



OECD Environmental Performance Reviews

SLOVAK REPUBLIC

2011



OECD Environmental Performance Reviews: Slovak Republic 2011



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Foreword

Since joining the OECD in 2000, and the European Union in 2004, the Slovak Republic has made major strides in protecting the environment and enhancing the quality of life of its people. Despite growing at the fastest rate among OECD countries from 2000-08, the Slovak Republic managed to stabilise or reduce emissions of a range of pollutants. Positioned at the heart of Europe, it has actively pursued environmental co-operation with its neighbours, particularly for the protection of wetlands. However, much remains to be done. The energy consumed, and pollution produced, to generate each unit of GDP is among the highest in the OECD, and Slovakia has paid a high price for a series of floods in recent years.

The Slovak Republic was severely hit by the global economic and financial crisis: GDP fell by about 5% in 2009. Although the economy rebounded quickly, driven by strong external demand, it is still vulnerable to fluctuations in economic activity in its trading partners. To boost living standards durably, the Slovak Republic must raise the productivity and competitiveness of its economy. At the same time, it needs to reinvigorate its environmental institutions after a period of change and instability. Fully integrating environment into its strategy for economic and social development would be the best way to address these twin challenges in a coherent way. In doing so, the Slovak Republic can draw on the OECD Green Growth Strategy that was presented to the annual meeting of Ministers of Economy and Finance in May 2011.

This Environmental Performance Review aims to provide further support to Slovakia's environmental progress. It presents 35 recommendations, with special emphasis on climate change and energy, and the integration of agricultural and environmental policies. Some of the key recommendations are to:

- Develop a new environmental strategy as an integral part of Slovakia's strategy for economic and social development.
- Improve general innovation capacity as a prerequisite for promoting eco-innovation.
- Consolidate the framework for developing and implementing climate, energy and transport policies in a coherent way.
- Make environmentally related taxes more efficient and effective.
- Better target environmental outcomes when designing support schemes for agriculture and rural development.
- Strengthen dialogue and co-operation with business, NGOs and other stakeholders.

This Review is the result of a searching and co-operative dialogue between the Slovak Republic and other members and observers of the OECD Working Party on Environmental Performance. We are confident that this collaborative effort will be useful to advance the policy debate on how best to tackle the shared and common environmental challenges that OECD members and their partners face.



Angel Gurría
OECD Secretary-General

Preface

The principal aim of the OECD Environmental Performance Review programme is to help member and selected partner countries to improve their individual and collective performance in environmental management by:

- helping individual governments to assess progress in achieving their environmental goals;
- promoting continuous policy dialogue and peer learning;
- stimulating greater accountability from governments towards each other and the public opinion.

The present report reviews the environmental performance of the Slovak Republic since the previous review in 2002. Progress in achieving domestic objectives and international commitments provides the basis for assessing environmental performance. Such objectives and commitments may be broad aims, qualitative goals, or quantitative targets. A distinction is made between intentions, actions and results. Assessment of environmental performance is also placed within the context of a country's historical environmental record, present state of the environment, physical endowment in natural resources, economic conditions, and demographic trends.

The OECD is indebted to the Government of Slovakia for its co-operation in providing information, for the organisation of the review mission to Slovakia (26 September-5 October 2010), and for facilitating contacts both inside and outside governmental institutions.

Thanks are also due to all those who helped in the course of this review, to the representatives of member countries participating in the OECD Working Party on Environmental Performance, and especially to the examining countries: the Czech Republic and Portugal.

The team that prepared this review comprised experts from reviewing countries: Ms. Klara Wajdova (the Czech Republic), Mr. Pedro Liberato (Portugal); members of the OECD Secretariat: Mr. Gérard Bonnis, Ms. Ivana Capozza, Mr. Brendan Gillespie, Mr. Krzysztof Michalak, Mr. Tappei Tsutsumi, Mr. Vaclav Vojtech, Ms. Frédérique Zegel, and Ms. Sara Moarif and Mr. Tom Jones (consultants). Ms. Carla Bertuzzi, Mr. Shayne MacLachlan and Ms. Sarah Sentier (OECD Secretariat) and Ms. Rebecca Brite (consultant) provided statistical and editorial support during the preparation of the report.

The OECD Working Party on Environmental Performance discussed the draft Environmental Performance Review of Slovakia at its meeting on 20 June 2011 in Paris, and approved the assessment and recommendations.

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General notes

Signs

The following signs are used in figures and tables:

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

Country aggregates

OECD Europe: This zone includes all European member countries of the OECD except Estonia and Slovenia, *i.e.* Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

OECD: This zone includes all member countries of the OECD except Chile and Israel, *i.e.* the countries of OECD Europe plus Australia, Canada, Japan, the Republic of Korea, Mexico, New Zealand and the United States.

Country aggregates may include Secretariat estimates.

Currency

Monetary unit: Euro (EUR).

In 2009, EUR 1.00 = USD 0.720

In 2010, EUR 1.00 = USD 0.751

Cut-off date

This report is based on analysis up to October 2010 as well as some updated information and data available up to May 2011.

Executive summary

The Slovak Republic is a small, land-locked country at the heart of Europe. Environmental co-operation with its five neighbouring countries is correspondingly important: Slovakia is both a major source and a recipient of transboundary air pollution; it shares watercourses which are subject to floods and transboundary pollution; and it is at the intersection of important ecosystems and hence host to rich biodiversity.

Between 2000 and 2008, the Slovak Republic had the highest rate of growth among OECD countries, even though GDP per capita remains well below the OECD average. Rising wealth generated environmental pressures related to consumption, particularly from transport and waste. At the same time, economic restructuring led to the closure or modernisation of pollution- and energy-intensive manufacturing sectors. The integration into the European Union – the Slovak Republic became a full member in 2004 – supported increased investment in environmental infrastructure, and an upgrading of environmental policies and institutions, though not at the same pace as economic development. As a result, environmental trends are mixed, and the effectiveness and efficiency of environmental measures will need to be strengthened in the future.

The Slovak Republic was severely hit by the global economic and financial crisis: GDP fell by about 5% in 2009. The economy rebounded quickly in 2010, driven by strong external demand. In the medium- to long-term, the Slovak Republic's main economic challenge is to boost the productivity and competitiveness of its economy, particularly in relation to economies in Eastern Europe where labour costs are lower. At the same time, it needs to reinvigorate its environmental institutions after a period of change and instability in the first decade of the century. Developing a new environment strategy as an integral part of Slovakia's strategy for economic and social development would be the best way to address these twin challenges in a coherent way.

Key environmental trends

While GDP increased more than 60% between 2000 and 2008, emissions of most air pollutants (SO_x, NO_x, CO, ammonia, particulates, mercury and dioxins/furans) decreased. Emissions per unit of GDP are in line with the OECD averages. Since 2000, emissions of NO_x from road transport, NMVOCs from solvent use, and particulates from the residential sector have been growing. Heavy metal emissions per unit of GDP remain above OECD Europe averages. Although most air quality standards are respected, particulate matter and ground-level ozone concentrations frequently exceed limit values for protection of human health.

Slovakia enjoys abundant water resources. Effective management of these resources remains a challenge, particularly regarding floods which have imposed significant costs to the economy in the recent past. Despite progress in reducing pollution loads from industry and households, around half of water bodies are at risk of not meeting the good-status

objectives of the EU Water Framework Directive for surface and groundwater by 2015. Assuring adequate quality is particularly important for groundwater, the main source of drinking water for the population.

The material intensity of the Slovak economy fell by nearly 20% between 2000 and 2007, and municipal waste generation grew more slowly than private final consumption. In 2009, municipal waste generated per capita was well below the OECD Europe average, reflecting the remaining gap in GDP per capita compared with many other OECD economies. Overall there has been little progress in diverting waste from landfill – which accounts for 80% of disposal – or increasing recovery. The costs of remediating contaminated sites have been estimated at 1.8% of GDP.

The Slovak Republic hosts a rich diversity of flora and fauna. Forests cover 40% of the territory and more than 20% of the total area is under national legal protection. Overall, trends in biodiversity conservation are mixed: compared to other OECD countries the proportion of threatened species is relatively low for birds, average for mammals and freshwater fish, but high for reptiles, amphibians and vascular plants.

Environmental policies and institutions

Slovakia should be commended for the progress it has achieved in aligning its environmental regulatory framework with the obligations of EU membership. Some initiatives have been taken to simplify and reduce the administrative burden of environmental regulations, and to clarify the business community's obligations. However, further efforts are needed to engage the business community in a constructive dialogue on environmental issues, and to promote a more proactive approach in which environment is seen not just as a threat, but also as an opportunity.

The focus of policy attention should now shift from the development to the implementation of environmental laws and regulations. Although environmental enforcement has become more risk-based, and some efforts have been made to strengthen compliance promotion, the adoption of an explicit environmental enforcement policy could clarify priorities and provide the basis for longer-term planning and performance assessment. More targeted inspection planning could result in efficiency gains, increased flexibility in reacting to potential risks, and improved effectiveness of response to non-compliance and pollution incidents.

Slovakia has developed an impressively comprehensive, policy-relevant system of environmental information. However, more could be done to include information on economic, financial and social aspects of environmental policies. Although access to information has been strengthened in line with EU requirements, historically well-established provisions for public participation and access to justice have been weakened in recent years. Relations between NGOs and the environmental authorities have been difficult, and often adversarial. Public participation in environmental impact assessment and strategic environmental assessment procedures, especially for transport and energy-related projects, has been a particular source of concern. The definition of standing, which determines eligibility to initiate legal proceedings, should be made consistent with that in the corresponding EU directives.

Slovakia has been active in regional environmental co-operation, and, amongst other things, has played a leading role in promoting the Carpathian Wetland Initiative, a strategic partnership involving seven countries. As an economy heavily dependent on trade, further

efforts should be made to address trade-related environmental risks. Further efforts are also needed to meet EU obligations as a donor, including for environmental purposes.

Towards green growth

In 2004, Slovakia introduced a flat tax rate of 19%, covering personal income tax, corporate tax and VAT. The latter was raised to 20% in 2011 to help reduce the government deficit which had risen to 8% of GDP in 2010. Making greater use of environmentally related taxes, and reducing environmentally harmful subsidies could contribute to achieving this objective.

Over the last decade, Slovakia expanded the use of environmentally related taxes by increasing taxes on transport fuels and broadening the energy tax base. However, Slovakia is one of the few European countries that does not tax private car ownership. Nevertheless, due to the relatively low tax burden, environmentally related taxes accounted for 6.6% of total tax revenue in 2009 – which is above the OECD Europe average – and 1.9% of GDP – which is below the OECD Europe average.

Environmentally harmful subsidies have been reduced in the agricultural and energy sectors. However, preferential tax treatment offered to energy-intensive industries provides incentives to increase energy consumption. Electricity generation from domestic lignite has been supported to reduce dependency on energy imports and for social reasons, encouraging the use of this relatively more polluting energy source.

Relatively low revenue from taxes has contributed to a comparatively high reliance on EU funds for environmental infrastructure. In the 2007-13 programming period, about 16% of the budget for Slovakia under the cohesion policy, equivalent to EUR 1.8 billion, has been allocated to the environment. In addition, about EUR 2 billion was allocated to indirect environmental investment, mostly for rail transport but also for renewables and energy efficiency. This assistance has significantly improved the share of the population with access to environmental services and infrastructure. However, further efforts are needed to achieve the service levels in other EU countries. To this end, Slovakia should do more to attract, absorb and efficiently allocate EU funds for environmental purposes.

Eco-innovation could provide a means to address both Slovakia's economic and environmental challenges. However, strengthening the basic innovation capacity – for example through more support for higher education, international co-operation on science and technology, and more engagement of the private and financial sectors – is a key prerequisite for boosting eco-innovation. Environment increased its share of government R&D, growing from 1.3% in 2000 to 2.8% in 2009, slightly above the OECD average. However, much of this goes to traditional environmental areas (air, water, waste) with low potential for inventive activities, rather than to emerging areas that could help boost Slovakia's long-term competitiveness.

Climate change and energy

The Slovak Republic's target under the Kyoto Protocol was to reduce GHG emissions by 8% below 1990 levels in 2008-12. This target was not demanding and may have contributed to the relatively low priority assigned to climate change on the political agenda. In 2009, emissions were more than 40% below 1990 levels, largely because of the restructuring of the economy, a lower share of coal in the fuel mix, and efficiency gains. The overachievement of the Kyoto target resulted in Slovakia having a large surplus of government emission

rights that could be traded in the global carbon market. However, the late establishment of a Green Investment Scheme in 2009 to manage such transactions hindered the effective and transparent use of this mechanism.

GHG emissions stabilised between 2000 and 2008 despite rapid economic growth. This resulted in a marked drop of the energy and carbon intensities of the economy, the largest decreases among OECD countries. However, Slovakia remains among the most energy- and carbon-intensive OECD economies. Emissions are projected to grow in the post-Kyoto period, especially in the transport and industry sectors, creating potential challenges for Slovakia to meet its mid- and long-term reduction targets. To address this challenge, the Slovak Republic will have to further strengthen its policies and institutions, and establish a clear and comprehensive framework linking climate, energy and transport policies. A comprehensive strategy for adapting to climate change is also needed.

Development of the policy package for reducing GHG emissions should take account of the revision of the EU Emissions Trading System for 2013-20. This will establish an EU-wide (rather than national) emissions cap, and auctioning of allowances that are currently allocated for free, thereby providing an implicit subsidy for participating installations. Other measures that should form part of the policy package include: removing subsidies for coal in electricity generation, and exemptions from excise duty for households and energy-intensive industries, with due consideration of potentially adverse social impacts; further promoting energy efficiency, particularly in the commercial and residential sectors; extending to cars the distance-based and emission-differentiated road tolls currently applied to heavy goods vehicles; modernising rail and public transport services and infrastructure, thereby providing efficient and reliable alternatives to road transport; and removing non-economic barriers to the deployment of renewable energies in an efficient and effective manner.

Agriculture and environment

The transition of the Slovak Republic towards a market economy, initiated in the 1990s, substantially reduced environmental pressures from agriculture. Pressures were further reduced in the 2000s due to policy reforms and investments linked to EU accession. As a result, many agri-environmental indicators (*e.g.* nitrogen and phosphorus balances, water use, ammonia emissions) showed positive trends in the 2000s. Nevertheless, agricultural practices still exert important pressures on the environment. Almost 60% of farmland is located in nitrate vulnerable zones requiring protection policies. Soil erosion is a widespread problem for arable land in mountainous (“less favoured”) areas, which make up 50% of agricultural land.

Rural areas account for 86% of the territory and 40% of the population. A significant part of EU farm support is channelled through a harmonised rural development programme that aims to improve competitiveness in the agriculture, food and forestry sectors, promote sustainable farming and forestry, and improve quality of life in rural areas. Although the programme has contributed to a decoupling of support payments from agricultural production and the associated environmental pressures, more could be done to link payments to environmental outcomes. A positive step has been the introduction of payments to help manage biodiversity on Natura 2000 sites which cover a high share of Slovakia’s territory. One outcome of agri-environmental policies is that, in 2009, organic agriculture accounted for 7.6% of farmland, exceeding the 2010 target of 7%. Payments to

less favoured areas have helped maintain extensive forms of farming and prevent land abandonment in areas of high environmental and recreational value.

A fundamental challenge in improving environmental performance in the agricultural sector is property rights. Since transition to a market economy began, there has not been much progress in identifying landowners. As a result, the agricultural land market is not well developed, and 85% of farm operations are on leased land. From an environmental perspective, this reduces incentives to manage farmland in a longer-term, environmentally sound perspective. It also creates problems regarding management of voluntary agri-environmental programmes, which must be implemented for five consecutive years to receive payment.

PART I

Sustainable development

PART I
Chapter 1

Developments since the 2002 review

This chapter presents the main features of the Slovak economy and society as well as its natural resources endowment. It examines progress in the decoupling of environmental pressures from economic growth since 2002. This chapter also outlines the development of the framework for environmental and sustainable development policies, including the institutional setting at the national and subnational levels and the main strategies and policy initiatives launched during the review period.

1. Main features of economic and social development in the review period

1.1. Economic development

The economy of the Slovak Republic is relatively small compared to other OECD countries. Since joining the European Union in 2004, Slovakia has undertaken major economic reforms that helped attract significant foreign direct investment (FDI), boost economic growth and increase living standards. Between 2000 and 2008, Slovakia enjoyed the highest rate of growth in the OECD (Table 1.1). Nevertheless, GDP per capita (in terms of purchasing power parity) remains well below the OECD average and is about two-thirds of the euro-area average. As a small open economy, Slovakia was severely hit by the economic downturn, but economic activity recovered at a strong pace in 2010, driven by exports (Chapter 2). Slovakia adopted the euro in January 2009.

Industry

Although services accounted for the largest part of value-added in 2009, at 61%, industry's contribution¹ of 26% was higher than in most other OECD countries. Between 2000 and 2008, industrial production grew by 77%, the third-highest rate in the OECD, though it declined sharply in 2009 (Table 1.1). Manufacturing – particularly the automobile and electronics industries, which attracted large FDI inflows – was the main driver of this growth. Motor vehicles and electronic equipment are the main exported products. Basic metals (aluminium, iron and steel) and fabricated metal products also account for a significant share of value-added in manufacturing. Over the review period, industry made significant progress in reducing some of its impact on the environment, with declines in most air emissions, waste generation and water abstraction, for example. However, greenhouse gas (GHG) emissions from industrial processes rose between 2000 and 2008, and the share of agricultural land converted to industrial activities grew.

Agriculture

Agricultural production increased by 18% between 2000 and 2008, but dropped by 12% in 2009 (Table 1.1). In accordance with a long-term trend that began in the 1990s, the structure of agricultural output changed: the share of crop production (mostly cereals) rose while that of livestock fell. The share of agriculture in the economy continued to decline, from 4.5% in 2000 to 3.8% in 2010. The sector's share in employment fell from 6.6% to 3.2% in the same period. Slovakia is a net importer of agro-food products. Policy reforms initiated in the 1990s, including the removal of input subsidies, helped reduce environmental pressure from the sector. However, between 2000 and 2008 the use of fertiliser and pesticides increased. Agriculture continues to have adverse effects on water quality and soil erosion, and cessation of farming has had negative impacts on landscape and biodiversity (Chapters 3 and 6).

Table 1.1. **Socio-economic trends and environmental pressures**

	2000-08 % change	2008-09 % change
Selected economic trends		
GDP ^a	62	-5
Private final consumption ^a	52	-0.7
Agricultural production	18	-12
Industrial production ^b	77	-13
Road transport		
Freight transport ^c	36	-6
Passenger, ^d private cars	10	0.1
Passenger cars in use	21	3
Energy		
Total primary energy supply	3	-9
Total final consumption of energy	3	-8
Renewable energy supply	28	21
Selected social trends		
Population	0.2	0.2
Life expectancy at birth	2	..
Ageing index ^e	32	3
Unemployment	-47	27
Selected environmental pressures		
Pollution		
CO ₂ emissions from energy use ^f	-3	-8
Emissions of SO _x	-45	-8
Emissions of NO _x	-12	-11
Resource use		
Water abstractions	-43	-5
Municipal waste generation	16 ⁱ	-2
Industrial ^b waste generation	-6 ⁱ	-39
Domestic material consumption ^{g, h}	24	..
Nitrogenous fertiliser use	21	-12
Pesticide use	15	-11

a) Constant prices.

b) Mining and quarrying, manufacturing, and production of electricity, gas and water.

c) Based on values expressed in tonne-kilometres.

d) Based on values expressed in passenger-kilometres.

e) Number of persons over 65 years old per hundred persons under age 15.

f) Sectoral approach; excluding marine and aviation bunkers; 2008-09: estimate.

g) To 2007.

h) Sum of domestic (raw materials) extraction used by an economy and its physical trade balance (imports less exports of raw materials and manufactured products).

i) From 2002.

Source: OECD, Environment Directorate; OECD-IEA; FAO; national submission to UNFCCC, April 2011.

StatLink  <http://dx.doi.org/10.1787/888932496577>

Energy

During the period of buoyant economic growth from 2000 to 2008, Slovakia's total final consumption (TFC) of energy and total primary energy supply (TPES) increased only slightly, by 3%. In 2009, TPES decreased by 9% with the economic slowdown. Over the decade, structural changes and efficiency gains underpinned a dramatic reduction in energy intensity (TPES per unit of GDP), the largest recorded among OECD countries. Nevertheless,

in 2009 the energy intensity was 13% higher than the OECD average and 36% above the OECD Europe average. Industry remains the major energy consumer, accounting for about one-third of total TFC, a share that has remained stable since 2000. Energy consumption by the transport sector rose by 60% while residential and commercial use decreased by 15%. Compared to other OECD countries, Slovakia has high shares of gas and nuclear power in TPES, while the contribution of renewable energy forms (mainly biomass and waste), although increasing, remains limited (Chapter 5).

