel excise duties based on sulphur content. Coal subsidies ceased in 1995. Cost-benefit analyses and estimates of health effects of air pollution are systematically considered in policy decisions. Overall, the UK has proceeded very well with its air agenda, in the context of its EU and other international commitments.

Despite these very positive intentions, actions and results, the UK faces a number of air management challenges. Metropolitan areas still contain "hot spots" where NO_x and PM₁₀ concentrations frequently exceed national standards and cause *air quality concerns*, particularly affecting the poor. In some urban areas heavily exposed to road traffic, the UK's proposed national long-term standards for benzene would be exceeded at many roadside locations; exceedances of the proposed national standard for PAH would also occur in a few industrial and domestic coal burning areas. This suggests that additional local measures would be needed to achieve the proposed national standards (which would be more stringent than the EU limit values) by 2010. At the local level,

implementation of the national air quality strategy has been rather slow, in part due to insufficient commitment and capacity on the part of local authorities. *Decoupling road transport use from GDP growth*, for both passengers and freight, remains the biggest challenge. Despite increased use of rail for passenger and freight transport in recent years, its modal share is still lower than that in many other OECD countries. The latest national transport programme is predicated upon major investment in the current decade, after years of underinvestment. A significant proportion of the public appears to perceive *taxes on fuels and vehicles* as fulfilling a revenue raising function, rather than as tools to help achieve environmental goals. Local authorities have not yet used their recently extended road pricing powers. Natural gas and oil prices for industry and households, compared to EU and OECD averages, leave room for increased internalisation of environmental externalities. Investment in new and cleaner transport, including low-emission vehicles, is relatively limited and has not been integrated into efforts to “green” government operations in practical terms.

Recommendations:

- continue efforts to reduce *NO_x, particulate and NMVOC emissions*, in light of persistent problems with high concentrations of NO₂, PM₁₀ and ozone in some areas;
- implement *area-wide emission control* more consistently, providing more precise guidance to local authorities and taking measures to reinforce their management capacity where necessary;
- work to increase public perception of *fuel- and vehicle-related taxes* as tools for achieving environmental goals, improving public transport and promoting low-emission vehicles and their refuelling infrastructure;
- strengthen *transport demand management* measures, including through the use of local authorities’ new powers to set road use charges and workplace parking levies;
- improve integration of air management concerns into *transport policies and plans*, particularly at the local level through better land use planning;
- continue to integrate local, regional and global atmospheric management concerns into *energy policies*.

Water

The UK made *significant progress* during the 1990s on improving the quality of surface, bathing, drinking and estuary waters and controlling discharges from point sources. River quality objectives have been adopted for all rivers, as recommended during the 1994 Environmental Performance Review, though they are not statutory. This progress was made possible by a significant increase in *water infrastructure investment* (e.g. GBP 3 to 4 billion per year from 1990 to 2000 in England and Wales) to reduce urban point source pollution. Sewage treatment infrastructure has been upgraded and storm overflows constructed. Disposal of sewage sludge at sea has been discontinued. These achievements came about through a *major shift in water policy*, responding to a decade of underinvestment and stimulated in large part by EU water directives. *Water pricing policies*, supervised by an independent regulator, have led to full cost recovery of public water supply and sewage treatment services by privatised water companies in England and Wales. Continued increased investment is planned until 2005 to complete sewage treatment infrastructure. In response to a recent increase in the frequency and

severity of floods, flood prevention and defence are evolving towards more integrated *flood management*, making greater use of specific planning tools (catchment flood plans, shoreline plans, water level plans), general land use planning and flood damage liability. Serious droughts have led to proposals to increase withdrawal charges.

Recommendations:

- increase the number of designated sensitive areas and complete *urban waste water treatment infrastructure*, especially that needed to reduce pollutant discharges to coastal waters;
- complete delineation of *nitrate vulnerable zones*, in which codes of good agricultural practice and nutrient management plans should be binding;
- further develop the *river basin approach to water management* (e.g. by setting statutory water quality and quantity objectives), extending responsibilities of subnational environment agencies accordingly;
- continue to develop a policy framework for *sewage sludge management* based on economic and environmental analysis;
- further explore the possibility of introducing *taxes on nutrients and pesticides* as a means of internalising external costs of diffuse pollution;
- explore the possibility of introducing industrial *water pollution charges*, with efficiency and financing objectives in mind.

Despite this overall progress and a well-established policy framework, much remains to be done. Addressing *drinking water quality* breaches (e.g. for iron and manganese) and meeting the EU requirements on lead content will require considerable investment. Even after significant improvements, 16% of *river length* in north-western England is of poor quality. Eight cities of more than 150 000 people still lack treatment plants. The number of water pollution incidents remains high. Controls on sewage sludge used for land application need to be strengthened. The quality of coastal waters remains a concern, largely because of *diffuse pollution* leading to nitrate, phosphate and pesticide contamination. Little has been done to address this issue; in particular, no strategy exists to deal with nutrient management in agriculture, despite EU directives and a recommendation in the 1994 OECD review. However, a review of diffuse pollution of waters by agriculture in England is under way to identify pollution control measures, including regulations, economic instruments and voluntary actions. The *interface between water and nature*, including wetland management and river revitalisation, has received relatively little attention, although there is a growing number of programmes to rehabilitate or restore river habitats. Building on a long tradition of monitoring/enforcement and service provision at the river basin level, and of planning at the catchment level (local environment agency plans), priority should be given to addressing water quantity and quality issues in an integrated manner, in line with requirements of the new EU water framework directive. Control of industrial effluent discharges has remained mainly regulatory, with little use of economic incentives such as *pollution charges*. Metering should be extended to further support modernisation of *water pricing*. A large amount of water-related investment is to be made in the next ten years (e.g. for drinking water supply, urban waste water treatment, nitrate and pesticide control and more ecological management of water bodies). Financing this investment will require a water pricing policy with a longer-term perspective, along with better integration of environmental concerns into sectoral policies, notably those for agriculture.

Waste

In 1999 and 2000, the UK established *national waste management strategies* that, for the first time, included quantitative targets. It initiated data collection on municipal waste generation and management in the mid-1990s. Mechanisms to improve local authorities' performance on municipal waste management (e.g. "Best Value" duty) were introduced. The UK developed several *economic instruments* for waste management in the 1990s, including the landfill tax and the aggregates levy. A system of tradable permits for the landfilling of biodegradable municipal waste has been proposed. For some waste streams, recycling rates gradually increased over the decade. The UK transposed the EU packaging directive into national legislation, and progressed with preparations to implement EU directives on waste electrical and electronic equipment and on end-of-life vehicles. *Regulations* on hazardous waste were strengthened with, for instance, a broader definition of "special waste" and the obligatory attachment of consignment notes. A new regime for the identification and remediation of contaminated land was introduced.

Recommendations:

- establish a systematic *data collection and information system* concerning the generation, recovery and disposal of non-municipal waste;
- introduce effective measures to encourage *waste minimisation* (e.g. waste charges for household waste, material resource efficiency standards) and accelerate efforts to increase *material recovery rates*;
- strengthen measures to prevent and discourage *illegal disposal of waste*, with emphasis on inspection and enforcement;
- review and revise *landfill-related measures* (e.g. landfill tax rates, exemptions; inspection and enforcement) so as to more effectively support objectives related to reduction of landfilling and diversion of waste to unlicensed sites;
- accelerate measures to ensure that treatment and disposal of *hazardous waste* are organised in an environmentally sound and economically efficient manner (e.g. eliminating "co-disposal"), and clearly identify infrastructure needs;
- assure implementation of new legislation on remediation of *contaminated land*.

