

## ENVIRONMENTAL PERFORMANCE REVIEW OF KOREA

## EXECUTIVE SUMMARY

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 km<sup>2</sup>, 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.<sup>1</sup> Some 54 recommendations<sup>2</sup> are made that could help strengthen Korea's environmental performance in the context of sustainable development.

**Implementing strengthened environmental policies...**

Achievements since the previous OECD environmental performance review (1997) include striking progress with air management (major cuts in SO<sub>x</sub>, 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

<sup>1</sup> The Objectives of the "OECD Environmental Strategy for the First Decade of the 21<sup>st</sup> 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).

<sup>2</sup> See Annex.

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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 CO<sub>2</sub> 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.

### ***...and integrating better environmental concerns in economic decisions***

Korea succeeded in the review period in strongly decoupling several environmental pressures from GDP growth (e.g. SO<sub>x</sub> emissions, the use of pesticides and fertilisers in agriculture); SO<sub>x</sub> and NO<sub>x</sub> 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 CO<sub>2</sub> emissions are among the highest in the OECD. High priority should be given to further reducing the energy and CO<sub>2</sub> 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

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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.

### ***International commitments met...***

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.

### ***...and to be met.***

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.

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## Annex: 54 Recommendations\*

<b>Environmental Management</b>	<ul style="list-style-type: none"> <li>▪ review and revise, as needed, national, regional and local <u>inspection and enforcement regimes</u>. Increase inspection and enforcement <u>capacity</u> at the local level and strengthen the mechanisms of supervision and evaluation at the national level to ensure effective and efficient implementation;</li> <li>▪ introduce a <u>periodic permit renewal system</u>, and consider introducing <u>integrated pollution prevention and control</u> permits for large stationary sources at the national and regional levels;</li> <li>▪ continue to increase the <u>use of economic instruments</u> (e.g. environmental charges, trading mechanisms) to further internalise environmental externalities;</li> <li>▪ further integrate environmental concerns (i.e. pollution, natural resources, nature concerns) at all levels of <u>land-use planning</u>, 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;</li> <li>▪ strengthen <u>public-private partnerships</u> and industry-driven environmental progress, including for small and medium-sized subcontractors of large firms.</li> </ul>
<b>Air</b>	<ul style="list-style-type: none"> <li>▪ complete and firmly implement the comprehensive air management plan for the <u>Seoul metropolitan area</u>;</li> <li>▪ formulate and implement comprehensive air quality plans (including cost-benefit analyses) for the <u>major cities and industrial complexes</u> outside the Seoul metropolitan area;</li> <li>▪ strengthen the management of <u>hazardous air pollutants</u>: 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;</li> <li>▪ further improve <u>energy efficiency</u> 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;</li> <li>▪ 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 <u>pivotal role of energy issues in sustainable development</u>;</li> <li>▪ ensure that efforts to manage air quality are <u>commensurate with the magnitude of the problem</u>, 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.</li> </ul>
<b>Water</b>	<ul style="list-style-type: none"> <li>▪ further strengthen <u>demand management</u> policies and consistently apply the user pays principle to all categories of users;</li> <li>▪ consider how current water supply, sewerage, stormwater and waste water treatment policies can be harmonised in urban areas to achieve an <u>integrated urban water management</u>;</li> <li>▪ strengthen limits on <u>industrial effluent</u> discharges and increase rates of pollution charges;</li> <li>▪ speed up measures to control <u>non-point sources</u> of water pollution, notably from agriculture, and further reduce point discharges from livestock enterprises, including through a greater utilisation of manure;</li> <li>▪ adopt and implement <u>biological water quality standards</u> for surface waters;</li> <li>▪ ensure that <u>basin-wide flood control plans</u>, regional and local land-use plans, and comprehensive water resource management plans are consistent;</li> <li>▪ consider <u>combining the policy functions</u> for water quantity and water quality.</li> </ul>
<b>Waste</b>	<ul style="list-style-type: none"> <li>▪ further reduce the <u>material intensities</u> of the Korean economy through efficient waste reduction, reuse and recycling;</li> <li>▪ strengthen measures to <u>reduce industrial waste</u> generation (e.g. promoting cleaner production, broadening the scope of the extended producer responsibility system, increasing the rate of the waste treatment fee);</li> <li>▪ further <u>reduce municipal waste</u> generation (e.g. increased cost recovery from the volume-based waste fee);</li> <li>▪ encourage the development of <u>markets for recycled products</u>, including by further extending green government procurement;</li> <li>▪ promote more <u>efficient waste disposal</u> 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);</li> <li>▪ foster <u>public awareness of waste issues</u> (e.g. reducing waste generation, preventing illegal dumping, acceptance of waste infrastructure).</li> </ul>
<b>Nature and Biodiversity</b>	<ul style="list-style-type: none"> <li>▪ give higher priority to nature conservation and biodiversity protection; protect <u>ecologically valuable areas in urban, peri-urban and coastal areas</u>, e.g. by use of land-use planning, prior environmental review and environmental impact assessment; increase attention to landscape values;</li> <li>▪ strengthen <u>funding and human resources</u> 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;</li> <li>▪ increase the actual protection of designated <u>protected areas</u>; streamline the management of these areas by the relevant authorities; minimise the impact of recreational and tourist facilities;</li> <li>▪ strengthen <u>species protection</u>, 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;</li> <li>▪ set targets for nature protection in <u>coastal areas</u> and develop appropriate funding mechanisms to reach them;</li> <li>▪ further <u>integrate</u> nature and biodiversity considerations into sectoral policies and practices (e.g. agriculture, forestry and fisheries);</li> <li>▪ further strengthen <u>scientific knowledge</u> of Korea's natural resources and biodiversity (e.g. through surveys in the Demilitarised Zone and other valuable areas) to support policy decisions; prepare <u>biotope maps</u> at the local level to support the protection of valuable areas; raise <u>awareness</u> of the ecological and economic value of nature, landscape and biodiversity.</li> </ul>