Transport

Over the review period, Slovakia saw a boom in road transport – both freight and passenger – to the detriment of rail. The volume of infrastructure investment accelerated strongly, reflecting efforts to compensate for earlier underinvestment in the road network and meet increased demand from the growing economy. In 2009, road haulage represented 77% of freight transport (expressed in tonne-kilometres), compared with 53% in 2000, while rail accounted for 20%, half its share at the beginning of the decade. Similarly, passenger traffic (in passenger-kilometres) using private vehicles steadily increased, accounting for 70% of the modal split in 2009, compared with 30% for public transport. Fleet renewal towards more efficient vehicles and cleaner fuels has helped reduce some air emissions from road transport, but the sector is a growing source of energy use and of NO_x and GHG emissions (Chapters 3 and 5).

1.2. Social development

In 2009, Slovakia had 5.4 million inhabitants. Its population was stable over the decade. The average population density of 110 inhabitants per km² is in line with the EU average. Only 10% of the population live in urban regions; the rest live in intermediate (65%) or rural regions (25%).

The unemployment rate fell by half between 2000 and 2008 but rose in 2009 to 12%, among the highest rates in the OECD. Long-term unemployment as a share of total unemployment is 51%, the highest rate in the OECD, where the average is 24%.

Household income is more equally distributed in Slovakia than in most other countries: in the late 2000s, the Gini coefficient was the second lowest in the OECD. The poverty rate² (8%) was below the OECD average (11%). However, Slovakia is characterised by striking economic, social and environmental disparities among regions. Bratislava generates more than 25% of GDP, attracts most of the FDI and receives the bulk of R&D expenditure. Unemployment is highest in the eastern rural areas and in the Banská Bystrica region, though the gap was considerably reduced over the decade (Chapter 2).

Overall, education levels have improved: the share of the adult population with secondary or higher education increased from 83% to 90% between 2000 and 2008, though the share of the population with tertiary education (15%) is well below the OECD average (28%). In 2007, expenditure on educational institutions as a percentage of GDP was 4%, the lowest in the OECD.

Total health spending accounted for 7.8% of GDP in 2008, compared with an OECD average of 9.0%. Health spending per capita grew, in real terms, by an average of 11% per year between 2000 and 2008, the fastest growth rate among OECD countries (which averaged 4% per year). However, Slovakia ranks well below the OECD average in the amount

spent: USD 1 738 per capita in 2008 (adjusted for purchasing power parity), compared with an OECD average of USD 3 060 (OECD, 2010).

In 2008, life expectancy at birth was 74.8 years, significantly below the OECD average of 79.4 years. The infant mortality rate fell from 8.6 to 5.9 deaths per 1 000 live births between 2000 and 2008 (the OECD average is 4.7). The smoking rate among adults (25% in 2006) is relatively high while the obesity rate (17% of adults in 2008) is lower than the OECD average (21%).

2. Key environmental pressures

Slovakia is a landlocked country located in central Europe, sharing borders with Austria, the Czech Republic, Hungary, Poland and Ukraine (Box 1.1).

Box 1.1. Physical context

Slovakia covers a total area of 49 035 km², extending 416 km east-west and 208 km north-south. Some 96% of the territory lies in the Danube River basin and the rest is part of the Vistula River basin.

Slovakia is a mountainous country. The Carpathians extend across much of the north and north-west: the Little Carpathians, the White Carpathians and the Tatras, which are the highest Carpathian range. The High Tatras include Gerlachovský Štít, the country's highest peak (2 655 metres), along with one of Slovakia's largest national parks. Other important mountain ranges include the Low Tatras in central Slovakia and the Lesser and Greater Fatras in the centre and west. The Slovak Ore Mountains in the east are named as such due to their mineral deposits. South-western Slovakia includes the fertile Danubian Lowlands.

Slovakia has a continental climate, with cold, dry winters and hot, humid summers. Average annual precipitation is 800 mm. Scarcely 18% of Slovakia's surface waters have their origins in the country. The Danube is Slovakia's main navigable river. Other important rivers include the Váh, Hron, Ipel, Nitra, Ondava, Laborec and Hornád. Many small glacial lakes are located in the High Tatra Mountains.

Forests cover 40% of Slovakia. Fir and spruce are common in most mountain areas. At lower elevations, oak, birch and linden predominate. The forests are home to fox, rabbit, deer, bear, lynx, wild cat, squirrel, weasel and muskrat; boar and wolf are occasionally seen in remote mountain areas. Arable and permanent cropland covers nearly 29% of the total land area and permanent grassland 11%. Cropland is mainly devoted to grain (wheat, barley, maize), oilseed, potato and sugar beet. Livestock farming consists of 470 000 cattle, 740 000 pigs, 380 000 sheep and goats and 13.6 million poultry.

Slovakia produces a modest range of mineral products. Aluminium and steel are two of the most significant metal products. Industrial mineral output includes cement, dolomite, lime and magnesite. Brown coal, including lignite, and small amounts of natural gas are produced, but Slovakia depends on imports (mostly from Russia and the Czech Republic) to meet domestic demand for mineral fuel. In 2009, net energy imports accounted for two-thirds of TPES.

Nature and biodiversity

With its geographic position on the edge of the Carpathian Mountains and Pannonian Lowlands, Slovakia supports a rich diversity of flora and fauna. Forest ecosystems play a key role in protecting its biodiversity. Half of these ecosystems have been assessed as

ecologically stable (Chapter 3). However, human activity has put increased pressure on biodiversity. Compared to other OECD countries, the proportion of threatened species is relatively low for birds and average for mammals and freshwater fish, but relatively high for reptiles, amphibians and vascular plants (Figure 1.1). Protected areas cover about 23% of the territory, which is relatively high by OECD standards. Their coverage increased only slightly over the review period. Most protected areas are in low protection categories.

Air pollution

Between 2000 and 2008, emissions of most pollutants (SO_x , NO_x , CO, ammonia, particulates, mercury, dioxins/furans) continued to decline, albeit more slowly than in the 1990s. They fell further in 2009 with the economic downturn. The switch to cleaner fuel, use of advanced technology and reduction of livestock numbers helped further decouple SO_x , NO_x , CO and ammonia emissions from economic growth. Emission intensities are now in line with OECD averages. However, emissions of NO_x from road transport, NMVOC from solvent use and particulates from the residential sector have been growing. Increasing trends are recorded for lead, polycyclic aromatic hydrocarbon and polychlorinated biphenyl emissions. Heavy metal emissions per unit of GDP remain above OECD Europe averages. As in other OECD countries, particulate matter and ground-level ozone concentrations frequently exceed limit values for protection of human health (Chapters 3 and 4).

Greenhouse gas emissions

After a significant fall in the 1990s, greenhouse gas emissions remained relatively stable from 2000, then decreased with the recession. In 2008, GHG emissions (excluding those from land use, land use change and forestry) were 35% lower than in 1990, well below the Kyoto target of -8% for 2008-12. The declining trend was mainly driven by decreases in the energy and agriculture sectors; emissions from industrial processes and from the transport and waste sectors increased (Chapter 5). Between 2000 and 2008, CO_2 emissions from energy use decreased by 3%, resulting in a spectacular fall in the carbon intensity of the Slovak economy (Table 1.1). However, Slovakia ranks among the ten most carbon-intensive economies in the OECD.

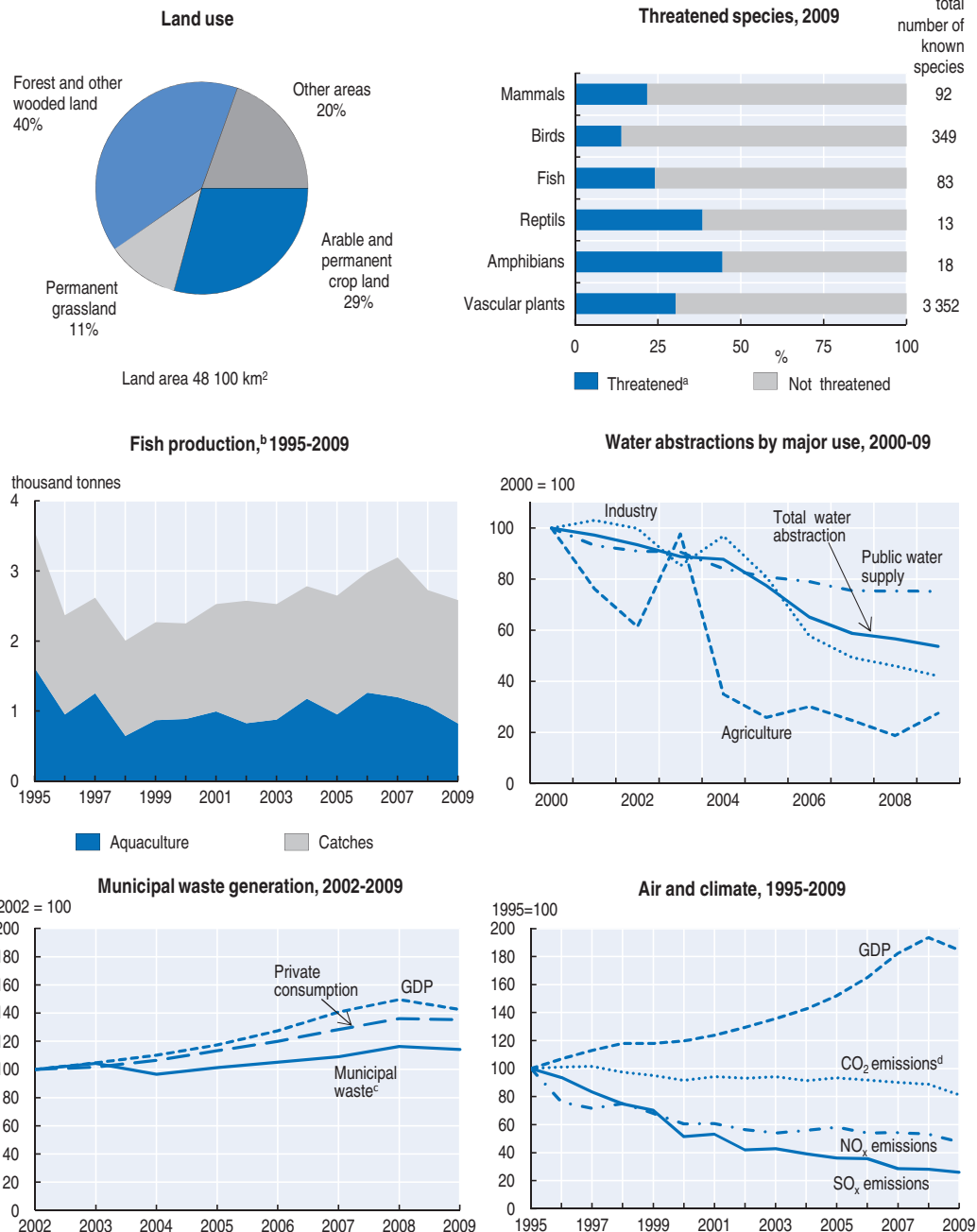
Water

Slovakia's water resources are abundant and evenly distributed. Water abstraction decreased markedly due to the reform of water pricing, structural changes and increased efficiency in water use by industry and agriculture (Figure 1.1). As a result, freshwater abstraction represents less than 1% of available resources, a low water stress rate compared to other OECD countries. During the review period, the share of the population connected to sewerage and wastewater treatment plants progressed significantly, but connection rates remain among the lowest in the OECD (Chapter 3). Water pollution is still a challenge and about half of the country's water bodies are unlikely to meet EU water quality targets for 2015. Over the past decade, Slovakia has been affected by frequent and damaging floods.

Waste, material intensity and contaminated sites

Industrial waste generation was decoupled from economic growth in absolute terms during the review period (Table 1.1). By contrast, municipal waste generation grew steadily to 2008, albeit more slowly than private final consumption, then slightly decreased in 2009 (Figure 1.1). With 300 kg of municipal waste generated per capita in 2009, Slovakia

Figure 1.1. Selected environmental indicators



- a) IUCN categories “critically endangered”, “endangered” and “vulnerable” in % of known species.
- b) Fish catches and aquaculture in inland and marine waters, including freshwater fish, diadromous fish, marine fish, crustaceans, molluscs and miscellaneous aquatic animals. Catches exclude marine mammals, crocodiles, coral, pearls, sponges and aquatic plants.
- c) Waste collected by or for municipalities. It includes household, bulky and commercial waste, and similar waste handled at the same facilities.
- d) Emissions from energy use only; excludes international marine and aviation bunkers; sectoral approach. 2009: estimate.

Source: OECD, Environment Directorate; OECD-IEA (2010), *CO₂ Emissions from Fuel Combustion*; OECD (2010), *OECD Economic Outlook No. 88*; FAO (2011), *FAOSTAT Database*.

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continued to be well below the OECD Europe average, reflecting the remaining gap in GDP per capita with more advanced economies. Although separate collection of municipal waste improved, 80% of municipal waste is landfilled, compared to 40% in OECD Europe. Domestic material consumption increased, but at a lower rate than GDP, leading to a fall in the material intensity of the Slovak economy. Contaminated sites that pose a risk to public health and the environment are a continuing concern (Chapter 3).

3. Framework for environmental and sustainable development

3.1. Institutional framework

Since the public administration reform in 2001, further elaborated in 2003, Slovakia's environmental administrative structure has been based on a four-tier system: i) the Ministry of Environment (MoE), national agencies and the Slovak Environmental Inspectorate; ii) eight regional environmental offices; iii) 46 district environmental offices; and iv) municipalities. The 2003 reform resulted in the delegation of several responsibilities from the national level to regional and district offices and the devolution of decision making to the municipal level (Chapter 3).

The MoE is responsible for air, climate and water protection, waste and risk management, geology and natural resource management, nature and landscape protection, environmental legislation and environmental information. In 2001, spatial planning and construction were transferred to the Ministry of Construction and Regional Development.³ The MoE oversees national institutions dealing with the environment, including the Slovak Environmental Agency, the State Nature Conservancy and the Slovak Environmental Inspectorate.

Municipalities play an important role in managing local environmental issues such as local air pollution, water and waste management, nature protection, environmental impact assessment, and building and land use planning. They may impose fees and grant real estate tax exemptions on environmental grounds.

During the review period, several organisational changes created instability, weakening the effectiveness of the environmental management system. Examples include four changes of minister in 2009, reorganisation of subordinated agencies and a decrease in the number of staff. In July 2010, the MoE was merged with the Ministry of Agriculture, then, in November, reinstated as a separate body.

Until 2011, a Government Council for Sustainable Development,⁴ chaired by the deputy prime minister, was the advisory and co-ordinating body for implementation of the national sustainable development strategy. Since 2005, the Government Office unit that serves as the secretariat of the council has also co-ordinated European affairs, implementation of the Lisbon strategy, and priorities related to the knowledge-based society. EU accession has been the main driver for integrating environmental concerns in economic policies. However, co-operation between the MoE and other ministries has remained weak, in part due to the instability in the second part of the decade (Chapter 2).

Since 2005, an inter-ministerial working group on climate change has co-ordinated the preparation of national allocation plans and national communications on climate change. A high-level Commission for the Climate and Energy Package was established in 2008 under the supervision of the MoE and the Ministry of Economy. It is charged with preparing EU negotiations related to GHGs, renewable energy and development of a national strategy.

The commission regularly reports the outcomes of its activities to the Slovak Government (Chapter 5).

3.2. Strategic framework

The 1993 national environmental policy strategy continues to be the key reference document for environmental policy. The National Environmental Action Programme for 2003-07 (NEAP III), implementing the 1993 strategy and updating NEAP I (1996) and NEAP II (1999), was prepared in 2003 but never adopted.

The sustainable development strategy was adopted in 2001, followed by an action plan in 2005 covering the period until 2010. The plan outlined general goals and priorities related to policy integration. An implementation report on the plan, with input from the various ministries involved, was submitted annually to the government.

The national development plan for 2004-06 and the national strategic reference framework for 2007-13 have been the basic programming documents setting investment priorities, including on the environment, to be supported by the European Union. The framework is also the central document linking the various national strategies, including the 2001 strategy for sustainable development, the 2005 Lisbon strategy for Slovakia and the 2005 national reform programme (Chapter 2).

4. Key environmental and sustainable development initiatives

4.1. Environmental initiatives

Over the review period, environment-related initiatives were mostly driven by Slovakia's obligations as a member of the European Union. Slovakia made intense efforts to transpose the EU environmental *acquis* and adopted many new media-specific acts and horizontal legislation. The overall conformity of Slovak legislation with the EU environmental legal framework is relatively good and was generally accomplished on time. Environmental compliance promotion and access to information were strengthened in line with EU requirements. However, historically well-established provisions for public participation and access to justice have been weakened in recent years (Chapter 3).

Funds received from the EU steadily increased over the period: they contributed 0.3% to gross national income in 2000, 1.2% in 2004 and 1.9% in 2009. This support played a significant role in environmental (including water) investment. Over the decade, environmental priorities shifted: the bulk of investment on air protection was made before and during EU accession, while financial efforts since have been increasingly directed to wastewater treatment, soil and groundwater protection, and waste management (Chapter 2).

Air and climate

Protection of the atmosphere against air pollutants has continued to be a priority. During the review period, Slovakia ratified the 1998 protocols on heavy metals and persistent organic pollutants (POPs) (in 2002) and the Gothenburg Protocol to the 1979 Convention on Long-range Transboundary Air Pollution (in 2005). In 2007, the government approved a national programme for reducing emissions of SO₂, NO_x, ammonia and NMVOC, in line with requirements of the EU Directive on National Emission Ceilings (2001/81/EC). Objectives related to air quality were harmonised with EU standards and a 2010 law transposed the Directive on Ambient Air Quality and Cleaner Air for Europe (2008/50/EC).

Slovakia has been a party to the Kyoto Protocol to the United Nations Framework Convention on Climate Change since 2002. Its individual target is to reduce its GHG emissions by 8% in the period from 2008 to 2012 relative to their 1990 level. Slovakia is not part of the EU burden-sharing agreement for the first commitment period of the Kyoto Protocol. As an EU member state, Slovakia participates in the EU Emissions Trading System (EU ETS) and has to comply with the EU climate and energy package, which translates into the following targets for Slovakia in 2020: i) limit GHG emissions in sectors not covered by the EU ETS to 13% above the 2005 level; ii) increase the share of renewable energy to 14% of gross final energy consumption; and iii) increase the share of biofuel to 10% of the transport fuel mix.

The 2008 energy security strategy aims to save 11% of final energy consumption by 2020 (compared to the average consumption for 2001-05). Slovakia has adopted two national energy-efficiency action plans (in 2007 and 2011) to reach this target. In 2007, the government approved a strategy for higher use of renewable energy sources which was later implemented in the 2010 National Renewable Energy Action Plan.

Water

Following transposition of the EU Water Framework Directive (2000/60/EC) into national legislation, the government adopted a strategy for implementing the directive in 2004 and updated it in 2006. Slovakia undertook the prescribed steps to develop river basin management plans as required by the directive: characterisation of river basin districts (Danube and Vistula), elaboration of water monitoring programmes and development of measures to achieve good water quality status by 2015. After public consultation, the government approved the water management plan in 2010. In 2009, Slovakia presided over the International Commission for the Protection of the Danube River (ICPDR) and promoted timely implementation of the Water Framework Directive.

In 2003, the programme for flood protection for the period up to 2010 was updated. At the 2004 ICPDR ministerial meeting, Slovakia adopted an action programme for sustainable flood protection in the Danube basin to manage flood risk so as to protect human life and property. In 2010, it adopted the Flood Protection Act, transposing the 2007 EU Directive on Assessment and Management of Flood Risks (2007/60/EC). Flood risk management plans, including objectives and measures for mitigating flood impacts, are expected to be completed by 2015 (Chapter 3).

Waste

Over the review period, efforts focused on bringing waste infrastructure into line with EU standards: building and modernising waste separation and recovery facilities and closing or remediating uncontrolled landfills and incinerators. The strategy for waste management was outlined in two national plans approved by the government in 2001 (for the period up to 2005) and 2006 (for the period up to 2010). The 2006 plan established ambitious 2010 targets for increasing material recovery (to 70% of total waste generated) and energy recovery (15%) and for reducing waste subject to landfilling (13%). A new plan for 2011-15 is expected to be approved in early 2012. Major initiatives in the near future include transposition of the Waste Framework Directive (2008/98/EC) into national law and development of strategies for management of health care waste and for hazardous waste management.

An inventory of contaminated sites, including a risk assessment of individual sites, was completed in 2008. In 2010, the government approved a national programme on contaminated sites for 2010-15, identifying particular sites as priorities and defining measures for a range of time horizons (Chapter 3).

Biodiversity

Since the last OECD review, Slovakia has transposed the EU Habitats and Birds directives (92/43/EEC and 2009/147/EC). It set the ambitious target of protecting about 30% of its territory as part of the Natura 2000 network. In 2002, the country updated its action plan for implementing the national biodiversity strategy for 2003-10, reducing the number of strategic objectives. In 2006, the government adopted a nature and landscape protection concept, in line with the EU biodiversity strategy and action plan (Chapter 3).