The *rate of municipal waste generation* showed no sign of decoupling from GDP growth in the 1990s. Furthermore, given the relatively low cost of landfilling, there is little incentive to reduce waste generation or increase recycling. Measures to encourage waste minimisation remain very weak, and charges on household waste management have not been introduced despite a recommendation in the 1994 OECD review. An official *data collection system for non-municipal waste* is still lacking, rendering analysis of waste generation, management and disposal trends impossible, except for selected waste streams. The controversial practice of "*co-disposal*" (landfilling hazardous waste with other waste) continues, though it is supposed to be phased out by 2004 to comply with the EU landfill directive. Full compliance with EU legislation will require considerable investment to expand waste treatment capacity. Recycling rates continue to be among the lowest in OECD countries due to low public awareness and a lack of recycling infrastructure. *Regulatory inspection* of waste management sites should be made more

systematic and consistent, and efforts to control illegal disposal should be further strengthened.

Nature and biodiversity

Since the 1994 OECD review, the UK has steadily strengthened *protection of special sites* by increasing their area (e.g. a 22% increase in areas and sites of special scientific interest between 1993 and 2001), enacting new legislation (e.g. the 2000 Countryside and Rights of Way Act) and promoting positive, rather than compensatory, management agreements with landowners/occupiers. Some trends of *habitat loss* seen before 1990 have been slowed, halted or reversed, including those affecting plant diversity in arable fields, area of fen/marsh/swamp and biological condition of small rivers. Forest cover increased by 16% between 1990 and 2000. A framework for implementing "*Biodiversity: The UK Action Plan*" was established with the preparation of individual action plans for 45 priority habitats and 391 species, as well as for 160 local areas, under highly successful voluntary public-private partnerships. The first five-year progress report was published in 2001. Incorporation of biodiversity concerns into other policy fields was further advanced through national initiatives such as sustainable development indicators and the UK forestry standard, although there is still need for improvement. Land area subject to agri-environmental programmes continued to increase, as did related public expenditure (from GBP 9 million in 1990 to GBP 150 million in 2000). Environmental NGOs play a major and influential role in managing nature and biodiversity in the UK.

Recommendations:

- extend and strengthen the use of *management agreements* for protected areas;
- fully implement the *biodiversity action plan* through local action plans, and improve monitoring of the condition of individual species and habitats;
- continue to encourage the expansion of *woodland and forest cover* and to promote sustainable forestry in line with the UK forestry standard;
- further promote *agri-environmental programmes*, as allowed for under the EU Common Agricultural Policy (CAP);
- develop and implement comprehensive legislative and institutional mechanisms for *marine nature conservation*, fully implementing the EU habitat directive in the 200-mile exclusive economic zone;
- continue to promote measures to conserve *wildlife species* that are in decline, and regularly monitor their status as a basis for establishing related conservation measures.

Nevertheless, the UK still faces significant challenges concerning biodiversity and nature conservation. It is uncertain whether nature and biodiversity protection efforts are sufficient to balance the multiple pressures from densely clustered economic activities. There is still considerable room for improvement in the *condition of protected areas*, as only 60% are in either "favourable" or "unfavourable but recovering" condition (the national target is 95% by 2010). The deterioration of some habitats and species has continued (e.g. plant diversity in grasslands, population of farmland birds, number of shrubs and bogs), largely because of intensive agriculture. Runoff from agricultural sources still causes *eutrophication* of sensitive habitats (e.g. over 80% of riverine

habitats). *Fertiliser and pesticide application intensities* for the UK are higher than OECD Europe averages by 100% and 70%, respectively. Intensive grazing causes major habitat deterioration, especially in uplands. Statutory mechanisms for *marine nature conservation* are patchy, and an overall policy framework is lacking. Information is still insufficient to allow the recent biodiversity status of some animal species to be known.

2. Towards Sustainable Development

Integration of environmental concerns in economic decisions

The UK economy has grown by almost 2.5% per year since the early 1990s. *Strong decoupling* from GDP growth has been achieved for emissions of major air pollutants and CO₂, as well as for water withdrawals and application of agrochemicals. A sustainable development strategy is in place. Progress towards sustainable development has been aided by institutional and market-based integration in several sectors. *Institutional integration* of sustainable development has been fostered by a range of high-level co-ordination committees (e.g. Green Ministers Committee, Environmental Audit Committee) and advisory bodies (e.g. Sustainable Development Commission). Strengthened procedures for taking environmental issues into account have been built into policy-making processes. The traditional filtering of policy measures through cost-benefit analysis has been extended, with a stronger focus on objective setting and monitoring of progress through indicators. Substantial progress in policy integration has been achieved with respect to energy, transport, construction and agriculture. The UK has begun to use the modulation mechanism of the CAP, strengthening integrated rural development approaches, including through targeted support for environmental management and biodiversity. A number of *market-based instruments* have been introduced, such as the climate change levy, that apply the principle of taxing “bads” and using the revenue to support “goods”. In transport, the fuel duty escalator influenced the modal split, shifting the trend back towards rail and water, and thus helped the UK reduce air pollutant emissions. At project level, environmental impact assessments are carried out for large projects, and recent legislative changes are expanding their scope, in compliance with EU legislation.

On the other hand, many UK indicators of environmental pressure intensity are still in the OECD middle range. Changes in consumption patterns are generating and/or accentuating environmental concerns. For instance, traffic volumes continue to grow, and municipal waste generation closely tracks GDP growth. Decoupling of diffuse pollution from economic growth will require continued efforts. Much remains to be done to translate sustainable development orientations into practice and to achieve full integration of economic, social and environmental considerations in important *sectoral policies*. Although such efforts have been fairly comprehensive on the part of the central government, translation of general intentions into *regional development priorities* and local action is patchy. The integration of environmental objectives into the policies of *economic regulators* such as OFGEM should be improved. The guidance function of important environment-related *energy and transport taxes* should be reviewed. Progress toward national goals concerning renewable forms of energy, waste management and agri-environmental concerns remains slower than what is needed to reach them.

Recommendations:

- reflect sustainable development objectives more systematically in *public service agreements* and through integrated analysis (e.g. extended cost-benefit analysis) of policy measures;
- ensure that central government initiatives for improved environmental integration and sustainable development are effectively translated into *regional development priorities and local action*;
- strengthen the incentive role of economic instruments in inducing targeted *modal shifts in transport*, with appropriate phasing and consultation;
- further extend the shift of CAP resources towards integrated rural development programmes, including through *agri-environmental measures*;
- study and develop the extension of the *climate change levy* into a broader based tax on greenhouse gas (GHG) emissions.