\* These Recommendations were formally approved by the OECD Working Party on Environmental Performance.

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<p><b>Integration environment-economy</b></p>	<ul style="list-style-type: none"> <li>▪ strengthen <u>institutional mechanisms</u> 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;</li> <li>▪ develop <u>economic analysis capacity</u> within the Ministry of Environment;</li> <li>▪ establish an institutional mechanism, such as a <u>green tax commission</u>, to review the environmental effects of fiscal instruments, identify environmentally harmful subsidies, and improve the use of economic instruments;</li> <li>▪ reduce the <u>differential in energy prices</u> (electricity, natural gas) between households and industry, with a view to fostering demand-driven energy planning policy;</li> <li>▪ further reduce <u>energy, material and pollution intensities</u> performance indicators.</li> </ul>
<p><b>Integration environment-transport</b></p>	<ul style="list-style-type: none"> <li>▪ continue efforts to strengthen <u>emission and fuel efficiency</u> standards for vehicles, as well as to improve <u>fuel quality</u>; continue efforts to review various policies to internalise externalities related to transport and the environment;</li> <li>▪ give higher priority to <u>transport demand management</u>, e.g. through road and road fuel pricing; streamline the current <u>economic and fiscal incentives</u> to enhance environmentally sustainable transport;</li> <li>▪ move towards a more environmentally <u>sustainable modal share of freight traffic</u>;</li> <li>▪ pursue efforts to facilitate <u>public transportation in urban areas</u>, e.g. through further expansion of bus-only lanes and integrated fare systems;</li> <li>▪ pursue integration of <u>transport, housing and land-use policies</u> in the context of sustainable development.</li> </ul>
<p><b>Integration environment-social</b></p>	<ul style="list-style-type: none"> <li>▪ further strengthen mechanisms for preventing and resolving <u>environmental conflicts</u>; strengthen and broaden <u>public participation</u>, especially in preparing and implementing development projects and assessing their environmental impact; strengthen the <u>liability legislation</u> in order to better compensate for damage to the environment in line with the polluter pays principle;</li> <li>▪ develop and use <u>environmental indicators</u> 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;</li> <li>▪ 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 <u>National Environmental Health Action Plan</u>; monitor its implementation with appropriate indicators; strengthen management of indoor air quality and <u>occupational health</u>;</li> <li>▪ review and improve <u>water supply</u> management on the basis of equity, efficiency and financing criteria;</li> <li>▪ further raise <u>public awareness</u> of environmental issues and promote sustainable consumption patterns and <u>land use</u>.</li> </ul>
<p><b>International Co-operation</b></p>	<ul style="list-style-type: none"> <li>▪ continue to strengthen and build on Korea's recent <u>expansion of international engagement, co-operation and leadership</u> in regional and global environmental problems;</li> <li>▪ set out in the next national plan on <u>climate change</u> 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;</li> <li>▪ reduce Korea's production and export of <u>ozone-depleting chemicals</u> to ensure that the nation's responsibilities under the Montreal Protocol are fully met on schedule;</li> <li>▪ continue to expand <u>support to developing countries</u> 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;</li> <li>▪ continue to tackle <u>marine pollution</u> problems, including pollution in Korean waters and eutrophication of shallow coastal waters; further strengthen <u>oil pollution</u> prevention, preparedness and response;</li> <li>▪ upgrade Korea's environmental <u>enforcement capabilities</u> 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;</li> <li>▪ enable ongoing multi-national planning, modeling and monitoring programmes on <u>critical regional problems</u> of acid rain, dust and sandstorm pollution, and fisheries management to move into the operational problem-solving phase at an early date;</li> <li>▪ pursue, bilaterally and in concert with other nations and international organisations, a strategy for ensuring sound environmental management of the <u>Demilitarised Zone</u>, including its possible designation as a UNESCO Biosphere Reserve.</li> </ul>

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