During the review period, Slovakia became a party to several multilateral agreements on biodiversity, nature and landscape protection including the Cartagena Protocol on Biosafety, the European Landscape Convention and the Carpathian Convention. It adopted a wetland programme for 2003-07 (later updated for 2008-14), along with an action plan for 2008-11. In 2004, Slovakia initiated the establishment of the Carpathian Wetland Initiative, which the Ramsar Convention Standing Committee formally endorsed as a regional initiative in 2009. The initiative aims to improve and co-ordinate implementation of the Ramsar Convention in seven countries of the Carpathian Mountains (Chapter 4).

4.2. Initiatives integrating environmental concerns into sectoral policies

Reflecting the increased emphasis on environmental issues in EU cohesion policy, environmental objectives were given more prominence in Slovak strategies related to economic and social development in order for Slovakia to catch up with EU environmental conditions and standards. As in other new member countries, underdevelopment of environmental infrastructure was identified as a key area for promoting further convergence in social and economic conditions in the regions.

Energy and transport

Environment-related components of Slovak energy policy include increased use of renewable energy sources and improved energy efficiency. Measures to achieve these goals were outlined in the 2007 strategy on energy efficiency and subsequent action plans (2007, 2011), the 2007 strategy for greater use of renewables, the 2008 action plan on biomass use and the 2010 National Renewable Energy Action Plan (Chapter 5).

The 2005 transport policy for the period up to 2015 sought to satisfy increasing demand while decreasing transport's negative environmental impact. The 2007 Operational Programme for Transport, which sets priorities for EU co-financed investment, reiterated the goal of sustainable mobility through development of transport infrastructure and public passenger transport. In 2010, the government approved a strategy for transport development to 2020 that includes promotion of environmentally sound, energy-efficient and safe transport.

Agriculture

Environmental protection has become an important part of Slovak agricultural policy, in line with the EU Common Agricultural Policy. Environmental objectives were implemented

through the 2004-06 rural development plan and the 2007-13 development programme. Agri-environmental programmes from 2004-06, such as payments conditional on adoption of environmental farm management practices, support for conversion of arable land to permanent pasture and payments for organic farming, were strengthened and expanded for 2007-13 (Chapter 6). Environment-friendly forest management is one of three strategic objectives of the 2007 national forest programme.

Environmental, social and regional policy integration

Sustainable regional development is a key objective of EU cohesion policy. The 2004-06 national development plan and the 2007-13 strategic reference framework outlined priorities for narrowing the gap between regions in access to environmental services so as to contribute to Slovakia's economic and social development (Chapter 2).

Integration of environmental and health policies continued through implementation of the National Environment and Health Action Plan (NEHAP). In 2006, the government approved an updated plan, NEHAP III, with special emphasis on children (Chapter 3). It aimed to: i) reduce child morbidity and mortality from drinking water; ii) prevent and reduce health consequences of accidents and injuries to children; iii) prevent and reduce respiratory diseases in children caused by indoor and outdoor air pollution; and iv) reduce risk of disease and disability in children due to exposure to dangerous chemicals such as heavy metals, physical phenomena such as excessive noise, and biological agents (SEA, 2009). However, there is still no integrated approach to environment and health. The Public Health Authority has been given limited resources for implementing NEHAP (WHO, 2008).

Notes

1. Mining and quarrying, manufacturing, and production of electricity, gas and water.
2. The poverty rate is the percentage of people with less than half the median income.
3. In 2010, they were transferred to the Ministry of Transport, Construction and Regional Development.
4. In 2011, the Government Council for Sustainable Development was abolished and merged (along with the Ministerial Council for EU Affairs, Government Council for Regional Policy and Supervision of Structural Operations, and Board of Ministers for Drug Addictions and Drug Control) into a new Ministerial Council headed by the prime minister.

Selected sources

The government documents, OECD documents and other documents used as sources for this chapter included the following.

OECD (2010), *How Does the Slovak Republic Compare*, OECD Health Data 2010, www.oecd.org/dataoecd/43/3/40905158.pdf.

SEA (Slovak Environmental Agency) (2009), *Health and Environment in Slovak Republic, 2008, Indicators report*, Banská Bystrica.

WHO (2008), *Implementation of the conclusions and recommendations of the Environment and Health Performance Review in Slovakia*, workshop report, Bratislava.

PART I
Chapter 2

Greening growth

This chapter discusses the extent to which environment has contributed to the Slovakia's economic growth over the past decade, including environmental measures as part of the fiscal stimulus implemented in response to the global economic and financial crisis. It outlines how EU accession contributed to integrating environmental concerns in economic policies, especially in financing environmental protection expenditures and reducing regional disparities in access to environmental services. Trends in environmentally related charges and taxes, and in removing environmental harmful subsidies, are also assessed. The chapter reviews efforts to promote innovation and eco-innovation as part of Slovakia's longer term goal of boosting the productivity and competitiveness of its economy.

Assessment and recommendations

Between 2000 and 2008, Slovakia enjoyed the highest rate of growth in the OECD. However, the country was severely hit by the economic downturn, and real GDP declined by almost 5% in 2009. The government adopted three separate packages of anti-crisis measures amounting to 0.4% of GDP in 2009 and an estimated 1% of GDP in 2010. Some of these measures were environment related such as projects to increase energy efficiency. In 2010, driven by exports, the economy recovered at a strong pace, but the budget deficit deteriorated badly and unemployment rose dramatically. The new government aims to reduce the budget deficit from 8% of GDP in 2010 to 3% in 2013.

In 2005, the government adopted an Action Plan for Sustainable Development for the period 2005-10. Environment has been further integrated into economic and sectoral strategies, in particular in the national strategic reference framework setting investment priorities supported by the European Union. However, there has been no strong political commitment for environmental policy integration other than to comply with EU requirements. The Environmental Strategy has not been updated and the evaluation of the Action Plan for Sustainable Development was largely formal. Strengthened capacity for economic analysis could provide valuable support for environment-related policy development and implementation.

Over the past decade, Slovakia has broadened the use of economic instruments in environmental policy. It has made significant progress in expanding the use of environmentally related taxes by increasing taxes on transport fuels and broadening the energy tax base. In 2009, environmentally related taxes accounted for 6.6% of total tax revenue which, due to the relatively low tax burden in Slovakia, is above the OECD Europe average. However, they were equivalent to 1.9% of GDP, below the OECD Europe average. It is likely that this share dropped in 2010 due to the lowering of the tax on diesel. Slovakia is one of the few European countries not to tax private car ownership. Vehicles used for commercial purposes are subject to an annual road tax with a legal minimum rate which is not systematically linked to environmental performance. Increased water charges have contributed to more efficient water usage. However, current rates are not sufficient to support environmental infrastructure needs. Taxes and charges are often earmarked for the Environmental Fund and for the Recycling Fund, which may lead to inefficient spending.

Environmentally harmful subsidies have been reduced in the agricultural and energy sectors. However, preferential tax treatment offered to energy-intensive industries provides incentives to increase energy consumption. Electricity generation from domestic lignite has been supported to reduce dependency on energy imports and for social reasons, encouraging the use of this relatively more polluting energy source. Public support to rail transport failed to improve the performance and competitiveness of the sector which has contributed to the shift towards road transport. Reforming environmentally related taxes and environmentally harmful subsidies could contribute to fiscal consolidation.

Since its accession to the EU in 2004, Slovakia has increasingly relied on the EU to finance environmental infrastructure. In the 2007-13 programming period, about 16%

of the budget for Slovakia under the cohesion policy, equivalent to EUR 1.8 billion, was devoted to the environment. In addition, about EUR 2 billion was allocated to indirect environmental investment, mostly for rail transport but also for renewables and energy efficiency. This assistance has significantly improved the share of the population with access to environmental services and infrastructure. However, further efforts are needed to achieve the service levels in other EU countries. To this end, Slovakia should do more to attract, absorb and efficiently allocate EU funds for environmental purposes.

Belatedly, innovation has emerged on the policy agenda as a potentially important driver of growth and long-term competitiveness. The government's innovation policy (2007) and strategy (2008) established the framework for improving Slovakia's poor innovation performance. However, overall innovation capacity remains weak; strengthening it, for example through more support for higher education and international co-operation on science and technology, is a key prerequisite for boosting eco-innovation. Environmental protection has represented an increasing share of the government R&D budget, growing from 1.3% in 2000 to 2.8% in 2009, slightly above the OECD average. However, much of this goes to traditional environmental areas (air, water, waste) with low potential for inventive activities, rather than to emerging areas that could help boost Slovakia's long-term competitiveness. In addition, the engagement of the domestic private sector in innovation, including eco-innovation, is very weak. The number of patent applications in environment-related technologies remains limited. Slovakia needs to galvanise all the relevant stakeholders to strengthen its innovation performance, including in the environmental sector.

Recommendations

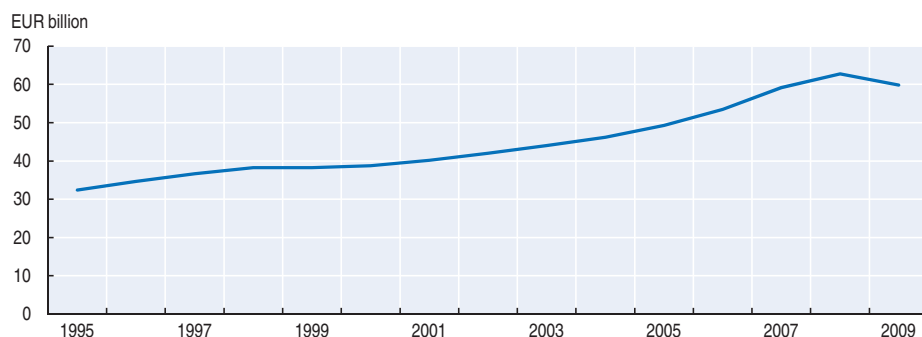
- Review the efficiency and effectiveness of environmentally related taxes in achieving their environmental objectives, and their coherence with other economic instruments.
- Consider extending the annual road vehicle tax to private cars and link the tax rate to environmental performance, particularly regarding carbon and other emissions that may pose risks to human health in urban areas.
- Periodically assess the value-added of the Environmental Fund and Recycling Fund in terms of both their economic efficiency and environmental effectiveness in meeting their objectives; consider options for adjusting the objectives and operation of the funds, including eventually phasing them out.
- Strengthen capacity to attract, absorb and efficiently allocate EU funds for environmental purposes.
- Build capacity for economic analysis to support environment-related policy development and implementation; strengthen co-operation between the Slovak Statistical Office, the Ministry of Environment and other relevant ministries and agencies to develop environmental accounting.
- Improve general innovation capacity through greater support for higher education and international co-operation in science and research; refocus public support for environment-related R&D on selected areas and consider incentives to increase the private sector contribution in this regard; establish innovation clusters or other mechanisms to foster more intensive co-operation among central and local governments, multinational and national enterprises, and universities and the financial sector to promote the development and diffusion of eco-technologies.

1. The environment as a driver of economic growth

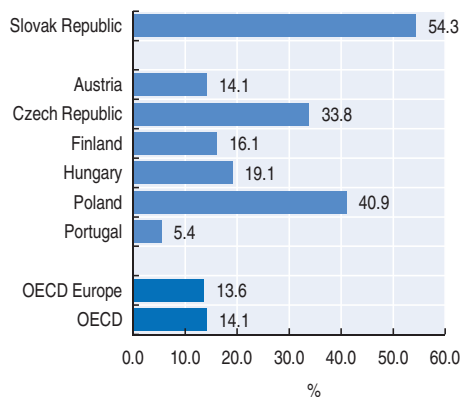
Between 2000 and 2008, the GDP of the Slovak Republic increased by about 6% per year, the highest rate of growth among OECD countries (Figure 2.1). This high growth was underpinned by wide-ranging structural reforms: changes to the tax regime, reforms of the

Figure 2.1. **Economic structure and trends**

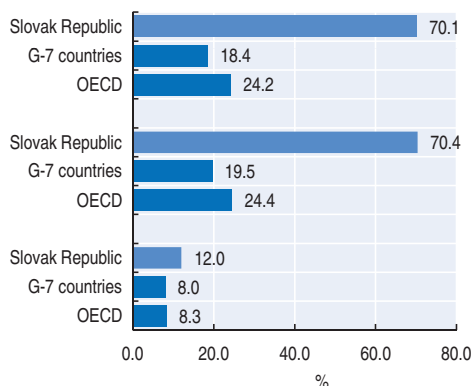
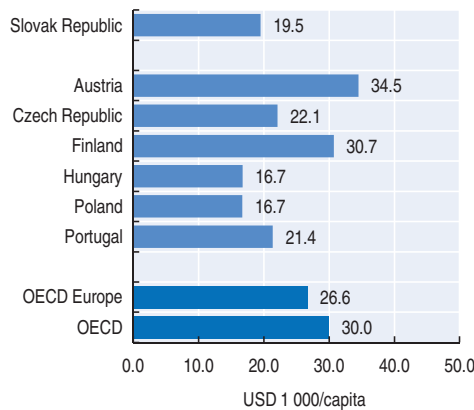
GDP^a in Slovak Republic, 1995-2009



GDP^b growth, 2000-09



GDP^b per capita, 2009



a) GDP at 2005 prices.

b) GDP at 2005 prices and purchasing power parities.

c) % of civilian labour force.

Source: OECD (2010), OECD Economic Outlook No. 88.

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labour market and pension system, and large-scale privatisation. The reforms helped attract significant foreign direct investment (FDI), especially in the automobile and electronics sectors. While the gap in GDP per capita between Slovakia and the more developed OECD economies narrowed, particularly after entry to the EU in 2004, the Slovak indicator was still below the euro-area average in 2009. The benefits of the growth are concentrated in the geographic areas where FDI inflows have been strongest.

The Slovak economy, being small and open, was severely affected by the global downturn in 2009, mainly because of falling demand for exports. Real GDP declined by almost 5% and unemployment rose from 9.5% in 2008 to 14.5% in 2010. In response, the government launched three packages of anti-crisis measures, including tax relief and additional spending (OECD, 2010a). The stimulus packages eventually amounted to 0.4% of GDP in 2009 and an estimated 1.0% of GDP in 2010. The measures were financed by the Slovak national budget, EU funds and other sources, such as the European Investment Bank.

The stimulus packages contained a mix of measures to spur demand in the short term and boost productivity and competitiveness in the longer term. Of particular interest, from an environmental perspective, were projects to increase energy efficiency (*e.g.* interest-free loans for home insulation), energy-infrastructure improvements, a vehicle-scraping programme (Box 2.1), support for business R&D in the form of government subsidies and income tax relief, and new public infrastructure investment.

Increased demand from the country's main trading partners has driven a swift recovery, with GDP up by 4% in 2010. However, a cyclical decline in tax revenue, a rise in social spending and the cost of the stimulus packages put severe pressure on government finances: the budget deficit increased from 2% of GDP in 2008 to 8% in 2009 and 2010. In 2010, the new government approved a fiscal consolidation package aiming to lower the deficit to 3% in 2013. Revenue-raising measures adopted in 2011 include a temporary increase of the VAT rate from 19% to 20% and an 80% tax on excess greenhouse gas (GHG) emission quotas (Chapter 5).

Role of EU accession in integrating environmental concerns in institutions and policies

The importance of integrating environmental issues in economic policy has been recognised since the 1993 Strategy of National Environmental Policy and its implementation programmes, the 1996 National Environmental Action Programme (NEAP I) and NEAP II (1999). The 2001 strategy for sustainable development and associated 2005-10 action plan outlined general goals and priorities related to policy integration. Sustainability of economic, social and environmental processes was re-emphasised in the 2005 Lisbon strategy for Slovakia and in the 2005 and 2010 national reform programmes. It was also a key element of the national strategic reference framework setting investment priorities to be supported by the European Union.

Until 2011, a Government Council for Sustainable Development,¹ chaired by the deputy prime minister, was the advisory and co-ordinating body for implementing the sustainable development strategy and Agenda 21. Since 2005, the Government Office unit that housed the council's secretariat has also co-ordinated European affairs, implementation of the Lisbon strategy and priorities related to the knowledge-based society. EU accession has been the main driver for integration of environmental concerns in economic policies, as it has required adoption of new regulations, reinforcement of

Box 2.1. Car-scraping programmes in Slovakia

The automobile industry has significant weight in the overall Slovak economy, representing about one-fifth of Slovak exports of goods and 8% of total output in 2008. In the first two months of 2009, sales of passenger cars dropped by nearly 40% on a year-to-year basis, and some plants reduced production to a couple of days per week. As part of its fiscal stimulus package, the government launched two car-scraping programmes, in March and April 2009. They applied to private and business consumers purchasing new cars* to replace cars over ten years old. Environmental criteria, such as air emissions and fuel efficiency of the new car, were not included. The basic incentive was EUR 1 000 (EUR 1 500 if the seller reduced the sale price by EUR 500). In the second programme, EUR 1 000 was granted if the seller offered an equivalent reduction.

The measure successfully supported short-term demand for new cars: new registrations from March to September 2009 were 34% higher than the 2008 equivalent, and the scrapping systems contributed to 62% of the sales. The Slovak car industry also benefitted from an increase in external demand linked to scrapping programmes in partner countries such as Germany, which limited the fall in Slovak car production to about 20% in 2009 (EC, 2010a).

By the end of 2009, the government had spent EUR 50 million (0.1% of GDP), and 39 270 new vehicles had been registered with the bonus. The net impact on the state budget, via VAT and administrative fees, was EUR 19 million. Several thousand jobs were maintained. However, given rebound effects such as the drop in sales once the programmes were phased out and reduced private consumption of other goods, the programmes will likely prove to have had a limited impact on GDP over the medium term.

The programmes spurred renewal of the car fleet (vehicles scrapped were more than 20 years old, on average) and a shift in demand towards smaller and more efficient cars. Estimates of total CO₂ emissions saved through the programmes ranged from 0.4% to 1.4% of total 2008 emissions, depending on the factors considered (e.g. additional distance travelled due to the purchase of new cars). The programmes also improved the safety of the fleet, thereby decreasing the cost of injuries (IHS, 2010).

Overall, the scrapping programmes had a clear stimulus benefit and, with similar programmes in other EU countries, positive spillover effects. However, from a medium- and long-term perspective, the economic and environmental benefits of the Slovak measures are limited. Such programmes create market distortions that can prevent necessary structural adjustments, and they are not the most cost-effective ways to reduce GHG emissions (OECD, 2009a).

* Passenger cars (M1 category) costing less than EUR 25 000.

environmental controls, environmental impact assessment of plans and programmes, and analysis of planning coherence, while providing financial assistance for environmental investment.

However, there has been no strong political commitment for environmental policy integration other than to comply with EU requirements. The Environmental Strategy has not been updated, the 2005 action plan for sustainable development was prepared under pressure from the European Commission and the monitoring of its implementation was largely formal (Sedla ko M., 2007). Some progress has been made in integrating climate change and energy policies but more should be done to integrate environment in other sectoral policies and to strengthen co-operation among ministries. The instability of the

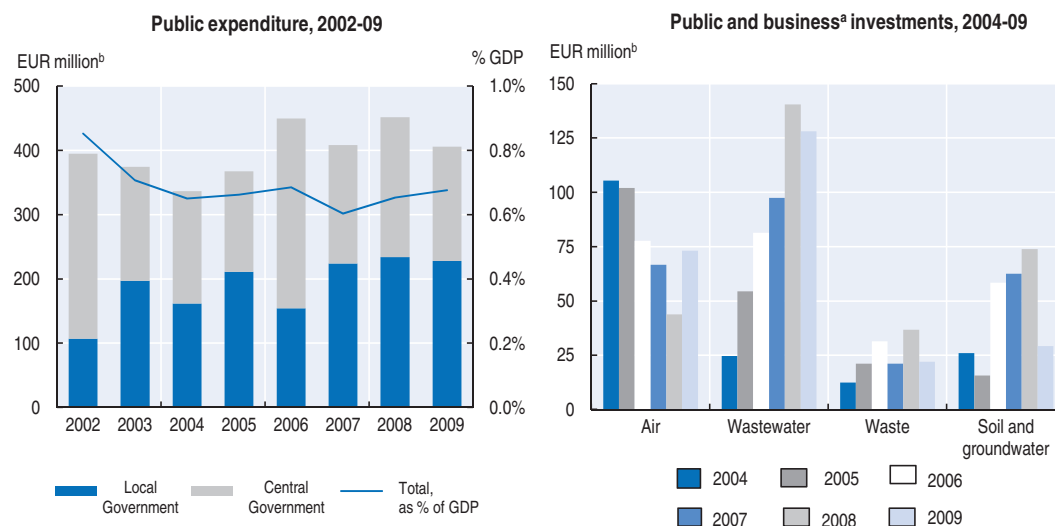
Ministry of Environment (MoE) in the second part of the last decade contributed to the low profile of environment in government policy (Chapter 3). As Slovakia develops its policies to boost economic productivity and competitiveness, more attention should be given to how environment, including eco-innovation, could form part of this effort.