Integration of environmental and social concerns

The environmental-social interface has taken on new importance in the UK's sustainable development strategy. Improving environmental quality and resource efficiency is among the objectives of local initiatives to combat *social exclusion and deprivation*. Disparities in exposure to pollution and the distributive effects of environment-related measures are increasingly considered in policy design and assessment. Legislation concerning countryside access and rights of way has been reinforced. *Access to environmental information* has improved, and broad-based consultation is current practice. Extensive databases on the state of the environment have been established, and particular emphasis has been put on developing and using "headline" indicators of sustainable development. Consumer campaigns have helped raise *environmental awareness* and influence behaviour. Partnership approaches are promoted, and have helped improve environmental management and integration. *Environmental NGOs* are major actors in the environmental and sustainable development debate and activities, not only at the local, regional and national levels but also in international contexts such as the EU and the IUCN. Environmental and sustainable development *education* and learning have been reinforced by a wide range of measures, including an update of the national curriculum.

However, substantial *disparities in environmental quality* persist and generally are associated with socio-economic imbalances, resulting in significant inequality in health status and death rates. Distributive effects of environmental or environment-related policies are not systematically taken into account in planning. Countryside access and rights of way still require significant improvement to meet objectives. Regional development agencies have missed opportunities to promote truly integrated approaches to sustainable development with a strong environmental-social dimension. Local partnership approaches (e.g. Local Agenda 21 and community strategies) should be further strengthened, and performance assessment of local authorities in programmes such as Best Value should include systematic reviews of progress in environmental management and sustainable development. *Public support* for use of economic instruments is fading, partly because of inadequate communication strategies (e.g. concerning the roles of energy and transport taxation in achieving environmental objectives). Recent legislation concerning access to environmental information needs to be fully implemented. *Access to courts* is limited, de facto, for

NGOs, which have no explicit right to stand on behalf of nature and the environment. Stakeholder participation in the *planning* of large-scale investment projects should not be restricted, but rather made more effective.

Recommendations:

- take concerted action to reduce *disparities in risk exposure* and access to environmental services;
- monitor implementation and assure proper enforcement of *countryside access and rights of way*;
- further strengthen the *integration of environmental targets and actions* in initiatives to combat social exclusion and deprivation, and seek to ensure that social *compensation measures* do not undermine the effectiveness of environmental policies;
- assure effective integration of environmental objectives in *local partnership approaches* to sustainable development;
- provide for improved *legal standing of NGOs* in courts and pursue implementation of recent legislation concerning access to environmental information.

Sectoral integration: construction

The UK recently adopted a *strategy for more sustainable construction* and has established institutions and procedures for improving the integration of environmental concerns into construction activities and policies. In close co-operation with the industry, several initiatives for technology diffusion have been set up. With respect to material use, a quantified target of increasing the use of construction waste and *recycled aggregates* was set: an increase of more than 80% by 2006, from the 1989 level. Landfilling of construction and demolition waste has fallen since the introduction of the *landfill tax*. The 2002 *aggregates levy*, which increased prices of sand, gravel and crushed rock by some 30%, is expected to provide additional incentive for recycling. The 2001 climate change levy should help improve energy efficiency in commercial buildings. Standards for *energy efficiency* in new buildings have gradually been raised through the application of revised building regulations, and there is now more technical flexibility in meeting them. To improve energy efficiency in the existing housing stock, an investment programme targeted at "*fuel poor*" households was launched. In the private sector, builders now have to display energy ratings for new homes. The environmental performance of buildings is rated through the Building Research Establishment Environmental Assessment Method (BREEAM). Already applied to about 25% of new office buildings, this *labelling system* has helped raise awareness of energy efficiency issues.

However, there is still considerable scope for progress. Despite repeated upgrades, energy efficiency standards for new dwellings remain below those of comparable EU countries, while the large potential for improved energy efficiency in the *existing building stock* is only now beginning to be addressed. Translation of positive experiences from pilot projects into standard practice should be accelerated. Awareness of energy saving potential is still low. Rating and labelling systems for buildings, such as BREEAM, should be promoted more actively. The public sector has not yet fully integrated sustainable construction objectives into its procurement policies as regards construction. Concerning waste streams, information is insufficient to review the impact

of recent measures, though there is growing concern about *illegal disposal* of construction and demolition waste at unlicensed sites. The sustainable construction strategy does not contain *specific quantified targets*, but calls on the industry to measure baselines, set targets and publish results. The industry is developing sector- and product-specific performance indicators, yet the development and use of environmental indicators needs to be further encouraged. Environmental and sustainable development concerns and criteria are often not sufficiently integrated into decisions on the design, construction, operation and assessment of buildings. Overall, the restructuring and reorientation of the sector has been primarily driven by economic priorities and perspectives.

Recommendations:

- further promote the *integration of environment-related measures* into strategies and programmes devoted to improving performance in the construction sector;
- amend the Building Act to address the operational *energy efficiency of existing buildings*, and launch a comprehensive policy, with clearly defined targets, to substantially upgrade energy efficiency in existing buildings;
- continue efforts to improve *resource efficiency and conservation* through increased recycling and reuse of construction materials and sites, and strengthen control of illegal disposal of construction and demolition waste;
- ensure that the public sector, through its *procurement policy*, sets a good example for sustainable construction and operation of buildings and infrastructure;
- add environmental indicators to the set of *construction performance indicators* and promote public awareness of *rating and labelling systems* such as SAP and BREEAM.

3. International Co-operation

Concerning *climate change*, the UK reduced its GHG emissions by 13.5% from 1990 to 2000. The country thus has already made very good progress towards meeting its ambitious national target of cutting CO₂ emissions by 20% between 1990 and 2010, as well as its international target under the Kyoto Protocol (a 12.5% reduction in GHG emissions between 1990 and 2008-12). A comprehensive climate change programme was launched in 2000, with the aim of sustaining these emission reductions and meeting the national CO₂ target. Concerning *transboundary air pollution*, the UK has met all of its international reduction targets for NO_x, SO_x and NMVOC emissions. Concerning *marine issues*, the UK extended prohibitions regarding ocean dumping to industrial waste and sewage sludge in the 1990s, and has consistently ensured that at least 25% of the foreign ships calling at its ports are inspected for compliance with the Paris Memorandum of Understanding on Port State Control. It has also upgraded waste management facilities in its ports, anticipating international requirements. Performance on transposing and applying EU directives on environment has improved overall, although several issues of non-compliance have been taken to court (e.g. on nitrates and marine habitats). A major review in 2000 of *export credit programmes* led to the adoption of a Statement of Business Principles that determines how applications for support are assessed, taking into account sustainable development concerns.

However, to ensure that the *GHG reductions* are sustained, the country needs to vigorously pursue implementation of additional policies and measures outlined in the climate change programme. Attaining its targets concerning wider use of renewables and combined heat and power production would also help assure the country's longer-term performance (post-2010) with respect to climate protection, and to transboundary air pollution control (in line with the EU acidification strategy and national emission ceiling directive). Additional measures will also be necessary to moderate demand for road transport and electricity. Further technological control of air emissions at *refineries and offshore installations* will be necessary to meet future international emission reduction targets for SO_x, NO_x and NMVOCs. The UK's performance in reducing *nitrate discharges to regional seas* has fallen short of international commitments. Offshore installations have been slow in complying with OSPAR limits on oil content in discharges of produced water. As in other North Sea countries, about half the *fish stocks* exploited by the UK fishing fleet are classified as outside of biologically sustainable limits. Programmes aimed at reducing fishing capacity have had moderate impact. The UK's *official development assistance* (ODA) totals 0.32% of GNI, well under the Rio target of 0.7%. Attempts to "mainstream" environmental concerns into ODA projects have helped raise general awareness of the issues, but have so far not led to clear and practical guidelines, or use of best practices.

Recommendations:

- review and adjust, if appropriate, *economic incentives in the energy and transport sectors* to facilitate full implementation of the climate change programme;
- strengthen and further expand measures to limit *nitrate inputs* into regional seas, with particular attention to diffuse sources such as agriculture;
- strengthen enforcement and pollution control measures at *offshore installations and refineries* in line with internationally agreed control targets (e.g. under OSPAR, MARPOL, EU emission ceiling directive);
- continue to reduce *fishing fleet capacity* and related subsidies, and work to ensure that precautionary management strategies are applied to overexploited fish stocks;
- monitor the implementation of voluntary initiatives designed to assure integration of sustainable development concerns into *export credits and guarantees*;
- increase *official development assistance* towards the Rio commitment of 0.7% of GNI and establish clear procedures for mainstreaming environmental objectives into projects;
- ratify and implement recently signed *international environmental agreements*.



UNITED STATES

1. CONCLUSIONS AND RECOMMENDATIONS

Part I
ENVIRONMENTAL MANAGEMENT

- 2. AIR MANAGEMENT**
- 3. WATER MANAGEMENT**
- 4. NATURE AND BIODIVERSITY MANAGEMENT**

Part II
SUSTAINABLE DEVELOPMENT

- 5. ENVIRONMENTAL-ECONOMIC INTERFACE**
- 6. ENVIRONMENTAL-SOCIAL INTERFACE**
- 7. HEALTH AND ENVIRONMENT**

Part III
INTERNATIONAL COMMITMENTS

8. INTERNATIONAL CO-OPERATION

REFERENCES

CONCLUSIONS AND RECOMMENDATIONS*

This report examines progress made by the United States since the previous OECD Environmental Performance Review in 1996 and the extent to which the country's *domestic objectives and international commitments* regarding the environment are being met. It also reviews progress in the context of the OECD Environmental Strategy. Progress has stemmed from environmental and economic decisions and actions by federal, state and local authorities, as well as by enterprises, households and non-governmental organisations (NGOs). Fifty-one recommendations are made that could contribute to further environmental progress in the United States.

Over the review period (1996–2004) the country's GDP grew by close to 30% while the population increased by 10% to 291 million. *GDP per capita is very high*. The United States has one of the lowest trade-to-GDP ratios in the OECD. Services generate some 75% of the value added in the economy, with natural resource-based sectors contributing less than 5%.

Despite relatively low population density, pollution and natural resource depletion continued to be prominent issues on the country's agenda over the review period. The National Environmental Policy Act, together with other sectoral acts, sets environmental protection as an overarching goal and establishes the framework of *environmental federalism*, within which specific environmental management responsibilities are shared among federal, state and local authorities. In the review period government institutions evolved, particularly through an improved system of strategic programming. *Decoupling* of environmental pressure from economic growth has been achieved in some areas, but the US still faces challenges with respect to high energy and water intensities, environmental health risks, marine habitat conservation and maintenance of biodiversity. There remains much potential to integrate environmental concerns through *market-based instruments*, particularly in the energy, transport and agriculture sectors. To meet these challenges, it will be necessary for the United States to i) thoroughly implement its environmental policies, improving their cost-effectiveness and inter-jurisdictional co-ordination; ii) further integrate environmental concerns into economic and sectoral decisions; and iii) further develop international environmental co-operation. This will require increased effort by all sectors of society.

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 17 May 2005.

** 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 (Section 2.1), integration of social and environmental concerns (Sections 2.2 and 2.3) and global environmental interdependence (Section 3).

1. Environmental Management

Implementing more efficient environmental policies

Traditionally, the US approach to *environmental management has been very effective*, relying on laws and regulations implemented through enforcement, compliance and funding mechanisms. During the review period, *cost-effectiveness concerns* became more prominent as regards the choice of policy instruments for environmental management. Increasing priority has been given to using more *flexible instruments* for implementing environmental policies (e.g. co-operative conservation), in the interest of reducing regulatory and compliance costs and in the interest of achieving a higher level of environmental protection at a more rapid pace. *Systems of tradable permits* have been pioneered for air emissions (e.g. SO_x, NO_x), water resource management and products (e.g. ozone-depleting substances). Ex-ante and ex-post *cost-benefit analysis* of environmental policies is used probably more than in any other OECD country, and evidence of the net economic benefits of air pollution control efforts has fuelled the recent tightening of emission reduction requirements for a number of pollution sources, including power plants and diesel engines. *Efficiency gains* and environmental benefits should also result from the delegation of environmental regulatory powers to states, and the increased flexibility negotiated by some states concerning implementation. Public land management and species protection are increasingly undertaken with an ecosystem, integrated approach. Focusing compliance assurance activities on priority sectors or industries with known compliance problems has made enforcement more efficient; even as inspection numbers have decreased, the proportion leading to violations and prosecutions has increased. The rule of law is pervasive in environmental management. "Managing for results", introduced by the Government Performance and Results Act, has catalysed better *environment-related programming* and made programmes more performance-oriented. *Public-private partnership* has proved effective in a number of cases.

The consensus that emerged in the 1970s for a national approach to environmental management remains strong. While states have taken a more active role in initiating policy responses to regional issues, a few have also urged more *federal leadership* on some far-reaching environmental issues, such as controlling air pollutant emissions from coal-fired power plants and limiting greenhouse gas (GHG) emissions. Command-and-control regulation is still the cornerstone of US environmental protection, accompanied by considerable *litigation*, which is often costly and time consuming. While implementation of the user pays and polluter pays principles is part of the environmental management culture, some environmental services (e.g. waste water infrastructure, waste collection and treatment) are still too often *financed to a significant degree by taxpayers* rather than through full cost recovery. The recent emphasis on *voluntary initiatives* introduces desirable flexibility, but also raises issues regarding transparency, public involvement and efficiency, which will need to be addressed to justify such measures' prominence in the policy package. The *permitting system* is still generally single-media in approach, and may result in higher-than-necessary administrative costs to industry. In general, fiscal and sectoral policies sometimes run counter to stated environmental objectives. The importance of these in the overall context of US environmental quality is subject to debate, but may warrant increased scrutiny.

Recommendations:

- continue to emphasise *coherence and co-operation among federal agencies* and between federal and state agencies involved in environmental management;
- place greater emphasis on the elimination of *ambiguities in laws and regulations* to avoid legal gridlock and protracted litigation; continue compliance assistance activities;
- evaluate the potential benefits of introducing *integrated pollution control permits* (e.g. multi-media or multi-pollutant permits) for large stationary sources;
- continue to incorporate *multi-pollutant and multi-media* considerations when assessing the cost-effectiveness of environmental policies, taking into account ancillary benefits for other environmental media and other areas of public policy (e.g. public health, international aspects);
- review government *financial assistance* (e.g. direct and indirect subsidies, preferential loans, tax incentives) *for the provision of environmental services* in light of the polluter pays and user pays principles; in particular, examine subsidies related to sewerage, waste water treatment, and grazing on public land;
- expand the role of *market-based instruments*, in association with other instruments, with a view to increasing cost-effectiveness and economic efficiency in environmental management; consider expanding the use of fees and charges to get prices right, particularly as regards water and energy resources;
- ensure that *voluntary environmental initiatives* include routine monitoring of performance and cost-effectiveness, and consultation of stakeholders.