Despite a more systematic evaluation of environment-related policies, there is a lack of capacity for analysing their economic costs and benefits. This capacity should be built in the MoE and further enhanced through improved co-operation with relevant ministries (e.g. Transport, Construction and Regional Development, Economy, Finance) and agencies (Slovak Statistical Office).

2. Environmental expenditure and financing

According to the Slovak Statistical Office, public and business environmental protection expenditure² as a share of GDP fell by about half from the mid-1990s to 1.1% in 2009. Since 2002, public³ environmental protection expenditure had decreased from 0.9% to 0.7% of GDP, putting Slovakia slightly below the OECD average (0.8%) in 2009. As part of the decentralisation process, state budget expenditure was reduced while local government spending rose markedly to account for more than 60% of public environmental outlays in 2009 (Figure 2.2).

Figure 2.2. **Environmental protection expenditure**



a) Includes municipalities and enterprises with 20 employees or more.

b) Constant 2005 prices.

Source: OECD (2011), *OECD National Accounts Database*; Slovak Statistical Office.

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Although growing in real terms, public and private environmental investment remained around 0.4% of GDP over the review period. However, there was a shift in environmental priorities. While the bulk of investment on air protection was made prior to and during EU accession, financial efforts since then have been increasingly directed to wastewater treatment, protection of soil and groundwater, and waste management (Figure 2.2). Between 2004 and 2008, wastewater investment rose almost sixfold, investment in waste, soil and groundwater tripled, and investment in air protection fell by more than half. Since 2007,

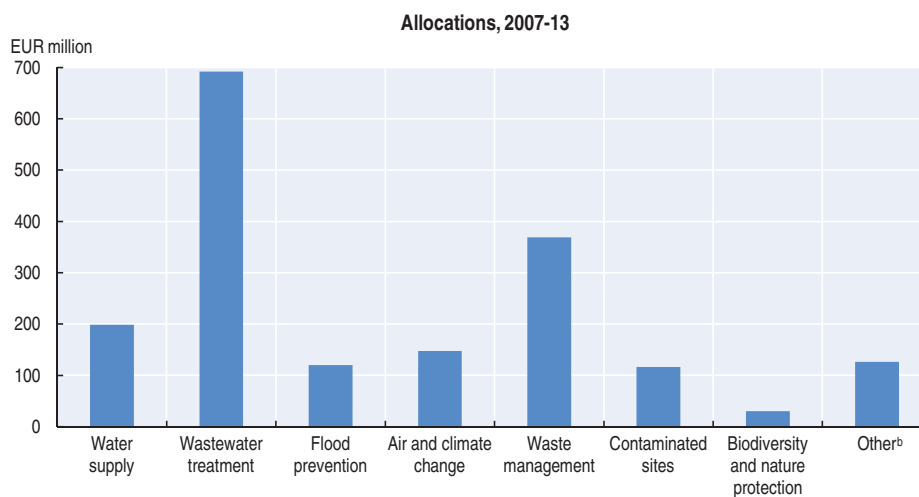
electricity, gas and water supply have been the main sectors investing in environmental protection, outstripping the manufacturing industry (basic metals, refineries), which invested the most in air protection.

Financing environmental protection

EU funds have steadily increased over the last decade, contributing 0.3% to Slovak gross national income in 2000, 1.2% in 2004 and 1.9% in 2009 (EC, 2010b). This support has played a significant role in environmental investment (including water supply): EU funding accounted for about two-thirds of public expenditure on the environment in 2008 (EC, 2010c). Before accession, Slovakia benefitted from various instruments aiming at gradual adoption of the EU environmental *acquis* (Phare programme) and funding for environment infrastructure (through ISPA,⁴ the Instrument for Structural Policies for Pre-Accession). Upon accession in 2004, the financing level increased with access to Cohesion and Structural Funds. In the 2004-06 programming period,⁵ more than EUR 400 million of EU funding⁶ was spent on environmental infrastructure, mostly for water.

In the next programming period, 2007-13, environmental protection was set as the second priority for EU funding, after transport. The total budget allocated to the operational programme for environment amounted to EUR 2.1 billion, including EUR 1.8 billion of EU funds (mostly Cohesion Fund). This represents about 16% of the total budget allocated to Slovakia under the cohesion policy. The water sector (wastewater treatment and water supply) remains the priority sector, with 50% of the allocated funds, followed by waste management (20%), air quality and climate change (8%), flood prevention (7%) and contaminated sites (6%) (Figure 2.3). In addition, about EUR 2 billion was allocated to indirect environmental investment in areas such as rail transport, renewable energy and energy efficiency (EC, 2010d).

Figure 2.3. EU funds^a for environmental investments



a) Includes Structural (13%) and Cohesion (87%) Funds.

b) Other measures to preserve the environment and prevent risks; promotion of clean urban transport; preparation, implementation, monitoring and inspection; evaluation and studies; information and communication.

Source: Operational Programme Environment, MoE.

StatLink  <http://dx.doi.org/10.1787/888932496083>

EU financial assistance has contributed to major improvements in the water sector: the share of population connected to public water supply rose from 83% in 2000 to 86% in 2009. The connection rate for public wastewater treatment progressed from 51% to 58%, compared with an average of 81% in OECD Europe. In the waste sector, about a hundred separation and recovery facilities were built or modernised over the decade. EU funds also contributed to the closure or remediation of uncontrolled landfills and incinerators. Nevertheless, while landfilling accounts for about 40% of municipal waste treatment in OECD Europe, 80% of waste is landfilled in Slovakia. The estimated financing gap for compliance with the EU Urban Waste Water Directive will amount to EUR 1.8 billion in 2015 (MoE, 2010).

Slovakia performed relatively well in absorption of EU funds over 2004-06, compared with other countries that joined the European Union in 2004 (EC, 2010e, 2010f). Yet, at the end of 2009, it was not as effective as other new members in drawing EU funds for the 2007-13 programming period, in particular funds related to the environment. The task was more difficult for new members because the significant increase in the assistance granted, combined with the overlap of the two programming periods, increased the need for administrative capacity. In addition, the large scale of the environmental projects concerned meant that longer preparation times were necessary. However, the challenge in Slovakia was more acute because the worsening of local government finances made it difficult to raise national matching funds, and changes in ministry responsibilities complicated matters⁷ in relation to EU funds (K. Frank, 2010a).

Between 2004 and 2009, Slovakia received EUR 64 million from the European Economic Area and Norway grants.⁸ One-quarter of it was aimed at projects on environment and sustainable development. The largest projects concerned modernisation of public street lighting and establishment of water management infrastructure in the town of Tvrdošín. Under the 2009-14 agreement, climate change is the largest priority. Out of EUR 81 million allocated to Slovakia, EUR 27 million is earmarked for programmes on adaptation to climate change and green industry innovation.

In the context of a 2007 framework agreement between the Swiss Federal Council and the Government of the Slovak Republic,⁹ Switzerland allocated CHF 67 million (about EUR 41 million) to Slovakia for 2008-12. The main priorities are the development of structurally weak regions in eastern Slovakia and improvement of environmental and basic infrastructure. The “environment and infrastructure” thematic focus represents around 40% of the total funding, most of it for the modernisation of wastewater treatment and waste infrastructure. Remaining funds were allocated to nature protection and support to non-government organisations (NGOs).

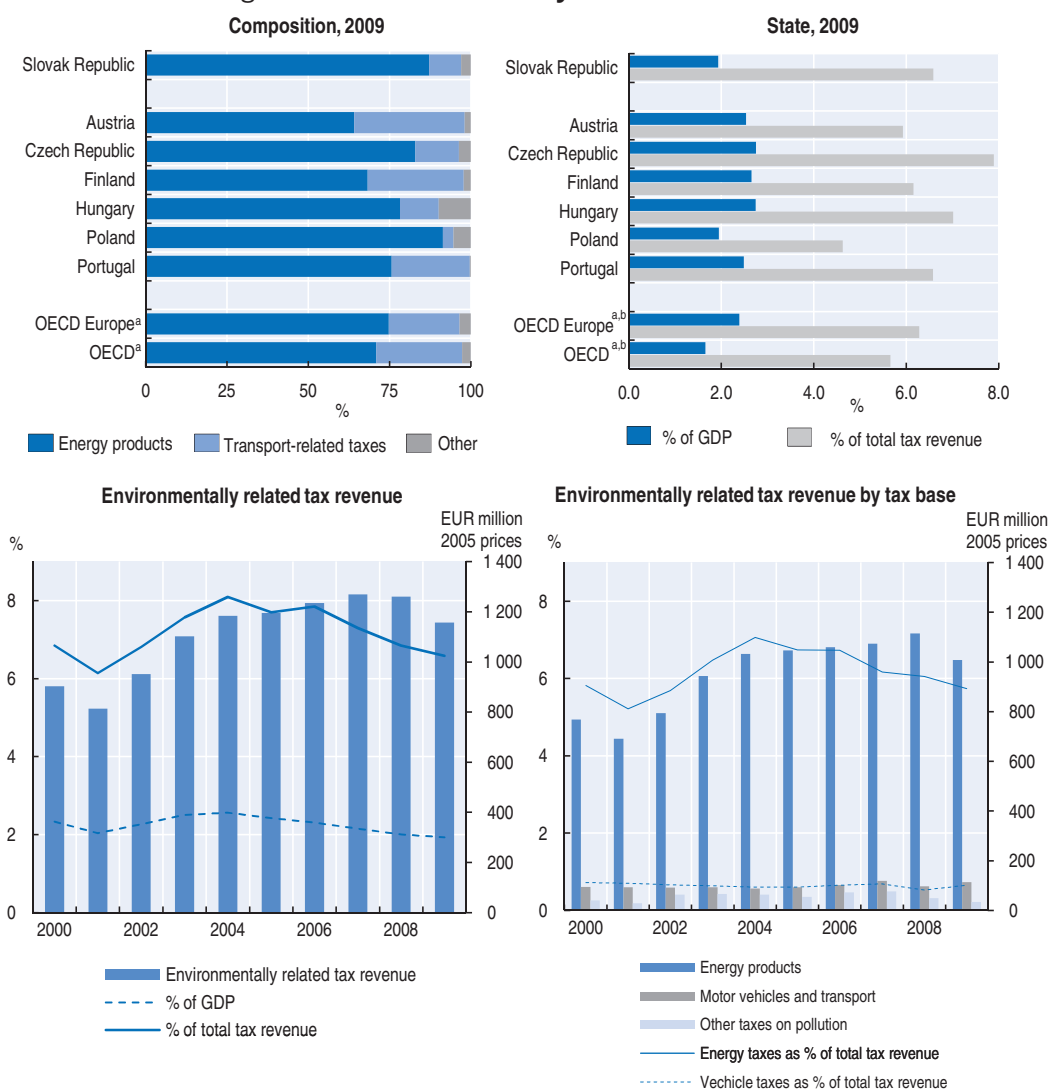
In sum, further effort is needed to meet the standards for environmental infrastructure typical of other EU member states. To this end, Slovakia must make the most of the opportunities provided by EU membership and ensure that EU funds are efficiently attracted, absorbed and disbursed. This is not just about constructing infrastructure; it is also about developing capacity for effective programming and project implementation. The experience of some other EU countries, such as Portugal, could be helpful in this regard (OECD, 2011). The Slovak authorities should redouble efforts to work with the European Commission to address bottlenecks in programme delivery and to target investment priorities where performance has been slower. As EU assistance decreases, Slovakia will have to shoulder more of the burden of developing and operating environmental infrastructure. This implies greater reliance on user charges. Opportunities for more involvement by the private sector should also be assessed.

3. Environmentally related taxes

Since the last OECD review, the overall tax burden in Slovakia has fallen. A fundamental tax reform in 2004 equalised rates for personal income tax, corporate tax and value-added tax at 19%. Since 2000, the tax revenue to GDP ratio has decreased by nearly five percentage points. In 2008, it was 29%, well below the OECD average of 35%. Social security contributions (41%, the second highest share in the OECD) and consumption taxes (36%) were the largest source of general government revenue.

In 2009, environmentally related tax revenue accounted for 1.9% of GDP and 6.6% of total tax revenue. Given the generally low level of taxation, this placed Slovakia below the OECD Europe average in share of GDP, but above the average in percentage of total revenue (Figure 2.4). From 2000 to 2008, environmental tax revenue rose in real terms by 40%, then

Figure 2.4. Environmentally related taxes



a) Data refer to all current OECD member countries.

b) Weighted averages.

Source: OECD/EEA Database on instruments used for environmental policy; OECD (2010), OECD Economic Outlook No. 88.

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decreased by 9% in 2009 with the economic slowdown. Excise duties on energy products provide the bulk (87%) of the revenue, followed by taxes on motor vehicles (10%) and other taxes on pollution (3%).

Taxes on energy products

Energy-related tax revenue in Slovakia is almost completely accounted for by taxes on transport fuel. This is common in new EU states that were granted temporary exemptions or reduced taxation for other energy products under the Energy Tax Directive (2003/96/EC) (EC, 2010g).

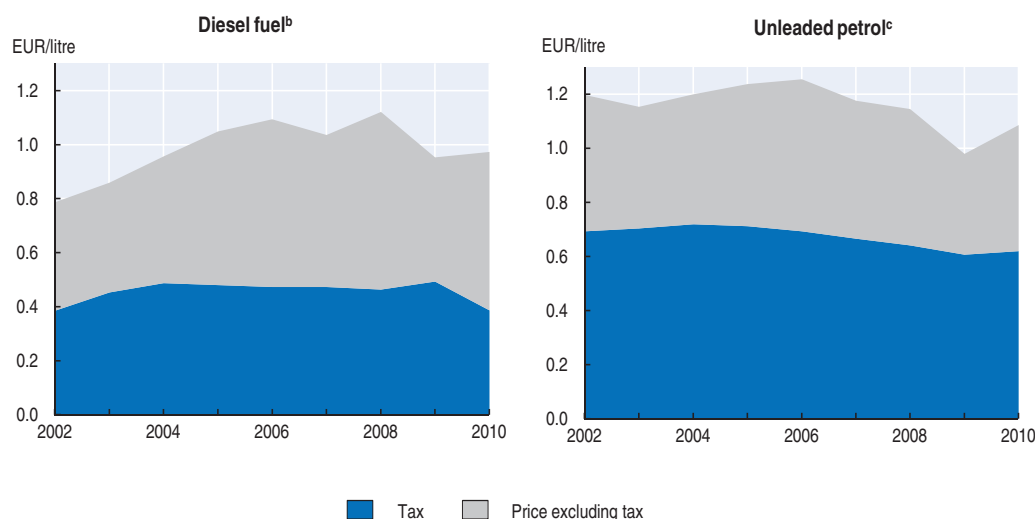
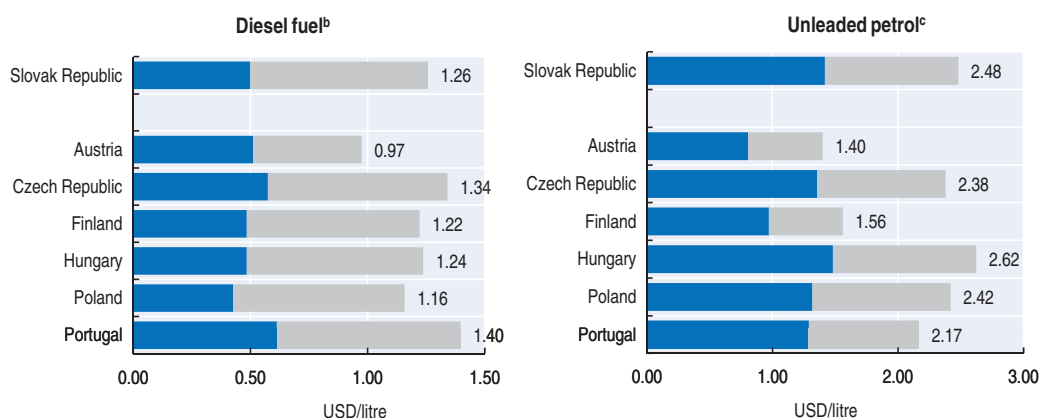
Since 2008, Slovakia has collected excise duties on electricity, coal and natural gas, but their share of revenue was limited in 2009 due to the transitional period granted.¹⁰ Since 2000, the implicit tax rate on energy¹¹ had risen significantly in real terms. As the 2002 OECD Environmental Performance Review recommended, Slovakia initiated a shift from labour taxation towards less distorting taxes on consumption, including on energy products. However, after EU accession, taxes on petrol and diesel were not adjusted for inflation. Related revenue continued to grow, albeit more slowly, due to high growth in road haulage and related diesel consumption (Chapter 5). The low price elasticity of demand indicates potential for tax increases on road fuel. However, the government in 2010 reduced excise duties on diesel in order to compensate road haulers for increased costs incurred by new road tolls, and also to induce transit carriers to refuel in Slovakia (IREF, 2011) (Figure 2.5). According to the Ministry of Finance, this change resulted in 15% growth in diesel consumption, which did not offset the drop in revenue due to the lower diesel rate. Therefore, the government should reconsider the diesel tax rate from the perspectives of both the environmental impact and the effect on the budget deficit. Nevertheless, tax increases have to be set against their social implications. In 2010, despite the reduced excise duty on diesel, diesel and unleaded petrol prices for households remained, respectively, 37% and 38% higher in Slovakia than in OECD Europe (in terms of purchasing power parities).

Notwithstanding a decline in residential energy consumption, the share of electricity, gas and other fuels in household expenditure has increased over the past decade due to the rise in real price of energy: it reached 11% in 2008, compared to 4% in the European Union. Reacting to higher prices, some households have switched from gas to wood for heating, with adverse impacts on air pollution. Further increasing excise duties on energy products could reinforce this trend. It could be offset by introducing compensatory measures not linked to energy consumption to maintain incentives to use energy more efficiently. Such transfers could be funded with the gains in tax revenue. Raising public awareness on the health impact of wood burning should be among the measures to support a shift towards the use of cleaner fuels.

Vehicle taxation

Taxation of motor vehicles accounts for a smaller share of environmentally related tax revenue in Slovakia than in other OECD countries. The key reason is the lack of a tax on private car ownership. Vehicles used for commercial purposes are subject to an annual tax, with a legal minimum rate based on weight and number of axles for trucks and on cylinder capacity for passenger cars. A 50% refund of the motor vehicle tax can be claimed for vehicles used at least 60 times during the tax period for combined transport. The law¹² includes provisions for reducing the rate on vehicles meeting higher emission standards.

Figure 2.5. Road fuel prices and taxes

Trends in Slovak Republic,^a 2002-10State,^d 2010

a) At constant 2005 prices.

b) Automotive diesel for commercial use.

c) Unleaded premium (RON 95).

d) Diesel fuel: at current prices and exchange rates; unleaded petrol: at current prices and purchasing power parities.

Source: OECD-IEA (2011), *Energy Prices and Taxes Database*.StatLink  <http://dx.doi.org/10.1787/888932496121>

Since 2004, regional authorities have collected the motor vehicle tax. Some have based the charges on vehicle emission categories. The share of cleaner vehicles in the fleet would be increased if the taxation were broadened to all vehicles and the rates more systematically differentiated by emission levels.

All vehicles using motorways must carry a tax disc, which in 2010 was replaced by an electronic road toll for trucks. This change is expected to reduce congestion, harmonise conditions in the transport market and raise funds for highway financing and maintenance. It was also expected that about 10% of existing road freight would shift to

rail, alleviating some environmental problems.¹³ Although the charge is not recorded as an environmentally related tax, it is based on distance travelled and vehicle emission category and is therefore directly connected to the underlying environmental harm caused by transport activity.

Other environmentally related charges and taxes

Although most revenue from environmentally related taxes¹⁴ stems from road fuels and motor vehicles, Slovakia imposes taxes on other environmentally harmful activities and products. These instruments were in place at the time of the 2002 OECD review. In 2008, charges on products for recycling, and on air and water pollution, generated the most revenue among these other instruments. Pollution taxes (*e.g.* on NO_x emissions and landfills) are low in comparison with other OECD countries, which limits their deterrent effect. For example, the landfill tax has not resulted in a reduction in the amount of waste landfilled. On the other hand, transitional non-compliance fees that have been added to basic rates of taxes on landfill and air pollution have proved successful in meeting EU technical requirements and contributed to the closure of obsolete installations (Chapter 3).

Revenue from environmentally related charges on water abstraction and supply and on waste and wastewater treatment amounts to around one-third of the level of environmentally related taxes. These charges rose considerably over the last decade, especially in the water sector, where cross-subsidies between households and other users were progressively removed. This change contributed to the dramatic fall in water consumption. However, current charge levels are not sufficient to support infrastructure needs. According to the MoE, cost recovery for provision of wastewater treatment could be improved by better differentiating the charges and taxes according to the pollution load (Chapter 3).

Charges are often earmarked for the Environmental Fund, where they become available for allocation to general environmental priorities. The current fund was established in 2005¹⁵ to help small municipalities finance environmental protection measures. The demand for financing from the Environmental Fund exceeds its financial capabilities by a factor of 10 to 12. Charges on products for recycling accrue to the Recycling Fund (Chapter 3). Generally, earmarking may counteract the polluter pays principle and may lead to inefficient spending unless there is a clear environmental justification for the expenditure and the operation of the fund is regularly reviewed to ensure that expenditure is cost-effective and still in line with objectives. The operation of these funds should be subject to such review.