Air

While the US economy grew substantially during the review period, emissions of major air pollutants declined: *emissions* of CO, lead, NO_x, SO₂, particulate matter (PM) and VOCs were *strongly decoupled* from economic growth in the review period. The SO₂ decoupling is due primarily to the success of the cap-and-trade approach of the Acid Rain Program. For CO, lead, NO_x and PM, the main factor is increasingly stringent controls on motor vehicle emissions and fuel quality, which have greatly reduced emissions per kilometre travelled. The standards for light-duty trucks (including sport utility vehicles) were raised around 8% in 2003, and will be phased in through the 2007 model year. Programmes for stationary sources have achieved substantial reductions, though many older installations still have relatively high emission rates. *Ambient concentrations* of criteria air pollutants have decreased significantly in urban areas, and sulphur deposition has been reduced in the East. The United States employs a *mix of policy instruments* for air quality management, including regulation, market-based instruments and voluntary measures. The recent emphasis on market-based and flexible approaches such as *cap-and-trade programmes* has increased the cost-effectiveness of pollution control for stationary sources. Though uncertainties remain, assessments of the overall costs and benefits of the Clean Air Act indicate that its implementation has had, and will probably continue to have, *substantial net economic benefits*. The Department of Transportation implements several programmes that help manage traffic demand and encourage more efficient vehicle use, though their influence is likely undercut by

economic signals in the sector. *New ambient air quality standards* for ground-level ozone and PM_{2.5} are expected to lead to significant net benefits, in particular in terms of avoided premature mortality. The recently promulgated Clean Air Interstate Rule, along with a number of other programmes such as engine and fuel improvements in the transport sector, are expected to help most areas in the United States meet the new ozone and fine particulate standards. The promulgation of a large suite of technology-based emission standards to regulate hazardous air pollutants has been completed, albeit considerably behind schedule. In 2005 the United States promulgated pioneering mercury control requirements for coal-fired electric power generators (the Clean Air Mercury Rule).

Despite this overall progress, *air pollution intensities* (emissions per unit of GDP) for most common pollutants are still quite high compared to those of other OECD countries. Emissions of mercury and particulates from *old coal-fired power stations*, and of ozone precursors from motor vehicles, pose human health risks and contribute to persistent regional pollution problems (e.g. smog, haze). *Ambient concentrations* of ozone and fine particulates remain an important public health concern, with some 160 million US residents living in areas classified as in non-attainment for ozone and/or PM_{2.5}. Innovative measures and improved inter-regional co-operation will be needed to meet the recently strengthened standards for ozone, PM and regional haze. The *State Implementation Plan* approach, which focuses on one pollutant at a time and on measures by a single state, is ill adapted to the multi-pollutant or air-shed approaches necessary to control such pollution. Data on ambient concentrations of *hazardous air pollutants* (HAPs) is patchy, and the recently initiated national HAPs monitoring network will need to be complemented by local-level ambient monitoring to facilitate evaluation of the “residual risk” associated with regulated HAPs. Integration of environmental concerns into decision making in the *energy sector* remains limited, and energy prices neither fully reflect external environmental costs nor provide adequate incentives for energy conservation. Although efforts are being made to integrate air management concerns into *transport planning*, little emphasis has been put on the use of price signals or the rationalisation of fiscal policies to support less polluting transport choices. The benefits of technological advances in reducing unitary motor vehicle emissions have been largely outweighed by increases in fleet size and in vehicle-kilometres travelled. *Average fuel efficiency* of the national motor vehicle fleet remained flat during most of the review period and is one of the lowest in the OECD. The Corporate Average Fuel Economy standards were not raised in the review period for passenger cars. *Protection of ecosystems* through secondary standards, while provided for in the Clean Air Act, has not been emphasised; some forests and crops are damaged by exposure to regional ozone. Despite an overall trend of improvement, visibility in many national parks and wilderness areas is still regularly impaired by haze; the recently promulgated Clean Air Interstate Rule and other measures are expected to lead to improvements in visibility and benefits for ecosystems.

Recommendations:

- continue to implement measures to achieve the new standards for *ground-level ozone and PM_{2.5}*, striving to take an integrated approach to control ozone precursors at air-shed level; develop and implement secondary ambient air quality standards aimed at *ecosystem protection* (e.g. for ozone);
- implement a cost-effective national system to achieve targeted reductions of emissions (e.g. of SO_x, NO_x and mercury) from *existing power stations*;
- in implementing future cap-and-trade programmes, ensure that current and projected *environmental benefits from existing regulations* are not diminished and that geographic disparities in pollution exposure are not increased;
- continue to ensure that federal and state *enforcement activities* are well co-ordinated and effectively raise the overall level of compliance with environmental regulations;
- strengthen *management of hazardous air pollutants* by monitoring local ambient concentrations, regularly updating and publishing inventories of toxic releases and cost-effectively assessing residual risk;
- reinforce measures to increase energy efficiency and the contribution of *low-emission energy sources* to the energy supply;
- continue to revitalise the system of *Corporate Average Fuel Economy* standards for motor vehicles, improving fuel economy standards for all vehicle classes.

Water

Drinking water quality standards have been strengthened since 1996, and the overall quality of the water supplied by public systems improved during the review period. Of the population served (273 million persons in 2003), the share receiving tap water in full compliance with health-based drinking water standards increased from 86% in 1996 to 90% in 2003. Nevertheless, localised quality problems, such as lead in tap water in Washington, DC, still exist. Due to tightened standards, increased sampling efforts and better detection methods, more health advisories are being issued to protect critical populations. The efficiency of water use in *agricultural irrigation* has improved. The marginal costs of meeting increasing water demand have spurred efforts to strengthen the conservation signal in water pricing. Almost all water networks now meter consumption and charge in relation to the volume consumed. In some areas, *watershed management* initiatives have been successfully used to integrate management of water resources and water quality, and thus avoid additional investment in infrastructure (e.g. Catskills watershed, New York). Several initiatives have introduced *trading of water pollution permits or water rights* associated with selected water bodies, thereby offering more cost-effective means of achieving certain environmental management goals. An additional 15 million people were connected to *waste water treatment* plants in the review period, maintaining coverage of the population at a high level (71%). The use of *sewerage charges* became more widespread during the review period, with surcharges in some cases differentiated as a function of suspended solids, oxygen demand or nutrients. Several states have applied innovative *economic instruments* (e.g. Massachusetts's pesticide tax, Oklahoma's tax credit for manure management) to reduce diffuse water pollution.