Tax expenditure and subsidies

In 2004, the introduction of a flat tax in the Slovak Republic was combined with a significant elimination of tax relief measures, some of which had provided perverse environmental incentives. A number of such provisions remain, however, particularly in the energy sector. In 2010, it was estimated that their removal could provide potential revenue gains of EUR 120 million, around 10% of total environmental tax revenue or 0.2% of GDP (OECD, 2010a). In 2011, as part of the fiscal consolidation package, and in line with obligations under the related EU directive, the government removed tax exemptions on coal and natural gas used by district heating companies, on compressed natural gas

and liquefied petroleum gas used as fuel. Minimum standards for biofuel were fixed with reduced rates. Reduced rates on marked gasoil used in agriculture were also repealed. However, exemptions favouring some energy-intensive industries remain, such as that for electricity used for industrial production if the costs of electricity represent more than 50% of the average own costs of the product manufactured.

Since the 2004 reform, businesses have been able to benefit from income tax credits on expenditure related to environmental protection activities, such as forest cultivation, rehabilitation of land affected by mining, closure and remediation of landfills and disposal of electrical and electronic waste collected from households. Property taxes can be reduced by 50% on certain land for environmental uses, including marshes, windbreaks, buffer zones for water resources and protected areas, or for land with reduced economic value due to pollution. The construction tax for water management can also be so reduced. There has been no assessment of the actual use of these legal provisions or of their cost.

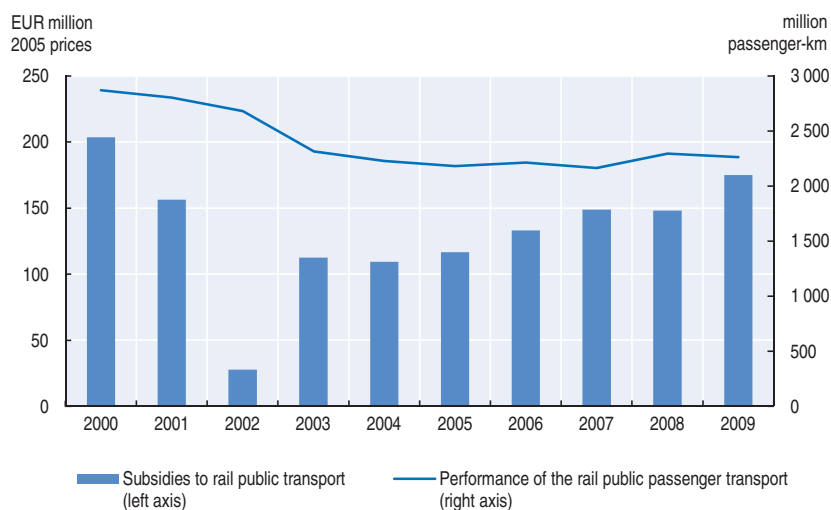
Subsidies to energy

The Ministry of Economy provides several energy subsidies which have an impact on the environment. They include: support for modernising public lighting for municipalities (2010 appropriation: EUR 18 million); installing solar collectors and biomass boilers by households (2010 planned funding: EUR 8 million); increasing energy efficiency in production and consumption; and introducing advanced technology in the energy industry (2010 appropriation: EUR 12 million). Slovakia supports renewable energy sources through feed-in tariffs for electricity production. Finally, coal generation is supported mainly for energy security reasons, but also to compensate the social impact of mine closures (EUR 30 million in subsidies allocated over 2005-10). Moreover, up to 15% of electricity generation from domestic lignite can be subsidised.

Subsidies to transport

Between 2000 and 2008, energy use in the transport sector and related GHG emissions increased faster than GDP. The rise in energy consumption was caused by a boom in road transport, to the detriment of rail. Major investment in rail and road infrastructure was financed by EU funds¹⁶ and the state budget, and still more investment is expected in the period to 2013. Although motorway construction absorbed the bulk of this investment, support to rail was allocated an equivalent share of funding in the 2007-13 programming period. However, the government is considering reallocating support from education, R&D, employment, social inclusion and rail towards motorway construction.

Public transport by rail, road and water is supported through exemptions on energy taxes. The Ministry of Transport grants subsidies covering losses by the railway infrastructure operator and the rail transport provider through a contract based on performance of services in the public interest (Figure 2.6). These subsidies have hampered the competitiveness of the rail sector, contributing to the financing gap for investment in rail infrastructure (OECD, 2007). Low performance by the railways has been a factor in the shift towards road transport. More effective use of EU funds could help halt or reverse this trend.

Figure 2.6. **Subsidies and performance of rail public transport**

Source: Ministry of Transport; Slovak Statistical Office.

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The operational programme for transport, which sets the investment priorities for 2007-13, has undergone a strategic environmental assessment. The EU co-funded programme is expected to have a positive influence on the environment of urban areas in Slovakia. The assessment also concluded that adverse effects on protected areas and landscape were not significant, leaving mitigation measures to be addressed in environmental impact assessment (EIA) of individual projects. EIA of motorways has been a controversial issue in Slovakia and some projects have been cancelled or postponed because they did not consider environmental issues sufficiently. Currently there is no instrument to offset the negative impact of infrastructure development on protected areas (Chapter 3).

4. Promoting eco-innovation and environment-friendly products

Innovation and eco-innovation policy frameworks

Structural reforms, along with low levels of taxes and wages, have made Slovakia one of the most attractive places for foreign direct investment (FDI) in the European Union. However, rising income and currency appreciation are reducing this advantage, and some multinationals have started to move production to eastern Europe and Asia. Thus, Slovakia faces the challenge of shifting to higher value-added production and increasing its productivity and competitiveness.

The need to promote innovation to build a knowledge economy and maintain long-term competitiveness was integrated in the government agenda in 2006 with adoption of Slovakia's Lisbon strategy¹⁷ (EC, 2009). Several key policy documents were adopted in the following years: the 2007 innovation strategy, the 2008 innovation policy, the National Reform Programme for 2008-10, the operational programmes for competitiveness and economic growth and for research and development, and the 2008-10 strategy implementing the long-term objective of the state science and technology policy up to 2015.

The Ministry of Education is responsible for science and technology policy while innovation issues are handled by the Ministry of Economy and its agencies,¹⁸ including the National Innovation Agency, which manages most innovation measures supported by EU

Structural Funds for 2007-13. Co-ordination of innovation and science and technology policies is handled by the Slovak Government Council for Science and Technology, administered by the Ministry of Education. The Commission for the Knowledge-based Society¹⁹ was the government's advisory and co-ordination body on matters of the knowledge-based society and related Structural Funds. Jurisdictional issues and institutional instability seem to have hampered innovation policy implementation (K. Frank, 2010b).

In line with the 2004 EU Environmental Technologies Action Plan, the government adopted two implementation road maps, in 2005 and 2008, to promote environmental technology in Slovakia. The updated version listed eleven measures, mainly supply-side instruments such as support for R&D, equity support and information services (OECD, 2009b). On the demand side, emphasis was on regulations and standards. In its 2009 evaluation of the road map, the government underlined the following outcomes: inclusion of indicators on expected environmental benefits in all applications for R&D funding from the Ministry of Education budget, creation of an information portal for environmental technologies, adoption of an innovation strategy and policy that created an innovation framework which also supports environmental technologies, and adoption of the 2007-10 National Action Plan for Green Public Procurement.

Research and industrial performance

Slovakia has one of the weakest innovation performances in the OECD. In 2008, the number of triadic patents per capita was significantly lower than the OECD average. A low percentage of firms had innovation activities (OECD, 2010b). At 0.5% of GDP in 2009, gross expenditure on R&D in Slovakia was the second lowest in the OECD, and was down from 0.9% in the mid-1990s. The long-term objective of the state science and technology policy – to reach 1.8% of GDP by 2015 – remains a challenge. However, R&D spending steadily increased in real terms between 2004 and 2008 due to an increase in government funding. This positive trend reflects the emerging role of innovation and R&D in the policy agenda and the increased use of EU funds on related activities.

Another objective of the science and technology policy is to raise the share of business funding to two-thirds of the gross expenditure on R&D by 2015. However, Slovakia is not on track to achieve this target, and it is the only OECD country to experience a decline of business expenditure on R&D in real terms in the last decade. The low share of industry funding in gross expenditure on R&D (35% in 2009, compared with 64% for the whole OECD) underlines the low level of demand for innovation by Slovak businesses. Technology is largely imported from outside the country. In 2009, 13% of gross expenditure on R&D was financed from abroad, including 8% from foreign businesses. This illustrates a divide in the Slovak economy: on one side multinational enterprises with advanced technology from abroad and high productivity, on the other, small and medium-sized Slovak enterprises, and a few large ones owned by domestic investors, with low productivity and low R&D intensity. In recent years, about half of the patent applications filed under the Patent Co-operation Treaty were with foreign co-inventors, which is a high share in the OECD.

As Slovakia has the highest long-term unemployment rate in the OECD, labour market and skills policies could play a significant role in improving its innovation performance. There is a need to remove obstacles to labour mobility and to develop lifelong learning and training, including on environment-related technology (OECD, 2010a). In 2008, the share of

the population with tertiary education was 15%, while the OECD average was 28%. However, that was five percentage points higher than in 2000, and Slovakia has a high secondary education graduation rate. With its strong machinery sector, Slovakia can take advantage of shortages of professionals with technical education in Europe. Multinational enterprises in the electronics and car industries are interested in establishing networks of high-skilled suppliers in Slovakia. Small and medium-sized Slovak firms have a good opportunity to participate in high-tech manufacturing clusters, providing significant increases in their innovative input (EC, 2009).

Environment-related R&D

Between 2000 and 2008, gross domestic expenditure on R&D for environmental purposes more than tripled in real terms before decreasing by 30% in 2009. Its share in overall R&D expenditure rose from 2% to 4%, with a significant increase in 2004. Since 2005, when the first implementation period of the Environmental Technologies Action Plan began, business spending has varied from year to year while government R&D expenditure on environment has increased steadily. Environmental protection has represented an increasing share of the government R&D budget, growing from 1.3% in 2000 to 2.8% in 2009, slightly above the OECD average. By comparison, the share of energy rose from 1.5% to 2.1%. Renewables technology (mainly solar and bioenergy) was second only to nuclear research (mostly on fusion) in the government energy R&D budget in 2009, accounting for 25%. Energy efficiency accounted for about 7%. The number of patent applications in environment-related technology has been limited: for example, six patent applications for renewables technology were filed under the Patent Co-operation Treaty in 2006-07, and two for water pollution control technology in 2005-06.

5. Regional disparities

Slovakia is characterised by striking economic, social and environmental disparities among regions. Bratislava generates more than 25% of GDP, attracts most of the FDI and receives the lion's share of R&D expenditure (Table 2.1). People living in the capital generate more waste and have better access to environmental services. Unemployment is highest in the eastern rural areas and in the Banská Bystrica region, though the gap has been considerably reduced over the past decade. Since the last OECD review, access to water services has improved significantly, but the Prešov and Košice regions in the east still lag in water supply while Trnava and Nitra in the west are behind on wastewater treatment.

Since accession to the EU, Slovakia has benefited from an increase in funding to reduce regional disparities through investment in environmental infrastructure. This investment not only has a direct impact on environmental protection, it is also expected to boost the attractiveness of the regions, thereby promoting new investment and employment opportunities. Construction of environmental infrastructure will create short-term employment while its operation will lead to longer-term jobs. The development of renewable energy sources and payments to less favoured areas are also expected to increase environment-related employment. Although attempts have been made recently to estimate the impact of environmental policies on the labour market, a lack of knowledge remains a major obstacle to assessing this relationship (ILFR, 2010).

Table 2.1. Selected regional indicators in the Slovak Republic, 2009

Region	Population density (inh./km ²)	GDP ^a per capita (1000 EUR/ cap.)	FDI ^b EUR million	Gross domestic expenditure on R&D EUR million	Unemployment rate (%)	Poverty rate ^c (%)	SO _x ^d (kg/ cap.)	NO _x ^d (kg/ cap.)	PM ^d (kg/ cap.)	Municipal waste generation (kg/ cap.)	Population connected to sewerage (%)
Bratislava	303	40	23 879	156	4	7	14	10	1	434	85
Trnava	135	20	3 251	13	8	8	1	3	3	413	52
Trenčín	133	16	1 628	41	10	9	60	13	7	328	58
Nitra	111	14	1 399	14	12	13	2	5	4	366	47
Žilina	102	14	2 195	20	11	9	5	6	9	317	57
Banská Bystrica	69	12	877	18	19	14	7	9	10	262	61
Prešov	90	9	364	11	18	16	2	3	6	247	56
Košice	115	14	2 633	29	17	11	16	19	9	252	60

a) 2007 data at current prices and purchasing power parities.

b) Inward foreign direct investment stocks. 2008 data.

c) Share of population with an income of less than 60% of the median income.

d) Emissions from stationary sources only.

Source: Slovak Statistical Office.

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Notes

1. In 2011, the Government Council for Sustainable Development was abolished and merged (along with the Ministerial Council for EU Affairs, Government Council for Regional Policy and Supervision of Structural Operations, and Board of Ministers for Drug Addictions and Drug Control) in a new Ministerial Council headed by the prime minister.
2. Investment and current expenditure on: i) pollution abatement and control covering air protection, waste and wastewater management, protection and remediation of soil and groundwater, noise reduction and other environmental protection activities; and ii) biodiversity and landscape protection. Excludes expenditure on water supply.
3. That is, by the central and local governments.
4. ISPA projects were later implemented under the Cohesion Fund.
5. Because of the financial crisis, Slovakia, like other EU states, was granted an extension on eligibility of its projects. The 2004-06 programming period was closed at the end of 2010.
6. About EUR 310 million in ISPA/Cohesion Funds and EUR 120 million in Structural Funds under the operational programme for basic infrastructure.
7. In 2010, multiple changes were made in ministry responsibilities. In particular, co-ordination of EU funds was transferred from the Ministry of Construction and Regional Development to the Government Office in July and then to the Ministry of Transport, Construction and Regional Development in November.
8. To reduce economic and social disparities in the European Economic Area and strengthen bilateral relations with 15 beneficiary states (those that joined the EU in 2004 or later, plus Spain, Portugal and Greece). The EEA grants are jointly funded by Norway, Iceland and Liechtenstein. Norway finances 97% of the total EEA and Norway grants.
9. The agreement concerns implementation of the Swiss-Slovak co-operation programme to reduce economic and social disparities within the enlarged EU.

10. Slovakia was granted a transitional period to adjust its national level of taxation on electricity and natural gas used as heating fuel (until 1 January 2010) and on solid fuels (until 1 January 2009) to the EU minimum levels.
11. That is, the ratio of energy tax revenue to total final energy consumption. In 2008, this ratio was among the lowest in the EU but comparison should be made with caution because of the dominant share of nuclear power in electricity generation in Slovakia.
12. 582/2004 Coll. on local taxes and on local fees for municipal waste and minor construction waste.
13. However, the likelihood of this is slim, given the reduction of the tax on diesel.
14. Environmentally related taxes are compulsory, unrequited payments to general government levied on tax bases deemed to be of particular environmental relevance. Payments are unrequited in that benefits provided by government to taxpayers are not in proportion to payments. Required compulsory payments to the government, which are levied more or less in proportion to services provided (e.g. on the amount of waste collected and treated or on extraction of natural resources), as well as broad-based consumption taxes such as VAT that encompass environmentally related bases, are not classified as environmentally related taxation.
15. A previous fund, the State Environmental Fund, was abolished in 2001. In the period before the new fund was established, charges accrued to the MoE budget.
16. Between 2000 and 2006, nearly EUR 600 million in structural and ISPA/Cohesion Funds was spent on modernising rail and road infrastructure and EUR 3.2 billion in EU funds has been allocated for 2007-13.
17. The Competitiveness Strategy for the Slovak Republic until 2010.
18. The Slovak Innovation and Energy Agency, founded in 1999 and transformed into a national innovation agency in 2007; the National Agency for the Development of Small and Medium Enterprises; and the Slovak Investment and Trade Development Agency.
19. Established in 2006, it was headed by the deputy prime minister for knowledge-based society, European affairs, human rights and minorities. It included representatives from the ministries of finance, economy, construction, regional development, agriculture, health, labour, and social affairs and family, along with the president of the Slovak Academy of Sciences. In 2011, the commission was abolished and a new advisory body, the Government Plenipotentiary for Knowledge-based Economy, was created to develop and co-ordinate related policies.

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PART I
Chapter 3

Implementation of environmental policies

This chapter outlines the evolution of the mix of environmental policy instruments, including regulatory, economic- and information-based measures. Environmental enforcement and compliance promotion are examined, along with the promotion of public participation in environmental decision making and the extension of access to information and justice. The second half of the chapter examines the Slovak Republic's progress in managing air, water, waste, and nature protection and biodiversity.

Assessment and recommendations

Cross-cutting issues

Upon acceding to the EU in 2004, Slovakia made a huge investment to align its environmental regulatory framework with its new obligations as an EU member. Slovakia should be commended for broadly achieving this difficult objective on time. The speed and scope of the resulting changes generated complaints from the business community about additional burdens and the potential impact on competitiveness. Although some initiatives have been taken to simplify and reduce the administrative burden of environmental regulations and to clarify obligations, more could be done in this regard. More could also be done to engage the business community in a constructive dialogue on environmental issues, and to promote a more proactive approach in which environment is seen not just as a threat but also an opportunity.

After reforming environmental policies and institutions in the early 2000s, the Slovak environmental administration went through a period characterised by instability and deteriorating relations with stakeholders. Following a merger with the Ministry of Agriculture, the re-establishment of a separate Ministry of Environment in 2010 provides an opportunity for a fresh start. The ministry should take this opportunity to clarify its priorities, strengthen its relations with the business and NGO communities, and take the steps necessary to establish itself as a high-quality, professional organisation.

In line with EU policy, Slovakia has adopted an integrated approach to pollution prevention and control. Although a system of integrated permits has been developed, permits for large installations are issued in parallel with permits under media-specific laws, and requirements for small and medium-sized enterprises could be streamlined. The process of assuring compliance with regulatory requirements has gradually become more risk-based. The system for preventing industrial accidents has been effective. Some efforts have been made to strengthen compliance promotion. However, the adoption of an explicit environmental enforcement policy could clarify priorities and provide the basis for longer-term planning and performance assessment. More targeted inspection planning could result in efficiency gains, increased flexibility in reacting to potential risks, and improved effectiveness of response to non-compliance and pollution incidents.

Slovakia has developed an impressively comprehensive, policy-relevant system of environmental information. However, more could be done to include information on economic, financial and social aspects of environmental policies. Access to information has been strengthened in line with EU requirements. However, historically well-established provisions for public participation and access to justice have been weakened in recent years. Relations between NGOs and the environmental authorities have been difficult, and often adversarial. Public participation in environmental impact assessment and strategic environmental assessment procedures, especially for transport and energy-related projects, has been a particular source of concern. The definition of standing, which determines eligibility to initiate legal proceedings, should be made consistent with that in the corresponding EU directives.

Recommendations

- Develop a new environmental strategy as an integral part of Slovakia's strategy for economic and social development; ensure that the environmental administration is stable, professional, efficient and open, dedicated to pursuing ambitious environmental goals.
- Speed up the development of a comprehensive, user-friendly web-based guide to environmental legislation that can facilitate compliance of the regulated community, especially energy- and pollution-intensive companies, with environmental requirements.
- Further streamline and simplify environmental permitting and integrate inspection procedures; develop an explicit environmental enforcement policy that includes enforcement priorities and policies for applying sanctions; strengthen compliance promotion efforts targeting small and medium-sized enterprises.
- Ensure that environmental impact assessment and strategic environmental assessment procedures are fully in line with EU requirements, particularly regarding public participation and access to justice.
- Establish a forum in which the Ministry of Environment and NGOs meet regularly with a view to strengthening dialogue and co-operation.

Air, water, waste and biodiversity

Air management

Slovakia succeeded over the review period in decoupling air pollution emissions from economic growth: while GDP increased more than 60% between 2000 and 2008, emissions of most pollutants (SO_x, NO_x, CO, ammonia, particulates, mercury and dioxins/furans) decreased. Emissions per unit of GDP are in line with the OECD averages. Slovakia is on track to more than achieve its goals under the Convention on Long-range Transboundary Air Pollution. Key factors in this performance have included a switch to cleaner fuels, upgrading of production processes, and the use of more advanced technologies (e.g. desulphurisation, catalytic converters). EU accession resulted in more stringent pollution standards and helped to accelerate implementation of policy measures. Emission taxes differentiated by health impact, along with non-compliance fees, have provided effective incentives for adoption of best available technologies. However, more could be done to assess the benefits and costs of policy objectives, and to design the most cost-effective mix of instruments. Since 2000, emissions of NO_x from road transport, NMVOCs from solvent use, and particulates from the residential sector have been growing. Emissions of lead, polycyclic aromatic hydrocarbons and polychlorinated biphenyls have been increasing. Heavy metal emissions per unit of GDP remain above OECD Europe averages. Although most air quality standards are respected, particulate matter and ground-level ozone concentrations frequently exceed limit values for protection of human health.