Recommendations:

- improve *co-ordination and co-operation* in setting federal water objectives and policies, including among the Environmental Protection Agency (quality), Department of the Interior (irrigation, nature protection), Department of Agriculture (agricultural run-off), Department of Commerce (the National Oceanic and Atmospheric Administration's hydrology and water information, supply estimates and predictions) and Department of Defense (flood control);
- reconcile *water quality and quantity objectives*, in particular by applying an ecosystem approach to flood control; ensure that *flood plain management* concerns are systematically taken into account in land use and water policy decisions;
- continue to move towards *full application of the polluter pays principle* and *cost recovery* in pricing water and waste water services for households and industry; in particular, phase out federal transfers to revolving funds, increase public-private partnerships and promote inter-municipal water utilities to improve efficiency of service delivery;
- give higher priority to reducing *diffuse water pollution*, in particular from agricultural and urban run-off, by implementing a mix of policies (e.g. water quality trading, storm water run-off control);
- continue to facilitate the *development of water markets* and, where appropriate, promote the use of prices as a management tool to improve the allocation of water;
- further apply *basin-wide management*, using existing watershed management initiatives as examples, to improve efficiency, to raise capacity and public awareness and, as appropriate, to extend co-operation between relevant US and neighbour-country authorities;
- foster *sustainable water resource management* through increased use of economic instruments (e.g. full-cost water pricing, basin-wide water trading, environmental management systems, asset management).

However, there is still considerable room to improve the effectiveness and efficiency of the management of water resources and quality, given that several trends are unfavourable and water has become a constraint on development (e.g. urban, agricultural) in part of the West. Some 40% of assessed *surface waters* are subject to health-related advisories restricting fishing or swimming, many due to elevated levels of mercury and pathogens, and *coastal waters* in the North-east and in the Gulf of Mexico regularly violate quality standards. Although related public health risks are reduced through the issuance of advisories, additional efforts are needed to fully restore impaired water bodies. In 2003, with a significant increase in monitoring, *beach closings* or health advisories were issued for more than 18 000 days nationwide, up from 3 000 in the mid-1990s. Many estuaries have high levels of *eutrophication*, and recent evidence suggests that chronic water quality problems persist in the Chesapeake Bay. Although new mechanisms (Farm Bill, municipal storm water permit programmes) are in place to address agricultural and urban run-off, these diffuse sources of pollution continue to pose significant challenges. Per capita *water consumption* remains the highest in the OECD, and the intensity of water use (per unit of GDP) is nearly 70% higher than the OECD average. In many noticeable cases the *user pays and polluter pays principles* are not fully applied. Although there has been a reduction in federal transfers, and greater emphasis on efficiency and cost recovery, federal transfers continued to support the

development of public water supply infrastructure over the review period. *Capital investment costs* for waste water treatment are also still not fully recovered from users, though progress has been made in reducing federal transfers. Municipal water service provision is highly fragmented, and providers too rarely seek to exploit potential economies of scale that could result from inter-municipal co-operation. There are increasing problems with water availability in the Western states as a result of *competing demand* among increasing populations, agricultural, recreational and environmental needs, and obstacles to more efficient use and conservation of water. This further threatens aquatic ecosystems and strains many Western aquifers. Efforts to address these concerns at local, regional and national levels have recently been initiated, but much more work remains to be done.

Nature and biodiversity

As a megadiverse country the United States has special responsibilities for biodiversity and nature protection. Efforts by government and NGOs to conserve natural habitats and species have achieved positive results. During the review period, the already extensive system of *national conservation areas* was further expanded. Many examples exist of effective conservation in protected areas such as wildlife refuges. *Strategic objectives* have been set concerning the protection, maintenance and restoration of natural habitats and ecosystems, with states, tribes, local governments and landowners playing leading roles. *Ecosystem management approaches* have been introduced to improve management of many sensitive areas, including the Great Lakes, Chesapeake Bay, the Florida Everglades, the Gulf of Mexico and numerous watersheds. Federal commitment to wetland protection has evolved from a policy objective of “no net loss” to one of “overall gain” in terms of quality and quantity of wetland surface area; efforts have been made to systematically integrate *wetland protection and reconstruction* objectives into the work of federal agencies. Agri-environmental subsidies have been used to effectively slow the rate of wetland loss on farmland, although they have been substantially reduced in recent years. More *sustainable forestry practices* have been introduced on public land. Special consideration is given to plant and animal communities on the 30% of US land area owned by the federal government, significant portions of which are managed as national parks, national wildlife refuges, national forests or wilderness. This is supplemented by laws and programmes aimed at individual categories of fish, wildlife and plant species, such as the North American Wetlands Conservation Act and the Endangered Species Act. Co-operation with Canada and Mexico on wildlife and nature protection has progressed. An executive order issued in 2004 reinforced federal commitment to using *partnership approaches* to engage states, tribes, local governments and private landowners in co-operative conservation initiatives. The Departments of the Interior, Agriculture and Commerce, as well as the US Environmental Protection Agency (EPA), fund partnership programmes to support *co-operative conservation* measures.

However, as in other countries, *biodiversity is still at risk in the United States*, with more species declining than improving. Particularly at risk are freshwater and anadromous fish, neotropical migratory birds and some birds of prey. Healthy ecosystems form the basis for sustainable economic growth, particularly in sectors depending directly on renewable natural resources or outdoor recreation or tourism; economic development continues to place heavy pressures on life support systems. While the US has an extensive framework of federal, state and local laws, programmes and institutions for managing its biological resources, it has no comprehensive set of

national objectives for managing biodiversity within and outside protected areas, nor a national biodiversity strategy. Among the 1 288 species of plants and animals listed as threatened or endangered, 85% are so categorised primarily because of *loss and degradation of their habitats*; this trend can be expected to continue unless efforts are made to better integrate nature conservation concerns into land management decisions. The spread of terrestrial and aquatic *invasive species* is a further challenge, resulting in economic damage estimated at USD 137 billion per year (equivalent to more than 1% of GDP). Some habitats are being degraded in different parts of the country, including coastal, estuarine and aquatic areas, although such areas are also being protected or restored. Some wetlands are degraded by excessive sedimentation, invasive species and inputs of nutrients and pesticides. *Nature reserves and parks* are subject to increasing pressures (e.g. from motor vehicle use and rising visitor numbers). Programmes such as the Wildlife Habitat Incentives Program, the Conservation Reserve Program and the Wetlands Reserve Program have helped conserve wildlife habitats outside of federal lands, but additional opportunities remain. *Fragmentation of responsibility* and programmes for biodiversity conservation, fish and wildlife management, parks and forest management among a large number of separate agencies makes overall co-ordination difficult and may reduce the effectiveness of individual programmes. Application of the *ecosystem approach* is still in the early stages and the use of biodiversity monitoring networks is not yet operational. The US has signed but not ratified the 1992 Convention on Biological Diversity.

Recommendations:

- prioritise *habitat and species protection efforts*, including rebuilding depleted fisheries and promoting recovery of endangered species, through co-operation among relevant departments and agencies, and public involvement;
- strengthen management of *protected areas* (e.g. national parks, wildlife refuges, marine sanctuaries); continue newly initiated efforts to strengthen *coastal and marine protection*, as well as ongoing *wetland protection and restoration efforts*, using an ecosystem management approach that maximises inter-agency co-ordination and partnerships with landowners, states, tribes and other stakeholders;
- further integrate nature protection concerns in *agricultural and forestry practices*, promoting practices that provide environmental benefits with respect to habitat conservation or reducing pollution by agrochemicals and nutrients;
- expand use of *incentives to promote voluntary wildlife conservation* and seek innovative ways to relieve burdens on landowners from restrictions on the use of their land to protect certain species or habitats;
- strengthen co-operation among federal agencies and between federal government and states, universities, industry and the non-profit sector in the management of *knowledge and databases* concerning pressures on natural ecosystems, the state of ecosystems and species, and the effectiveness of policy responses;
- strengthen and expand the use of *co-operative conservation* approaches to protect habitats and species through voluntary partnerships.