Water management

Slovakia enjoys abundant water resources. Water use has been reduced as a result of pricing reform, structural changes and increased efficiency in consumption by industry and agriculture. However, despite strengthened measures, water pollution is still a challenge: around half of water bodies are at risk of not meeting the good-status objectives of the

EU Water Framework Directive for surface and groundwater by 2015. Assuring adequate quality is particularly important for groundwater, the main source of drinking water for the population. Most farmland is in nitrate-sensitive areas. Slovakia has incurred significant costs because of floods in the recent past. Better landscape and land use planning, and management and investment measures, within a river basin management perspective, are needed to support flood prevention and response measures.

Slovakia has taken important steps towards more integrated water management. The 2004 Water Act transposed the Water Framework Directive into national law. River basin management plans have been developed and measures identified. Although the plans provide a good knowledge base, they should be regarded as a useful first effort that would benefit from early revision after consultation with stakeholders. More emphasis should be placed on carrying out economic and financial analysis of investment needs and available funding, as well as reducing conflicts between policies in areas including agriculture, energy, land use planning and nature conservation. The institutional framework for river basin management has yet to be developed, but it should provide a better framework for decentralised decision making and implementation at the sub-basin level. It would also facilitate transboundary co-operation, such as within the International Commission for the Protection of the Danube River.

Improving and extending water supply and wastewater infrastructure is a particular challenge. Slovakia's connection rates are among the lowest in the OECD. Important steps have been taken to increase the transparency and efficiency of water utility operations, increase water and sanitation tariffs, reduce cross-subsidisation and introduce additional economic incentives for better water management. Emphasis should now be placed on improving and extending sewerage systems, installing higher-performance wastewater treatment capacity, and achieving high connection rates to water supply and sanitation networks. Analysis of priority areas for investment, better project preparation and careful analysis of funding options are necessary to close a large implementation gap in meeting the EU Urban Wastewater Treatment Directive requirements. Further reform of water utilities, especially the smaller operators, could also help increase the effectiveness and efficiency of investments.

Waste management

Over the last decade, industrial restructuring and technological change led to an absolute decoupling of industrial waste from economic growth. As domestic material consumption increased more slowly than GDP, the material intensity of the Slovak economy fell by nearly 20% between 2000 and 2007. Municipal waste generation has been relatively decoupled from private final consumption. With 300 kg of municipal waste generated per capita in 2009, Slovakia continues to be well below the OECD Europe average, reflecting the remaining gap in GDP per capita compared with many other OECD economies. Additional efforts on waste prevention and recovery are needed to further decouple municipal waste generation from expected increases in living standards.

Overall there has been little progress in diverting waste from landfill or increasing recovery. Slovakia fell short of most objectives set out in the national waste management plan for 2006-10, in particular concerning hazardous waste. Separate collection of municipal waste improved, but in comparison with other EU countries, Slovakia has performed poorly. Landfilling remains the predominant type of municipal waste management, accounting

for 80%. The country failed to achieve the reduction target in the relevant EU directive on amounts of biodegradable municipal waste going to landfill. National targets for recycling and recovery of waste electrical and electronic equipment were achieved. Although the collection rate of 4 kg per capita required by the corresponding EU directive was reached in 2010, rather than 2008, the amounts collected represented a minor share of equipment put on the market. Slovakia met the EU targets on recycling of end-of-life vehicles and used tyres.

On the whole, waste management has not been a priority on the Slovak political agenda over the past decade. Waste policy has not been planned realistically and efforts have focused on catching up with EU requirements. Economic instruments have been ineffective in reducing the amount of waste generated and landfilled, and the revenue generated is not sufficient to cover waste management costs. To meet EU Waste Framework Directive requirements, substantial investment is needed to increase capacity for separate collection and treatment of separated components of municipal waste, and to build adequate facilities for hazardous waste treatment.

As recommended in the 2002 OECD Environmental Performance Review, Slovakia completed an inventory of contaminated sites in 2008. Costs of remediation were estimated at 1.8% of GDP. However, Slovakia missed an opportunity, while privatisation was progressing, to establish a legal framework defining responsibilities for environmental remediation associated with the previous operation of state enterprises. Financing arrangements for remediating orphan sites or sites whose owners went bankrupt remain a concern. In 2010, the government approved a programme of site rehabilitation, with financing mainly dependent on EU funds.

Nature and biodiversity

Slovakia has significantly strengthened its framework for biodiversity protection over the last decade, largely by transposing the relevant EU directives. It has also contributed to, and benefited from, co-operation with neighbours, notably in the area of wetlands. Overall, the results achieved are mixed: compared to other OECD countries the proportion of threatened species is relatively low for birds and average for mammals and freshwater fish, but relatively high for reptiles, amphibians and vascular plants. Continued efforts are needed to support the recovery of critically endangered species.

As part of its EU obligations, Slovakia has set the very ambitious target of protecting about 30% of its territory (including 12% of special areas of conservation) as part of the Natura 2000 network. Currently 23% of the total area is under national legal protection. Meeting this objective is a challenge and will require action on several fronts: identifying appropriate sites (as requested by the European Commission) taking account of the benefits for biodiversity protection and the associated costs; developing synergies with other policy areas, particularly agriculture and tourism; strengthening co-operation with other stakeholders, notably landowners, farmers and the public; broadening the use of economic instruments; and strengthening implementation of the “territorial system of ecological stability” to promote connectivity and landscape stability.

Currently, the economic instruments most commonly used are a mix of fees, fines, subsidies and compensation. Opportunities for creating markets for biodiversity protection and payments for ecosystem services should be more systematically examined. Opportunities for linking agri-environmental measures more closely to environmental

outcomes should also be considered further. The possible contribution that the tourism sector could provide to finance landscape conservation and agri-environmental measures merits further analysis.

Recommendations

Air management

- Develop cost-effective measures to reduce air emissions from growing sectors (e.g. transport, residential heating), and to reduce potential health impacts in urban areas.

Water management

- Review and adjust the ten sub-basin water management plans so as to increase synergies between policies (including those for agriculture, water supply and sanitation, landscape and land use planning, flood prevention, nature conservation and climate change adaptation); complete institutional arrangements for river basin management with a view to assuring adequate consultation between stakeholders and effective implementation at the sub-basin level.
- Conduct a comprehensive evaluation of the current gap in water supply and sanitation infrastructure, the measures required to meet objectives, and their cost; on this basis devise a realistic strategy for achieving EU objectives for the water sector, particularly for wastewater treatment, including clear priorities, strategic financial planning for achieving objectives and proposals for further institutional reform of the water management sector; identify measures to increase connections to the water and wastewater networks.
- Strengthen measures to reduce flood risks and their impacts, emphasising preventive landscape and land use planning and low-cost (ecosystem) options and technologies.

Waste management

- Review economic instruments applied to waste management with a view to increasing the incentive for waste minimisation, recovery, and diversion from landfill.
- Implement the state programme on contaminated sites, applying the polluter pays principle to site clean-up when appropriate; prioritise sites with the greatest risk to human health and the environment, and assure long-term funding for orphan site remediation.

Nature and biodiversity

- Develop a comprehensive strategy for protected areas in line with the Natura 2000 objective, involving all relevant stakeholders and taking account of the benefits and costs of different options; further develop the monitoring and information system for nature and biodiversity protection.
- Expand the use of existing economic instruments for biodiversity protection, and develop new instruments, particularly payments for ecosystem services.
- Better integrate landscape protection into land use planning; explore ways in which the tourism sector could provide payments for the services provided by landscape management; develop a valuation methodology to provide a basis for estimating payments to landowners and farmers for the ecological services they provide.

1. Strengthening the environmental policy mix

1.1. Reforming administrative instruments and institutions

Development of the legal framework

Environmental legislation underwent a major overhaul during the Slovak Republic's accession to the European Union.¹ The 2000 Integrated Approximation Strategy in the Environment Chapter, prepared through nationwide consensus-building activities led by the Ministry of Environment (MoE), identified steps for harmonising Slovakia's environmental regulations with all relevant EU legislation. The strategy also estimated the harmonisation and implementation costs. Formal negotiations between Slovakia and the European Commission on the introduction of environment-related *aquis communautaire* into the Slovak legal framework took place between March 2000 and December 2002. The agreement included transition periods in selected areas, such as supervision and control of waste shipments within, into and out of the EU (2011), integrated pollution prevention and control (2011), and water management and urban wastewater treatment (2015).²

The harmonisation process stimulated the adoption of several new laws on specific environmental media, including waste (2001), nature and landscape protection (2002), air protection (2002) and water (2004). The media-specific Acts were accompanied by the adoption of horizontal legislation and establishing instruments regarding pollution and environmental management. These included Acts on integrated pollution prevention and control (2003), environmental information (2004) and trading of emission allowances for greenhouse gas emissions (2004). At the same time, many existing Acts were amended and complemented by regulations.

After accession to the EU in 2004, Slovakia's environmental legal system was further adjusted to harmonise the national framework with new developments at EU level. For example, a new Air Act was adopted in 2010, replacing the 2002 one, to transpose the EU directive on ambient air quality and cleaner air. Other important new Acts included those covering the prevention and remedy of environmental damage (2007, transposing the EU environmental liability directive) and protection against floods (2010, following Slovakia's active involvement in the development of the EU Directive on the assessment and management of flood risks).

The overall conformity of Slovak legislation with the EU environmental legal framework is relatively good, and has generally been accomplished on time. However, a few non-conformity cases have been launched since 2006, though the number has decreased each year: out of 451 environment-related infringement cases in the EU in 2009, 19 concerned Slovakia (EC, 2011a). In 2010, the European Commission pursued legal action against Slovakia for failing to comply with obligations under EU law in 12 cases, mainly regarding Natura 2000 sites and implementation of the landfill directive.³ Other infringement proceedings included those concerning inadequate transposition of the Water Framework Directive and the directives on waste electrical and electronic equipment, restriction of hazardous substances and end-of-life vehicles. The Commission requested in 2009 that Slovakia assure full transposition of the Directive on Strategic Environmental Assessment into national law and in 2011 sent Slovakia a reasoned opinion (EC, 2011b).⁴

Wide-ranging legislative changes occasioned by EU accession resulted in complaints about more complex legislation, increased obligations on the regulated community and concerns about the ability of the Slovak companies to comply with the requirements.

The complaints stimulated a discussion between the government and business about the impact of the regulatory framework on the overall competitiveness of the Slovak economy. However, initial results of an analysis of nearly 50 Acts, which the Ministry of Economy published in 2009, concluded that environmental and other laws posed a reasonable and minimal administrative burden on business (MoE, 2010a).⁵

In a drive to address such concerns, Slovakia adopted a Better Regulation Agenda and Action Plan to Reduce Administrative Burden of Entrepreneurship in 2007. The agenda is among the measures to implement the National Recovery Plan. Its objectives, in line with the EU Better Regulation Action Plan, include a target to reduce the administrative burden on enterprises by 25% by 2012. Even though environmental laws were found to impose a relatively small regulatory burden, the MoE and its agencies could make environmental rules more intelligible in areas such as permitting and waste and water regulations. Better codification and/or simplification of administrative requirements could also facilitate compliance.

Since the adoption of the Better Regulation Agenda, all new legislative proposals have had to be accompanied by a regulatory impact assessment that includes environmental impact. In 2007, the government adopted a Unified Methodology for Legislative Impact Assessments, which describes the process and methodology for assessing the impact of new legislation in five areas, including environment. Impact assessment procedures were further strengthened by an update of the methodology in 2010. There is also a Unified System of Legislative Processes Administration: a software and process system connecting all government institutions and bodies, the official database of all legislation in Slovakia (JASPI), the legislative system and website of the Parliament, and “digital government” functions. The new system requires all draft laws and regulations (except international treaties) to be prepared using “legislative editor” software that assures consistency and coherence. Draft laws are now published on a legislative web portal (<https://lt.justice.gov.sk>) that allows institutions and the public to comment on the bills. Adoption of requirements for regulatory impact assessment and the legislative system was followed by capacity-building seminars.

Reforming environmental standards, permitting and licensing

Introduction of integrated permitting for large installations provided the basis for reforming the environmental permitting regime. The change followed the adoption of the Act on Integrated Prevention and Control of Polluted Environment (the IPPC Act) in 2003; it harmonised the Slovak system with the EU IPPC Directive and introduced a “single window” for environmental permitting. After the introduction of the Act, 552 integrated environmental permits were issued for large installations subject to the IPPC regulations by the deadline of October 2007 established by the IPPC Directive (Entec, 2009). The permitting procedures were formulated by a new department at the Slovak Environmental Inspectorate. Although the number of new permits issued decreased from 203 in 2007 to 22 in 2009, the number of substantial changes in the existing permits rose significantly, from 179 in 2007 to 433 in 2009, which put a heavy burden on the limited resources of the permitting department (MAERD, 2010).

Together with integrated permits, various registers were introduced to assure the comprehensive collection and management of information on IPPC installations. These include the Register of Operators and IPPC Operations, the Register of Issued Integrated

Licenses, the Integrated Register of Information Systems, the Register of Environmental Quality Norms, the Register of Best Available Techniques and the Register of Authorised Persons (those who can provide expert advice on preparing an application). The IPPC system continues to be adjusted and fine-tuned (GLG, 2010).

Reform of Slovakia's permitting system also introduced sector-specific requirements called general binding rules, minimum requirements that are compulsory for industrial installations in certain sectors. These are intended to simplify both the permit requirements and compliance assessment for the regulators, in order to increase regulatory transparency to establish uniform monitoring requirements for larger groups of installations (Entec, 2009).

However, integrated permits are issued in parallel with separate permits required under sectoral environmental Acts. Examples include permits for discharging sewage, or keeping, treating or disposing of listed waste under the Waste Act. The proliferation of permitting requirements imposes administrative burdens on operators. A review of the permitting system in the context of existing requirements under the integrated system and the general binding rules could lead to simplification of the procedures as well as more integrated and better targeted enforcement.

The introduction of integrated permitting for large installations was accompanied by changes in the legal framework concerning prevention of major industrial accidents. Several Acts introduced in 2002 strengthened the accident prevention and preparedness requirements and changed the classification of industrial operations to differentiate the requirements according to volumes of hazardous substances present.⁶ The strengthened system resulted in few major industrial accidents being reported during the review period. Between 2003 and 2010, four major accidents were registered, with 16 injuries, along with 28 imminent threats, including seven in 2003 and six in 2008 (MoE, 2010a).

Environmental impact assessment and strategic environmental assessment

Environmental impact assessment (EIA) procedures for public and private projects that are likely to have significant effects on the environment have been in place since the adoption of the EIA Act in 1994. In 2006, a new EIA Act was approved, and EIA procedures began to be applied to buildings under the 2006 Planning Act. The 2006 EIA Act introduced no major changes in EIA procedures but it tightened certain procedural time limits and better delineated EIA responsibilities between the MoE and the regional and district environment offices. It also harmonised the Slovak EIA legislation with three EU directives⁷ and put preconditions on the accession of Slovakia to the UNECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (the Aarhus Convention). The adoption of the EIA Act provided a firm basis for assessing forthcoming projects to be financed from EU Structural and Cohesion Funds.

The number of EIA procedures was low (30 to 70 a year) until 2000, but increased to around 200 in 2001 after the scope of projects subject to EIA was extended. Greater involvement by subnational environmental bodies after 2000 was also a factor. The number of EIAs increased further during the review period, reaching nearly 900 cases in 2008 (MoE, 2010a). Documentation from the assessment process is available to the public in electronic form on the MoE website. The complete documentation from 15 years of experience with EIA is archived in the EIA Documentation Centre at the Slovak Environmental Agency in Banská Bystrica.

Non-government organisations (NGOs) have criticised EIA procedures in Slovakia for insufficient consideration of alternative options, short consultation periods, limited access to the reasons underlying decisions and failure to carry out EIAs, including after initial screening (JaE, 2009).⁸ The most notable case involving NGO criticism was an extension to the Mochovce nuclear power plant (Box 3.1).

In 2009, amendments to the EIA Act clarified the screening procedures for activities below thresholds and revised the procedures for authorisation of activities subject to EIA. In 2010, as the result of an infringement procedure started by the European Commission, the Act was amended again, with a new definition of “public concerned” being adopted. The new definition includes environmental NGOs that actively participate in the EIA procedure, *ad hoc* public initiatives (by two or more people) and individuals (natural persons) who actively participate in the EIA procedure and can prove their interest in the activity concerned. The changes allow actors fulfilling these conditions to become parties to the relevant decision making procedures, and to have access to related court proceedings. The new Act is very much in the spirit of the Aarhus Convention. However, there is a further need to reinforce public participation, in particular at the scoping and screening stages. The screening mechanism should be simplified and clarified, for example by detailing the selection criteria and establishing thresholds, criteria or triggers. Changes are also needed to allow better access to the results of the assessment, not only “essential parts of the decisions”.

The 2006 EIA Act also transposed the 2001 EU Directive on Strategic Environmental Assessment (SEA). The Act regulated procedures for SEA of sectoral policies and plans, such as those concerning energy, transport, agriculture, forest management and industry, as well as regional development and land use planning. Several strategies and policies have since been evaluated, including the strategy for the final stages of the nuclear energy-production

Box 3.1. Environmental impact assessment of the Mochovce nuclear power plant

The Mochovce nuclear power plant in south-west Slovakia operates two 470 MW reactors. They generate almost 6 TWh of electricity a year, meeting about 20% of Slovakia’s energy needs. Original plans envisaged building four Soviet-made pressurised water reactors, and a permit for this was issued in 1986. Mochovce 1 and 2 were completed and began operation in 1989, but the construction of Mochovce 3 and 4 was halted 70% of the way through construction with 30% of the equipment in place. In November 2008, construction on the two unfinished reactor blocks was resumed using modern technology.

The European Commission received several complaints concerning the relaunch of construction. Several NGOs claimed the construction required separate permitting, as well as public participation and assessment procedures, under the EIA Directive and the UNECE Aarhus and Espoo conventions, arguing that the work should legally be considered a new project. However, obligations under the EIA Directive took effect at the time of accession, on 1 May 2004. Given that the project was initiated, authorised and partly built prior to accession, the EIA Directive is not applicable.

Slovak authorities said that changes to the project were made for safety reasons, and that a screening concluded that there was no need for a new EIA. Nevertheless, the Slovak authorities informed the Commission that they had voluntarily initiated a new EIA procedure for units 3 and 4 before issuing the permits for commissioning and operations.

Source: UNECE, 2010.

cycle, the energy-security strategy and the operational programme for transport. However, the current SEA legislation contains a number of shortcomings. In October 2009, the European Commission notified Slovakia that its national legislation did not ensure that all plans and programmes likely to have significant effects on the environment were subject to environmental assessment. The directive states that the public should be informed of why an impact assessment is not required for a specific plan or programme, but this requirement is not included in current Slovak law. In February 2010, the Commission sent a reasoned opinion to Slovakia. If it receives no satisfactory response, the Commission may refer the case to the European Court of Justice in 2012 (EC, 2011b).

Reforming environmental institutions

Since reform of the public administration in 2001 and the 2003 Act on State Administration of Environmental Protection, Slovakia's administrative structure for environment has comprised four tiers: i) the MoE, national agencies⁹ and the Slovak Environmental Inspectorate;¹⁰ ii) eight regional environment offices;¹¹ iii) 46 district environment offices;¹² and iv) environmental responsibilities carried out by 2 891 municipalities.¹³

The 2003 administrative reform resulted in the delegation of several responsibilities from national level to regional and district offices and the devolution of decision making to municipal governments. The latter step involved transferring some responsibilities related to water, waste and forest management, as well as nature and landscape protection, to municipalities from regional and district offices. Since 2005, the MoE has provided about EUR 700 000 a year in subsidies to municipalities for activities related to delegated responsibilities. The district and regional environmental offices, whose operations were co-ordinated by the MoE, still handle practical environmental matters such as permits and registrations and respond to minor environmental administrative offences.

The initial changes in responsibilities aimed at clarifying and solidifying responsibilities among government agencies at the national level. For example, in 2003, jurisdiction for water management was transferred from the Ministry of Agriculture to the MoE, and a new MoE organisational structure was approved. However, organisational changes continued through most of the review period, creating instability and weakening the effectiveness of the environmental management system. For example, the government changed environment ministers four times in 2009, reorganised subordinate agencies (including mergers of administration at some national parks) and decreased staff numbers. Questions were raised about the integrity of MoE management of operations concerning the EU Emission Trading System. In July 2010, the MoE was merged with the Ministry of Agriculture.

After the 2010 elections, however, the MoE was reinstated as a separate body. This decision created an opportunity for the ministry to make a fresh start. Steps in the right direction included the identification of clear priorities by the new leadership of the ministry, among them implementing vigorous anti-flood measures, addressing environmental problems related to historical pollution by industry and assuring compliance with EU environmental obligations.

1.2. Fostering compliance

Compliance monitoring

The Slovak Environmental Inspectorate has countrywide responsibility for environmental compliance assurance, while regional and district environment offices address minor administrative offences at subnational levels. The inspectorate operates from its headquarters

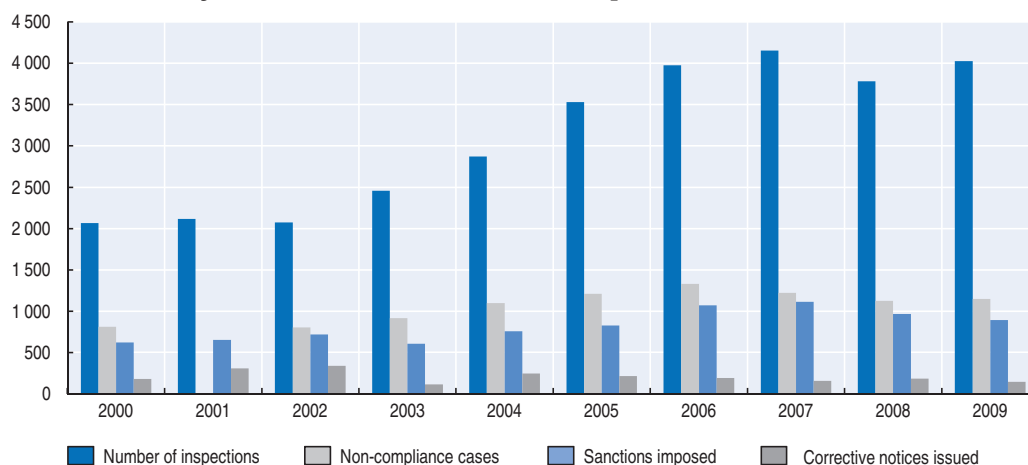
in Bratislava and four territorial inspectorates in Bratislava, Banská Bystrica, Žilina and Košice. It provides methodological assistance for operations of the regional agencies and hears appeals of their administrative decisions. The executive power of municipalities in environmental compliance assurance is very limited.

The transposition of EU legislation meant a substantial increase in the inspectorate's responsibilities, particularly as regards integrated permitting and bio-safety. Its responsibilities were also extended concerning trade in endangered species (under the Convention on International Trade in Endangered Species of Wild Fauna and Flora), prevention of major industrial accidents (under the EU Seveso Directive) and response to serious water pollution.

The inspectors have broad powers to carry out inspections without prior notification, to request information and to seize documents. Good relations with the police are cultivated, especially for cases where there is a need to prevent illegal activities or gather evidence. There is a growing tendency to focus inspections on high-risk installations, though this approach is not systematically taken.

The number of all types of inspections nearly doubled between 2000 and 2007, and stood at 4 154 in 2009 (Figure 3.1). However, the number of non-compliance cases did not rise proportionally, a fact that may suggest increased compliance. More recently, the number

Figure 3.1. Number of inspections and follow-up actions carried out by the Slovak Environmental Inspectorate, 2000-09



Source: Slovak Environmental Inspectorate (2010), *Annual Report 2009*.

StatLink  <http://dx.doi.org/10.1787/888932496159>

of inspections has been reduced, partly as a result of programmes to reduce administrative burdens but also because of the introduction of joint inspections by agencies such as health and labour and the customs. The number of inspections of IPPC facilities grew from 16 in 2005 to nearly 400 in 2009, however. Recorded violations of IPPC permits rose accordingly, to 60 in 2008 and 134 in 2009 (MAERD, 2010). Though the higher rate of non-compliance detection at large installations is positive from an environmental point of view, the trend indicates a need for more compliance promotion activities, such as encouraging companies to introduce management practices while offering regulatory relief to those with valid management certificates and good compliance records. The development of guidelines and

information on requirements in permits and possible types of non-compliance responses could also help promote better compliance by operators.

Budgetary pressures in coming years will probably result in a decrease in the number of inspections. If that happens, improvements in inspection planning and organisation will be necessary to improve efficiency, increase flexibility in reaction to potential risks and respond more effectively to non-compliance and pollution incidents. Inspections are still carried out separately for air, water and waste, and most of them are planned; introducing fully integrated cross-media compliance inspections could be beneficial for both government and industry. Such inspections review compliance with air, water and waste requirements simultaneously and in an integrated way. This approach would reduce the administrative burden on companies and the time and cost required for enforcement while fulfilling objectives of the Better Regulation Agenda. Introducing multi-annual planning and objective setting to monitor the development and impact of environmental improvement over the longer term would enable more effective comparisons and facilitate assessment of environmental outcomes that are difficult to analyse over a single year. Finally, adoption of an explicit environmental enforcement policy by the inspectorate and its units could help establish clear priorities, inform the regulated community about enforcement objectives and provide the basis for longer-term planning and performance assessment.

Non-compliance responses

Slovakia's legal framework is well equipped with measures to respond to non-compliance. Violations can be sanctioned through administrative or criminal proceedings, or both (Box 3.2).¹⁴

Box 3.2. Types of non-compliance responses in Slovakia

An activity not complying with a permit is considered as an environmental administrative offence regardless of whether the environment, property or health has been endangered. Intent or negligence in cases of endangerment or damage does not need to be proven. Fixed and variable fines are the most commonly used administrative measures. Fines can reach up to EUR 25 000 for a breach of the Act on Nature and Landscape Protection or up to EUR 125 000 for a serious breach of requirements prescribed in water, waste and air pollution laws. Acts on nature and landscape protection, on waste and on air pollution allow inspectors to impose restoration notices, requiring operators to stop the polluting activity and restore the environment to the required conditions while a decision on administrative (or administrative-criminal) measures is pending. If the restoration is not achieved before the deadline, the state supervision body is obliged to impose a fine. Financial sanctions may be increased if the perpetrator fails to pay a fine and fails to restore the situation to its previous state (in which case the authority may double the fine) or the same administrative offence is repeated within two years (in which case the fine may be increased to the upper limit). Withdrawals of a permit or bans on the performance of a particular activity as a result of administrative offence are used sporadically.

Pursuant to the criminal code, natural persons may be held criminally liable for breaching provisions of the code intentionally, unless only negligence is required. The code recognises eight kinds of crimes against the environment, including jeopardising and damaging the environment, unauthorised handling of waste, and poaching. Natural persons (individuals) and legal persons (companies) have been liable for administrative offences, but until 2005 only natural persons could be held liable for criminal offences. Since 2005, when the

Box 3.2. Types of non-compliance responses in Slovakia (cont.)

criminal code was re-codified, it has been possible to hold legal persons criminally liable for crimes against the environment. The accumulation of sanctions is possible: natural or legal persons can be punished both for an administrative offence by the administrative authority and for a criminal offence by the courts.

The 2005 re-codification introduced much higher penalties for criminal offences: formerly at a maximum level of EUR 120 400, fines can now reach up to EUR 2 million for significant deterioration of a protected habitat, unlawful discharge of hazardous substances into water, or illegal dumping or transboundary shipment of waste. Slovakia's criminal code includes one of the world's most stringent penalties for water- and waste-related offences: imprisonment for up to eight years. However, such penalties are seldom applied in practice.

When the criminality of acts has been considered, conditional penalties are the most frequently applied. If a fine was the only penalty imposed and the offender paid the fine, the offender is considered as not convicted. When a fine is imposed, the courts usually provide for an alternative prison sentence to ensure that the criminal act is still punished if the fine is not paid on time; a system of conversion of prison sentences into fines also exists. Other responses to criminal non-compliance include permanent or temporary dissolution of the legal person, forfeiture of property, restriction of activities, and bans against, for instance, participation in a public tender, the use of grants, or promotion or advertising. However, very few cases result in such measures being applied.

Administrative-criminal liability is similar to a criminal offence, as the procedural principles resemble those for criminal procedures. However, the sanctions or quasi-criminal penalties are imposed by administrative bodies rather than the courts. This kind of liability is intended to assure quicker punishment of offences that are harmful to the environment but not as dangerous as those specified in the criminal code. The penalties imposed in administrative-criminal law are mainly fines. Such contraventions cannot be sanctioned with imprisonment.

Source: Milieu, 2003.

The number of administrative non-compliance cases increased over the review period but there was a significant drop in infringements as a percentage of total inspections (Figure 3.1). In 2002, out of around 2 000 inspections, non-compliance was detected in almost 40%. In 2009, the share was much lower, around 20%. The number of corrective measures imposed was little changed over the review period, but the penalties rose: the cumulative amount increased from EUR 450 000 in 2003 to nearly EUR 1 million in 2008 before dropping slightly to EUR 790 000 in 2009 (SEI, 2010). The collection rate, an important element of effective enforcement, also increased, from a low level of 45% in 2003 to around 90% in 2008. The higher collection rates were partly due to provisions allowing the inspectorate to employ bailiffs if fines were not paid within the statutory deadline and after a written reminder.

Criminal proceedings are reserved principally for poaching and other illegal activities related to nature protection and biodiversity conservation, especially in protected landscape areas and national parks. Several steps have been taken to strengthen investigative capacity to address environmental crime. For example, the Economic and Environmental Delinquency Division of the Judicial and Criminal Police, established in 2005, can fast-track investigations. In 2008, the Ministry of Agriculture set up a working group to prepare a proposal on creation of a "nature police" force, as an integral part of the police, to address the

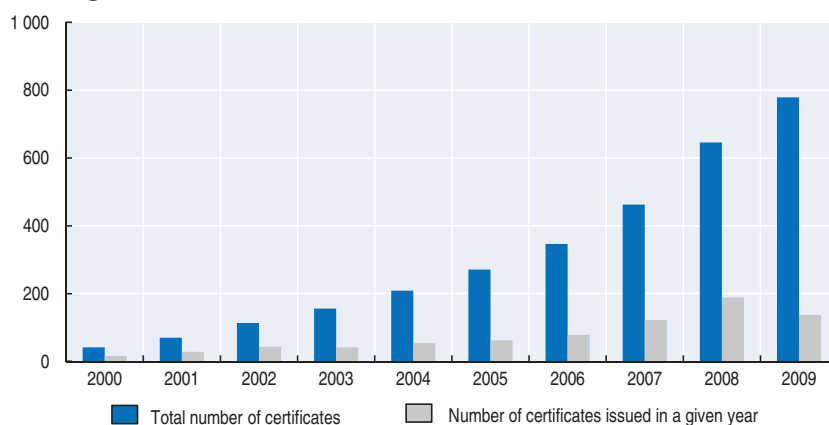
growing number of infringements related to nature protection and biodiversity conservation. The police, in turn, have elaborated an approach to fighting environmental delinquency, including detailed proposals for improved co-operation among state bodies. In 2009, the investigative capacity of the General Prosecution Office concerning environmental crimes was strengthened by increasing the number of prosecutors specialising in environmental matters. The specialised staff, comprising 100 people at the central, regional and district prosecutors' offices, receive guidance documents and co-ordinates activities with the police and environmental agencies.

In responding to non-compliance, more severe penalties have been imposed through administrative procedures than through the courts. Administrative-criminal liability is also more frequently applied. Although this approach provides for faster response (there is no need to prove culpability, and the process can be shorter than court procedures), it may not fully assure objectivity and independence of judgment. There is a need to rebalance the use of administrative and judicial procedures. This would require more effort to increase judicial professionals' expertise on handling environmental cases, to discourage judges from giving lower priority to environmental cases and to shorten investigations and court proceedings.

Compliance promotion

Slovakia has increasingly supplemented the traditional command-and-control approach to environmental compliance assurance with broader compliance promotion measures. Environmental authorities, in particular the Slovak Environmental Agency and its Environmental Management Centre in Trnava, have carried out regular seminars and training sessions for representatives of industry. The seminars are aimed at explaining environmental requirements and discussing better environmental management of industrial operations. The seminars offer opportunities for direct contacts between the regulators and the regulated community. However, they should be supported by the development of a comprehensive, user-friendly web-based guide to environmental legislation that can facilitate compliance of the regulated community. Energy- and pollution-intensive companies should become a particular focus of such efforts.

The Slovak Environmental Inspectorate grants regulatory relief to certified companies, reducing the frequency of inspections to every ten years. The number of companies certified under ISO 14001 increased significantly during the review period, from 113 in 2002 to 778 in 2009 (Figure 3.2). The breakdown by sector shows manufacturing companies being the most active (372), followed by construction (216), and wholesale and retail (74). The share of ISO 14000 certifications awarded to the environmental service sector (water supply, wastewater treatment and waste) is relatively low (58). In terms of certified companies' size, small firms (up to 49 employees) account for the highest share (45%), while around 35% are medium-sized companies (50 to 249 employees) and 20% are large (250 or more) (MAERD, 2010). The high share of small companies is probably due partly to their role as suppliers to larger companies elsewhere in Europe. In contrast, there has been little use thus far of the Eco-Management and Audit Scheme (EMAS), with only six organisations participating in the EU initiative by the end of 2009. The main reasons stated were higher costs, more stringent requirements and relatively low recognition in comparison with ISO 14000.

Figure 3.2. **Number of ISO 14001 certifications, 2000-09**

Source: Slovak Environmental Agency.

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Voluntary approaches are little used, though co-operation agreements have been signed between the MoE and various industrial associations, such as the Association of Industrial Ecology in Slovakia and the Association of Water Companies.

Some compliance-related financing comes via the Environmental Fund, which supports environment-related investment. The fund's predecessor provided interest-free support, and since its re-establishment in 2005, it has also granted soft loans, some directly to the private sector. As the transaction costs for firms are relatively high, such loans have mainly benefited a few large projects.

1.3. Other environmental policy instruments

Environmental monitoring and provision of environmental information

The Slovak environmental information system was well developed following the adoption of the State Information System Act in 1995. It was further strengthened during the review period. Information is collected through dedicated agencies that cover specific elements of the environment. These include the Slovak Hydrometeorological Institute,¹⁵ the State Nature Conservancy, the Slovak Geological Institute and the Soil Science and Soil Conservation Research Institute (all in Bratislava), as well as the National Forestry Centre in Zvolen and specialised Slovak Environmental Agency centres around the country.¹⁶

In 2005, an environmental information portal, Enviroportal (www.enviroportal.sk), was launched as a gateway to information generated by environmental agencies, using state-of-the-art information technology. Enviroportal helps increase public awareness on environmental issues and promote environmental education. It contains the state of environment reports that have been produced every year since 1992. They include details on the state of the environment, data about trends, and environmental measures and policy responses. The reports are complemented by the Environmental Regionalisation Atlas of the Slovak Republic, which presents information concerning the state of the environment, environmental pressures and policy responses, overlaid on maps of Slovakia (Box 3.3). Enviroportal also provides access to simplified brochures on environmental state and trends, incorporating indicators for individual components of the environment,

for individual and cumulative environmental problems, for selected economic sectors and for related environmental instruments. More recently, *EnviroInfo* (mis.enviroportal.sk), a new part of Enviroportal, has made available a large amount of information and metadata to support development, operations and expansion of e-government at the MoE.¹⁷ *EnviroInfo* also offers 366 online maps using about 800 GIS layers of various types of environment-related information.

Box 3.3. Environmental Regionalisation Atlas of the Slovak Republic

In 2002, 2008 and 2010, the MoE and the Slovak Environmental Agency published the Environmental Regionalisation Atlas of the Slovak Republic. The 2010 publication includes over 80 maps showing territorial differences in the quality and vulnerability of various aspects of the environment (geomorphological, geological, natural and cultural features, spatial differentiation in the quality of air, water, soil, habitats and landscapes), environmental pressures and risk factors (location of major sources of air and water pollution, contaminated land, mining areas) and environmental management features (drinking water sources, nature protection areas, geographical differences in coverage by waste, sewerage and wastewater treatment infrastructure, air and water pollution management plans).

The final sections of the atlas present the cumulative state of the environment. With the use of weighting factors, they show quality-graded regional diversification of the national territory divided into five levels: i) areas of high quality, least influenced by human activities; ii) areas complying with environment requirements; iii) areas with moderately deteriorated environment; iv) areas with deteriorated environment; and v) areas strongly disturbed by human activities with the highest proportion of environmental loads. The second and fourth levels are considered transitional.

The final maps also show sources of local degradation of environmental quality (power stations, mining operations, airports, damaged forests, contaminated reservoirs, military areas) as well as cultural and natural objects contributing to improvement of local environmental quality (world heritage sites, urban and rural monuments and architectural reserves, biological and habitat reserves).

With its graphics, the atlas is an easy and quick way to raise awareness about the environment among decision makers and the general public. It also provides links to more comprehensive environmental information systems.

Source: MoE/SEA, 2008.

Expenditure on environmental monitoring increased during the review period from EUR 5.2 million in 2002 to nearly EUR 8 million in 2009 (MoE, 2010a). Water monitoring benefitted from large increases and accounted for over 50% of the total in 2009. The resources devoted to monitoring of forests also increased, but those devoted to nature protection decreased significantly. For example, the State Nature Conservancy did not carry out any habitat monitoring in 2009 due to a lack of funding.

Securing adequate funding for environmental monitoring is important, especially in light of budgetary pressures after the economic crisis of 2008-09. However, more effort should be made to supply economic and financial data and information to environmental information systems as this would allow authorities to better relate changes in the state of the environment to economic pressures as well as response measures. Better co-operation and co-ordination of efforts between the Slovak Environmental Agency and the Slovak

Statistical Office could facilitate creation of more economically relevant environmental information systems.

The quality of information about environmental impacts on health is another area requiring attention. Slovakia has made progress in developing intersectoral co-operation on environment and health policy making, and the government's first National Environment and Health Action Plan,¹⁸ approved in 1997, was updated in 2000 and 2006. Yet more and better analysis of exposure to environmental hazards is needed, as is information on impacts, including economic costs and benefits. The recent focus on children's health would provide a good platform for developing and presenting such analysis (WHO, 2008).

Environmental labelling

Environmental labelling of products has been carried out in Slovakia since 1997, when a National Programme of Environmental Assessment and Product Labelling was developed. The use of national eco-labels increased further with the adoption in 2002 of the Act on the Eco-labelling of Products, which created 32 product categories. The "environment-friendly product" label has been awarded to 312 products. The number of products awarded the label each year has grown, from 29 in 2002 to 146 in 2010 (MAERD, 2010). The MoE grants authority to use eco-labels under licensing agreements, following a verification process. Between 1997 and 2009, 51 licensing agreements were reached. Since eco-labels are considered an effective marketing tool, their use requires a registration fee of up to EUR 500 and an annual fee amounting to 0.02% of sales volume (with a ceiling of EUR 4 000). Slovak products can also use the European "flower" label, and four products were doing so as of 2009.

Environmental liability

The 2007 Act on Prevention and Remedying of Environmental Damage transposed into Slovak law the EU Directive on Environmental Liability. The Act does not apply to any environmental damage that occurred before the date the Act entered into force. It stipulates that from 1 July 2012, every operator must prove financial coverage of liability for environmental damage, including expected costs of remedying environmental damage, not later than 100 days after approval of relevant business activity. To date the regulations on liability have not been applied.

2. Promoting environmental democracy

Access to environmental information, public participation in environmental decision making and access to justice

Slovakia ratified the Aarhus Convention in 2005, though measures facilitating public access to environmental information predated this, starting with the 2000 Freedom of Information Act. The Act guarantees free access to all type of information (included environmental information) without the need to provide legal or any other reason or interest concerning the request. The law also introduced a complaint procedure in the courts in case of denial of access to information by public administration. The requirements were further specified by the 2004 Act on Collection, Storage and Dissemination of Environmental Information. This Act sets out conditions and procedures for the collection and dissemination of environmental information by the public administration and other

legal entities.¹⁹ It fully implements the requirements of the EU Directive on Public Access to Environmental Information.

One result of the new legal framework was the establishment of a communications department in the MoE. It consists of a press division and a public relations division, including an office for the public. The office provides information and advisory and consulting services, runs a full-time telephone service (the Green Line) and keeps central records of requests for information. Its activities are oriented not only at informing the public on environmental issues but also at close co-operation with industry, the education sector and researchers. Ten Regional Environmental Advisory and Information Centres were also established, each of which employs at least one full-time officer, with larger regions employing more.

Slovak civil society has a long tradition of strong representation by NGOs. In 2009, more than 33 000 NGOs were registered, providing services in several areas, with many focusing on environmental issues (USAID, 2010). Environmental NGOs carry out awareness-raising, training and educational activities but also organise public campaigns and represent individuals and citizen groups in disputes over public or private decisions that affect public health or environment. The NGOs have joint communication and co-operation platforms, with Ekofórum being one of the most active.

NGOs face serious problems funding their operations. Their uncertainties increased recently as a result of a gradual change in the mechanisms of financing NGO operations. Previously, NGOs were entitled to 2% of businesses' tax liabilities. However, from 2011, the amount is to be gradually reduced to 0.5% by 2019 (USAID, 2010). This change will probably result in a decrease in funds for NGOs. At the same time, acquiring EU funds has also become more difficult. If NGOs are to continue to play an active role in policy making, they need to become more professional and carry out activities that generate revenue.