2. Towards Sustainable Development

Integrating environmental concerns in economic decisions

The United States *decoupled several environmental pressures from economic growth* over the review period. Pesticide use and emissions of some air toxics have been strongly decoupled, though most pressures (e.g. energy consumption, road traffic, water abstraction) have been weakly decoupled. The *Government Performance and Results Act* has promoted co-ordination among government programmes through planning methods that are result-oriented and accompanied by measurable indicators of performance. *Co-operation* among various government levels (e.g. in the Brownfields and Land Revitalization Program) has expanded, and this has yielded environmental benefits. *Partnerships* for environmental protection, involving commitments by businesses, non-profits and landowners to voluntary environmental protection, have led to some innovative and effective approaches, which have produced environmental results. Efforts by the Departments of Energy and Transportation to promote *uptake of low-emission fuel* by particular end-user groups are encouraging, although these programmes are in general supported by subsidies and have yet to result in widespread fuel switching. The US has an extensive system of *environmental regulation* at the state and federal levels that generally ensures the integration of environmental concerns in economic decisions. *Research programmes* support development of new technologies for sustainable development, such as hydrogen vehicles and carbon sequestration. Many federal agencies have points of contact on sustainability, and co-ordination is being provided by the Office of the Federal Executive. *Environmentally related tax revenue* increased from 6.9% of US tax revenue in 1995 to 9.3% in 2001.

Recommendations:

- review and revise, as appropriate, *environmentally related taxes* (e.g. in relation to transport, energy, agriculture, forestry, mining) with a view to reinforcing their environmental effectiveness and economic efficiency;
- review and revise, as appropriate, *sector policies and subsidies* that have environmental effects;
- strengthen the integration of environmental concerns into *transport policies and investment plans*, and promote consideration of environmental concerns in *land use planning*;
- continue to make greater use of *economic instruments* to integrate environmental concerns in the *transport sector*, especially through road pricing, fuel taxation and incentives to purchase fuel-efficient and low-emission vehicles and fuels;
- continue to apply *market-based instruments* to internalise the environmental costs of energy use in price signals and to reinforce incentives for *energy efficiency* in the transport, energy and household sectors;
- continue initiatives to make *urban development more sustainable* through approaches such as the EPA's Smart Growth programme, brownfield redevelopment and urban environmental initiatives.

Nevertheless, *room remains for further progress* in integrating environmental concerns into economic policies and decisions. The *pollution, energy, water and material intensities* of the US economy remain high in OECD terms, and the fuel supply is still among the most carbon intensive. Neither *municipal waste generation* nor *land conversion* has been decoupled from population growth. The lack of full internalisation of environmental costs in transport and energy pricing structures causes *market distortions* that undermine efforts to encourage energy conservation and enhance energy security through programmes such as Energy Star and incentives for development of low-emission energy sources. Progress in integrating environmental concerns into *tax policy* has been mixed, with rate differentiation or deductions (e.g. tax deductions for business purchase of sport utility vehicles and for home mortgage interest) sometimes inconsistent with environmental goals. *Environmentally harmful subsidies* remain. *Agric-environmental support* has increased as a share of total payments from 5% to 10%. The recommendations of the 1999 report of the *President's Council on Sustainable Development* have not been fully implemented. At the national level, the periodic publication of national environmental expenditure data was discontinued during the review period.

Integrating environmental and social concerns

During the review period, the United States continued to address *environmental justice* issues, with federal agencies taking actions aimed at reducing environmental disparities for all communities, including minority and low-income communities. In addition, more than 30 states sought to address environmental justice through legislation, policies and initiatives during the review period. The *Brownfields and Land Revitalization Program* is an effective co-operative mechanism to address environmental justice concerns while stimulating urban renewal. *Co-operation with tribal authorities* concerning environmental conditions has increased substantially at the federal and state levels since the 1990s, with capacity-building programmes leading to tribal self-determination in some environmental matters. US citizens generally have good access to environmental information and to courts, where they may petition or bring suit if they believe a federal environmental statute or state or local environmental law has been breached. The EPA issued a Draft Report on the Environment in 2003, and is scheduled to issue its next report in 2006. The EPA has also created Internet-based training for librarians and others to help the public find and use available environmental information via the free Internet access provided by virtually all public libraries in the US. The federal government has adopted performance-oriented environmental management. The advent of "*e-government*" and the substantial increase in electronic means of submitting comments on proposed rules has enhanced environmental democracy. Some *partnerships* involving multiple levels of government (federal, state and local) and stakeholders have resulted in innovative means of achieving conservation and environmental protection goals.

Although a great deal of progress has been made towards integration at the environment-social interface, challenges still remain. Poverty affected 35.9 million people in 2003, and some economically disadvantaged populations near polluting or contaminated sites still suffer greater health risks than other groups. Few *tribes* have been able to satisfy EPA requirements for implementation of federal environmental management provisions, and some of those that have tried face long administrative delays. For a number of tribes, environmental management services remain inadequate.

The production of comprehensive, up-to-date nationwide *environmental information, data and indicators*, and environmental expenditure data, should be further strengthened. Environmental *data quality* is mixed, partly as a result of fragmented data collection and information systems. Despite the substantial progress made since 1996 in assuring public access to the Internet, there is a risk that lower access to the Internet among low-income groups may compromise their *access to environmental information* and consultation processes.

Recommendations:

- continue to encourage the systematic integration of *environmental justice* principles in state government activities and programmes;
- ensure that *tribal communities* have access to safe drinking water; improve solid waste management on tribal lands and reinforce efforts to help tribes reach self-determination as regards environmental matters;
- continue to produce policy-relevant *environmental information and indicators* (e.g. national and state reports on the state of the environment, indicators of performance, information on environmental expenditure) and ensure that it is made available in a timely fashion;
- continue to improve *data consistency and quality* within and among databases and knowledge bases operated by federal and state government agencies, working with NGOs where appropriate;
- continue to promote *environmental education and awareness*, especially at the state and local levels, in co-operation with NGOs where appropriate.

Health and environment

Protecting human health from damaging levels of pollution has long been the fundamental objective driving US environmental policies, and the EPA's mission is to "protect human health and the environment". The country was proactive in taking measures to reduce pollutant exposure in the 1970s, with an early phase-out of leaded petrol and bans on certain pesticides. Through concerted policy action, the frequency of acute pollution episodes and the incidence of environmentally transmitted infectious disease have been minimised. In particular, enforcement of *ambient air quality standards* and partial bans on indoor smoking have reduced the frequency of exposure to acutely harmful levels of air pollution, reaping health benefits that greatly exceed the costs of control. During the review period, raised awareness of the vast economic benefits to be derived from reducing *children's environmental health* risks led to proactive policies, regulations, research, capacity building and international leadership in this area. The US has been among the front-runners in measures to reduce health risks from indoor air pollution, and its efforts have been largely cost-effective. The continued upgrading of *municipal water treatment* capacity, as well as some municipalities' targeted efforts to replace lead pipes, has considerably reduced health risks associated with public water supply. Although cost-benefit analysis is not required in the earliest stages of environmental health policy development, maximising the *cost-effectiveness* of implementation has become a high priority since the late 1990s. Federal *research programmes* continue to improve the scientific basis for policies aimed at reducing environmental health risks, and contribute substantially to international understanding of environmental health issues in the process.

However, with *health expenditure* at nearly 15% of GDP and a number of economic studies pointing out the cost-effectiveness of preventive environmental actions, the United States could still make significant progress towards improving national environmental health. The *environmental burden of disease* is relatively heavy, accounting for up to 20-25% of the overall disease burden. The prevalence of *chronic conditions* (e.g. birth defects, cancer, asthma) with links to environmental exposure is rising, as are related health costs. Some 40% of surface waters are subject to health advisories restricting fishing or swimming, mainly due to elevated mercury and pathogen levels; these advisories lead to a substantial reduction of risk to critical populations. Some 160 million people live in designated “non-attainment areas” for fine particulates and/or ozone. Risks posed by several *indoor air pollutants* remain elevated for certain groups, particularly schoolchildren. Children bear a disproportionate share of the environmental burden of disease, and this entrains significant economic costs. Promulgation of regulations on hazardous air pollutants has been very slow, and evaluation of residual health risks is nascent. *Co-ordination of efforts to improve environmental health* should be strengthened, particularly at the federal level, where responsibility is divided among more than ten institutions; the Healthy People 2010 initiative makes a step in this direction. *Promoting access to nature and outdoor recreation* as a contributor to better public health has historically been a relatively minor but growing objective of US environmental health policy. *National tracking of environmental health trends* has been piecemeal, although the 2002 launch of the National Environmental Health Tracking Program by the Centers for Disease Control and Prevention is an encouraging step. The promised *national children’s health study* is much needed to improve understanding of significant environmental health risks to children, but design of the study is taking longer than expected.

Recommendations:

- develop and implement a *national environmental health strategy*, defining targets and cost-effective measures for reducing the environmental burden of disease, as well as indicators to monitor progress;
- improve *co-ordination among federal agencies* responsible for environmental health management, and among federal and state agencies responsible for implementation; better *integrate environmental health objectives* into general health policy, favouring preventive approaches over technical fixes where the former are shown to be cost-effective;
- launch the planned *national study on children’s health*, giving special attention to monitoring the long-term effects of chronic exposure to pollutants in the environment and in food;
- reinforce efforts to reduce health risks associated with *indoor air quality* (e.g. radon, tobacco smoke, asbestos); set and enforce minimum ventilation standards in building codes so as to limit exposure to high-risk pollutants;
- continue to implement national programmes to reduce *contaminants* (e.g. mercury and pathogens) in *surface waters*, emphasising cost-effective measures to reduce releases at the source, in order to decrease the number of freshwater and beach advisories;
- continue to reinforce measures to ensure that levels of *pesticide residues* and other contaminants do not exceed allowable levels in the food supply, and that established tolerance levels adequately protect *children*.

3. International Commitments

During the review period, the United States maintained a *broad approach to international environmental affairs*, operating through a variety of bilateral, regional and multilateral channels, and *successfully met* most of its environmental policy objectives and commitments. Included in this broad approach are the US free trade agreements, which have incorporated strong environmental commitments, complemented by environmental co-operation agreements and other arrangements. Reduction targets for SO₂ and NO_x in the US-Canada Air Quality Agreement are being met. Co-operation with Mexico under the Border XXI Program achieved important advances in pollution monitoring, contingency planning and public participation, which are being extended through the decentralised, result-oriented Border 2012. The US remained the world *leader in supporting international environmental science and technology* programmes. It supported the design and negotiation of *international agreements* on invasive species, ship anti-fouling systems, vessel inspection, persistent organic pollutants and environmental guidelines for export credit agencies. It met reduction targets for *ozone-depleting substances* under the Montreal Protocol. With US support, the Arctic Council and the North American Commission for Environmental Cooperation have matured into important mechanisms for promoting region-wide integrated environmental management, including involvement of indigenous peoples. US public and private institutions have *embraced the partnership approach* that emerged at the 2002 World Summit on Sustainable Development to support developing and transition economies. The United States has initiated a number of international partnerships focused on *climate change*, including the Methane to Markets Partnership, the International Partnership for the Hydrogen Economy, the Carbon Sequestration Leadership Forum, the Generation IV International Forum and the Group on Earth Observations System of Systems. Nearly 25 states have launched initiatives to address climate change, either alone or with neighbouring states. In some cases they have adopted policies to reduce or register GHG emissions and to prescribe reductions in power plant emissions.

On the other hand, there has been some fragmentation of efforts, with many bilateral, regional and global programmes not fully funded and targets not met on schedule. In the *Great Lakes basin*, progress has been slow in cleaning up contaminated sediments, addressing the problem of invasive species and protecting ecologically vital shoreline habitats. Air and water pollution in the *US-Mexico border region* are still expanding in scope and severity as rapid population growth and urbanisation continue. US estuaries, *coastal waters and near-shore habitats* remain under heavy pressure from development, agricultural nutrient run-off and transport of air toxics. Although the US has not ratified the Kyoto Protocol, it remains committed to the United Nations Framework Convention on Climate Change (UNFCCC). Like most OECD countries, the US has not met the UNFCCC goal of returning GHG emissions to their 1990 level. As the world's largest economy, the US accounts for nearly 21% of global GHG emissions and has one of the highest per capita levels of GHG emissions in the OECD. *Federal climate policy* calls for a goal of lowering GHG emission intensity by 18% by 2012, to be met through a range of voluntary, regulatory and incentive-based programmes. While the US remains a major donor to the *multilateral development banks*, which all operate important environmental programmes, its funding pledges have occasionally been reduced or payments delayed. While the United States has been engaged in domestic legislative efforts necessary to ratify a number of major international agreements, its reputation and influence in multilateral efforts to protect and enhance the global environment are

damaged by its *failure to ratify major international agreements* that it initially advocated and helped design, including the Convention on Biological Diversity and the Stockholm, Basel and Rotterdam conventions.

Recommendations:

- strengthen efforts to improve water and air quality and protect wetlands and natural areas along the northern border (e.g. in the *Great Lakes basin*), building on the working relationships among relevant authorities in Canada and the US;
- ensure that the goals and quantified targets of the *US-Mexico Border 2012 Program* are fully met, with effective state-to-state and region-to-region co-operation and broad-based public participation in programme design and implementation;
- strengthen *national climate change policy*, programmes and implementation, complementing state and industry initiatives and partnerships, and introducing cost-effective voluntary, regulatory and/or market-based instruments, in order to fulfil commitments under the UNFCCC;
- continue to promote the new US vision and strategy to protect the health of the world's *oceans and living resources*; implement the US Ocean Action Plan; promote *ecosystem-based management* of US coastal waters and a stronger role at the global level;
- continue to support *environmental capacity building in developing countries*; provide the funding necessary to meet existing commitments to substantially *increase official development assistance*;
- assure continuous commitment and funding for the *Partnerships for Sustainable Development* that the US promoted in the context of the World Summit on Sustainable Development in Johannesburg;
- expedite *ratification of international environmental agreements* that the US has signed, particularly in cases where the country played a leadership role in their design and negotiation (e.g. Stockholm Convention, Convention on Biological Diversity, Rotterdam Convention).