In recent years, NGOs have expressed a growing sense of frustration, particularly regarding participation in environmental decision making, judicial independence and the enforceability of law. They have argued that the government does not consider them as a partner. Laws promulgated in 2007 and 2008 weakened participation rights and reduced access to courts for challenging the legality of administrative decisions.²⁰ Following these changes and anti-government protests, relations became even more adversarial. The establishment of a consultative group between the main NGOs and the MoE could help rebuild relations and lead to more constructive dialogue and co-operation.

The ability of NGOs to have recourse to judicial review, beyond EIA and IPPC procedures, has been limited, for example in cases of permits for railway, road and shipping projects and permits under the Act on Nature and Landscape Protection (JaE, 2010).²¹ Moreover, natural persons have no right to review decisions regarding land use plans. However, even successful judicial review has not always led to implementation of decisions. The case of the Pezinok landfill is a case in point. A civil initiative to prevent construction of a landfill in the town of Pezinok was upheld by the Supreme Court, which prohibited operation of the landfill. However, the Constitutional Court postponed implementation of the judgement and the landfill continues to receive waste despite strong opposition from local inhabitants and wide support for their stance across the country.

3. Progress in air, water, waste, nature and biodiversity management

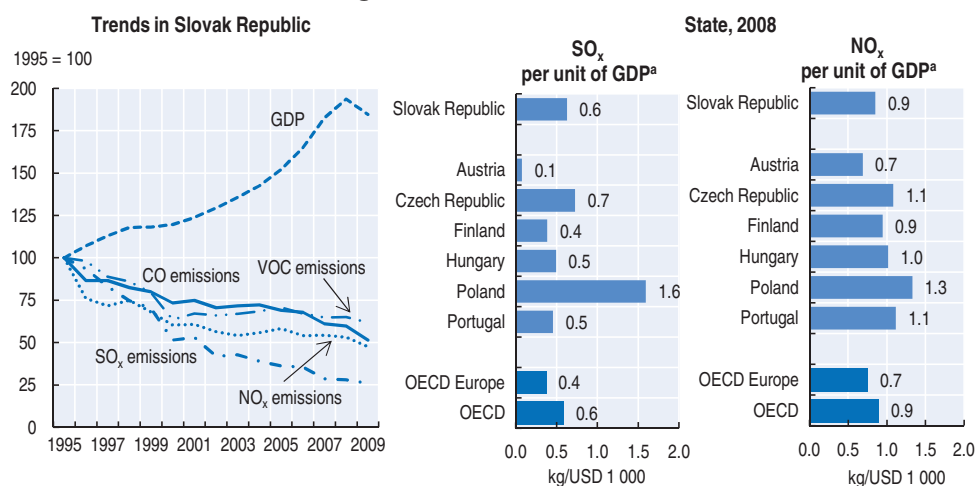
3.1. Air management

Atmospheric emissions

Protection of the atmosphere against air pollutants has been a priority since the 1993 National Environmental Policy Strategy, and related objectives were included in the 1996 and 1999 National Environment Action Programmes (NEAP I and NEAP II) (OECD, 2002). Slovakia is bound to reduce its air emissions under the Convention on Long-range Transboundary Air Pollution (CLRTAP) and its eight protocols. In 2007, the government approved a national programme for reducing emissions of SO₂, NO_x, ammonia and NMVOC in line with requirements of the EU Directive on National Emission Ceilings²² (MoE, 2006).

Following a dramatic decrease in air pollutant emissions in the 1990s due to a fall in industrial production and energy consumption, as well as fuel switching from coal and oil to natural gas and the introduction of more advanced technology, most air pollutant emissions continued to decline but at a lower rate. Slovakia is well on track to achieve the targets set under the CLRTAP protocols (Chapter 4). It is noteworthy that this progress was achieved in the context of high economic growth: 62% growth in GDP from 2000 to 2008, and a 52% rise in energy consumption from road transport. Slovakia succeeded in decoupling most main air emissions from economic growth in absolute terms (Figure 3.3). Emissions per unit of GDP are now in line with OECD averages, albeit still above those of OECD Europe. Complying with stricter ceilings in the framework of the European Thematic Strategy on Air Pollution will be a challenge, however. As the replacement of old polluting technology has largely been completed, marginal abatement costs are likely to increase (OECD, 2010).

Figure 3.3. Air emissions



a) GDP at 2005 prices and purchasing power parities.

Source: OECD, Environment Directorate; OECD (2010), OECD Economic Outlook No. 88.

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Between 2000 and 2008, Slovakia's most outstanding air management achievement was a 45% reduction in SO_x emissions (Table 3.1). This success mainly resulted from the use of low-sulphur fuel in both industrial and non-industrial combustion, along with

separation technology, improvement of energy efficiency and phasing out of some power plants. Power production, where emissions were reduced less than in other sectors, became the major source of SO_x emissions.

NO_x emissions dropped by 12% in the same period. Emissions were reduced by 55% from power stations and 28% from industrial combustion through denitrification processes and a decline in solid fuel consumption. However, this achievement was partly offset by an increase of around 40% in road transport emissions as petroleum consumption rose despite fleet renewal. The transport sector now accounts for more than half of total NO_x emissions.

A slight increase in NMVOC emissions was recorded over 2000-08. Despite a nearly 40% decline in emissions from road transport due to the introduction of catalytic converters on cars, emissions from solvent use rose by 26%.

Emissions of carbon monoxide fell by around 20%, mostly because of a 46% reduction in road emissions due to the fleet renewal and increased use of catalysts. Emissions from non-industrial combustion also decreased. In industry, however, especially the iron and steel sector, emissions rose, and industry is now the largest emitter of CO (Table 3.1).

Table 3.1. **Atmospheric emissions by source (1 000 t)**

		SO ₂	%	NO _x	%	NMVOC	%	CO	%
Power stations	2000	48.9	38.5	27.7	25.8	0.2	0.3	15.7	5.1
	2008	42.5	61.2	12.4	13.1	0.2	0.3	16.4	6.5
Industrial combustion	2000	57.8	45.5	28.6	26.6	0.6	0.9	110.0	35.7
	2008	22.2	32.0	20.5	21.7	0.9	1.3	122.9	49.0
Non-industrial combustion	2000	19.4	15.3	14.1	13.1	7.9	11.8	65.4	21.2
	2008	4.5	6.4	12.8	13.6	11.2	16.3	47.9	19.1
Industrial processes	2000	–	–	0.2	0.2	8.7	13.0	–	–
	2008	–	–	0.3	0.3	4.9	7.2	–	–
Mobile sources	2000	0.9	0.7	36.5	34	15.7	23.5	117.1	38.0
	2008	0.3	0.4	48.5	51.3	9.9	14.5	63.5	25.3
Solvents	2000	–	–	–	–	27.0	40.3	–	–
	2008	–	–	–	–	34.0	49.6	–	–
Miscellaneous	2000	–	–	0.3	0.3	6.8	10	–	–
	2008	–	–	–	–	7.4	11	–	–
Total	2000	127.0	100.0	107.4	100.0	66.9	100.0	308.1	100.0
	2008	69.4	100.0	94.5	100.0	68.4	100.0	250.6	100.0
Change 2008/2000		–45.3		–12.0		2.3		–18.7	

Source: OECD, Environment Directorate.

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Ammonia emissions, the vast majority from agriculture, declined by 20% even though agricultural production and fertiliser use increased. The decrease is largely due to reductions in the number of livestock, especially cattle and pigs.

Emissions of particulate matter (PM_{2.5}) fell by 16%. Large sources considerably reduced their emissions through fuel switching to high-grade fossil fuels, separation technology and closure of combustion units in power plants. However, emissions from the residential sector significantly increased, and the sector accounted for four-fifths of total PM_{2.5} emissions in 2008. Since 2000, the rise in natural gas prices has caused a decline in use of

natural gas, with wood combustion for household heating often taking its place. The cut in gas supplied from Russia in 2009 also resulted in Slovaks expanding wood burning.

Significant progress was made in the 1990s to reduce heavy metal emissions, with closures of obsolete metallurgy plants, installation of separation equipment, changes in raw material and the phasing out of leaded petrol (1997). However, since 2004 lead emissions have increased in line with growth in ore sintering,²³ copper and glass production, and waste incineration. In 2008, emissions of heavy metals were below their 1990 levels, as required by the Aarhus Protocol to the CLRTAP, yet heavy metal emissions per capita and per unit of GDP remain above OECD Europe averages (CEIP, 2011).

Between 2000 and 2008, emissions of some persistent organic pollutants (POPs), notably polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs), increased. Higher consumption of diesel in road transport and wood in the residential sector led to the rise in PCB emissions. The growth in wood use affected PAH emissions. Emissions of dioxins and furans declined as incineration facilities were renovated. Changes in copper and cement production and road traffic volume led to variation in hexachlorobenzene emissions. Nevertheless, POP emission levels are below the targets set in the Aarhus Protocol.

Ambient air quality

The Slovak Hydrometeorological Institute monitors air quality through a network of 36 stations, of which three-quarters have been equipped with particulate monitoring devices since 2007. Regional environment offices regularly release information on pollutant concentrations to the public.

In 2009, no exceedance of limit values for human health protection was reported for SO₂, CO, heavy metals²⁴ or benzene concentrations (MoE, 2010b). The NO₂ limit value was exceeded at two stations in Bratislava and Banská Bystrica. Exceedances of the PM₁₀ limit value were observed throughout the country (at 15 stations for the daily limit value and at 3 stations for the annual average limit value). As in several other OECD countries, particulate matter is the biggest challenge for air quality and health in Slovakia. Industry, domestic heating and road traffic are factors in the high PM₁₀ concentrations, together with long-range transport of air pollution. Because of high transboundary emissions, Slovakia was granted an extension until June 2011 on compliance with PM₁₀ limit values in the Košice, Prešov and Trenčín regions under the 2008 EU directive on ambient air quality. The urban population exposure to particulate matter peaked in 2005 and has since declined to below the EU average.

From 2006 to 2009, the health target on ground-level ozone concentrations was exceeded at 10 stations out of 13, but ever since the very warm, dry year of 2003, annual averages of ozone concentrations have been declining.

Policy measures to address air pollution

The 2002 Air Protection Act (478/2002),²⁵ transposing the EU Air Quality Framework Directive (96/62/EC), set the basis for implementation of air policy in Slovakia over the review period. It defined air quality targets, non-compliance penalties, and the responsibilities of the national and local authorities. The Act was complemented by Decree 706/2002 setting emission limits, technical requirements and conditions for operating stationary sources of air emissions. Regulatory measures have focused on large and medium-sized pollution

sources (the twenty largest polluters account for 90% of SO_x emissions, 50% of CO emissions and 30% of NO_x emissions) and the use of best available technology by new and retrofitted facilities. Other legislation with a significant impact on air protection includes the 2003 Act on Integrated Pollution Prevention and Control, the 2003 decree laying down national emission ceilings and emission quotas, the 2003 decree limiting VOC emissions from the use of organic solvents and the 2004 decree setting requirements on fuel quality. Slovak legislation has been amended and complemented repeatedly; in 2010, a new Air Act was adopted (137/2010), replacing the 2002 law and transposing the EU directive on ambient air quality and cleaner air for Europe (2008/50/EC).

By law,²⁶ operators of large- and medium-sized pollution sources have to pay emission taxes per tonne emitted. Rates are differentiated by pollutant, based on health impact, ranging from around EUR 30/tonne for CO to around EUR 1 300/tonne for cadmium, mercury and asbestos. The rates were phased in, from 55% in 1999 to 80% in 2003 and 100% in 2007. Non-compliance fees were also introduced as an incentive to upgrade less advanced facilities that exceeded emission limits before 1999. Such installations were permitted to operate until the end of 2006 on the condition of paying higher taxes on air pollution. Dynamic coefficients were applied to the standard tax rate, starting at 1.3 in 2000 and reaching 16.0 in 2006. This system provided strong incentives to introduce best available technology and comply with regulations on time.²⁷ Between 2000 and 2005, revenue from air emission taxes was constant in real terms, but it peaked at about EUR 39 million in 2006 and 2007 when the maximum rates applied. It has dropped since then with the closure of some non-compliant installations and the economic slowdown. In 2009, revenue was down to EUR 5 million. Over 2005-09,²⁸ air emission taxes from large and medium-sized pollution sources were the largest source of revenue for the Environmental Fund (45%), but only 3% of the fund expenditure went to air protection.

Slovakia has introduced an SO₂ emission trading system for large emission sources but has not yet implemented it because the quotas allocated were higher than real emissions. Moreover, as the Slovak SO₂ market is limited (four operators account for more than 80% of emissions), the number of transfers has been negligible. Overall, the combination of regulatory measures with increasing taxes has been more influential in capping emissions. No cost-benefit analysis of Slovak air management policy has been carried out.

Major investment on air protection was made for EU accession but since then investment has decreased. Even so, air protection remained the second environmental investment item, after wastewater, over the review period. Between 2004 and 2009, nearly EUR 500 million was invested on air pollution abatement in Slovakia, much of it in basic metals. Measures to mitigate air pollution have been financed via various EU programmes. Between 2004 and 2006, more than EUR 54 million (of which EUR 23 million came from EU funds) was spent on air protection under the operational programme for basic infrastructure and EUR 212 million (including EUR 180 million from EU funds) was allocated to air protection and minimisation of adverse effects of climate change under the operational programme for environment for 2007-13. Programmes on transport and energy are other significant sources of funding for air protection.

Regional environment offices have developed action plans to improve air quality in areas where concentration limits are exceeded. For example, until 2008, measures in Bratislava focused on modernising large pollution sources and changing the fuel mix. The 2009 city action plan gives priority to road infrastructure improvement, development of

public transport, modernisation of large polluting sources and extension of pedestrian areas (MoE, 2009b).

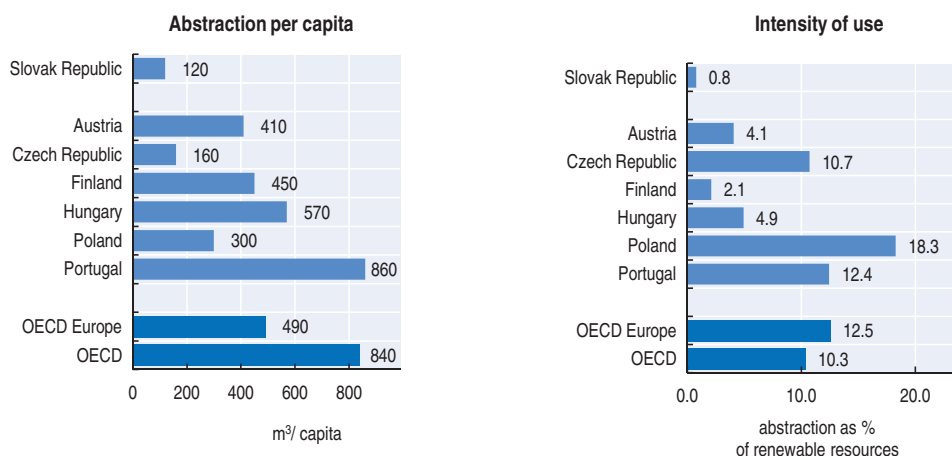
3.2. Water management

Water availability and use

Slovakia's water resources are abundant and evenly distributed. Using only 0.9% of its renewable resources, Slovakia is among the least water-intensive OECD countries (Figure 3.4). The share of groundwater abstracted for the economy and population is 52%, well above the OECD and OECD Europe averages. Drinking water is mostly drawn from groundwater (77%), while industry uses mostly surface water (78%).²⁹ Agriculture, including irrigation, uses 4% of surface water and 3% of groundwater (MoE, 2010a).

Overall abstraction of surface and groundwater decreased further in the review period, continuing a trend that began in the early 1990s (Figure 1.1). A decrease was also recorded in average water consumption by households, industry and agriculture, which fell to 192 litres/person/day in 2007, from 267 litres/person/day in 2000 (MoE, 2010a). The biggest decrease in water use came in agriculture, whose share is now very small (around 1% in 2007, down from 13% in 1990). By volume, industry had the biggest decrease (–40%), due to further restructuring and increasing efficiency in the sector. Water use by households fell by 20%, mostly due to reform of water pricing.³⁰ In 2007, the share of overall consumption for drinking was 46%, higher than industry's 44% share (the respective shares in 2000 were 36% and 53%) (MoE, 2010a).

Figure 3.4. Freshwater use, 2009^a



a) Or latest available year.

Source: OECD, Environment Directorate.

StatLink  <http://dx.doi.org/10.1787/888932496216>

Slovakia's rivers and streams have relatively unstable discharges, with frequent floods resulting. Flooding of larger rivers typically results from snow melting in around March and April or from heavy rain mostly in July and August. Floods on smaller rivers tend to be flash floods that are caused by heavy short-term rainfall. Particularly large floods were recorded in 2006, when over 30 000 ha of land was inundated, causing total damage and rescue costs of EUR 60 million (MoE, 2010c).

Hydropower plants on Slovak rivers produce almost 20% of the country's electricity. The River Váh and its tributary Orava in northern Slovakia are used primarily for this purpose. Other rivers that are used for energy production include the Danube in the south (with the Gabčíkovo dam and hydropower plant built on a diversion canal) and the Hornád and Ondava in the east.

Water quality

Slovakia's surface water generally complies with most physical-chemical quality requirements, including those for total organic carbon, calcium, sulphates, magnesium, micropollutants (cyanide, copper, nickel, chromium) and various organic substances. Indicators with the most exceeded values include aluminium, selenium, chloroform and the nitrous form of nitrogen. Other pollutants exceeding norms include bis(2-ethylhexyl)phtalate (DEHP),³¹ 1,2 dichloroethene, lead and cadmium. Values for faecal streptococci, thermo-tolerant bacteria and coliform bacteria, which are key microbiological indicators, are frequently exceeded in some locations (MoE, 2010a).

Exceedances of several limit values in groundwater indicate the impact of anthropogenic pollution. Agricultural activities are reflected in increased content of oxidised and reduced nitrogen forms, ammonia and nitrates. Every year, groundwater monitoring detects exceedances of value limits for sulphates and chlorides, heavy metals (especially aluminium, arsenic, antimony, cadmium, nickel and lead) and organic substances such as PAHs (phenanthrene, fluoranthene, benzo(a)pyrene, pyrene) and volatile aromatic hydrocarbons (1,3 dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene). Limit values for pesticides and volatile aliphatic hydrocarbons have been exceeded only sporadically (MoE, 2010a).

Evaluating trends for Slovakia's surface and groundwater quality is difficult because the assessment framework was significantly reformed as part of the harmonisation of Slovak water legislation with the Water Framework Directive. The 2004 Water Act and executive regulations transposing the directive into Slovak law stimulated redefinition of water bodies, revision of significant pollution sources and hydromorphological changes, and changes to water quality standards (MoE, 2009a). Using a new approach compatible with the directive's requirements, an assessment of Slovakia's waters was completed in 2007 (MoE, 2009b). It provides an important benchmark that will guide efforts to achieving the objectives in the directive (Box 3.4).

The number of accidents resulting in serious water quality deterioration decreased from a peak of 151 in 2006 to 101 in 2009.³² Out of the 101 cases reported in 2009, the source of pollution was discovered in 79, mostly involving road and rail transport (31% of all cases). Oil substances accounted for 65% of the total and wastewater releases formed the next largest category at 17%. As many as 13 of the cases resulted in fish kills. The Basic International Warning Centre Slovakia, part of the Danube early warning system, was activated twice (MoE, 2010c).

Most freshwater bathing waters (97.2%) met mandatory water quality norms in 2009, a significant improvement from 2004 when only 22% did so (EEA, 2009).

Box 3.4. Assessment of surface and groundwater quality in the context of the EU Water Framework Directive

The Water Framework Directive requires achievement of the following objectives by 2015: i) good ecological and chemical status for natural surface waters in all river basins; ii) good ecological potential and good chemical status for heavily modified and artificial water bodies; and iii) good quantitative and chemical status for groundwater.

The 2007 evaluation of surface waters showed that around 64% of all surface water bodies achieved high or good ecological status or potential. This corresponded to 54% of the total length of watercourses. A relatively high share of water bodies was classed as having moderate status or potential (33% of the total number, 40% of total length) and a very small share as being of poor or bad status (3% of the total number, 6% of total length).

The results of the evaluation of chemical status of surface water bodies, based on risk analysis for 1 595 water bodies and monitoring of 79, showed that around 95% of surface water bodies (and 90% of total length) were of good chemical status. However, rivers in western Slovakia are of poorer chemical status than those in the east. The whole length of the Danube River does not achieve good chemical status. Other major watercourses in the west (Morava, Hron, Ipel') exhibit good chemical status only in their upper stretches. The upper stretches of the Váh and Nitra are of poor status, and the lower stretches are classified as failing to achieve good chemical status. All surface water bodies in eastern Slovakia (Slaná, Bodva, Hornád, Bodrog, Poprad and Dunajec) were classified as having good chemical status.

In the quantitative status assessment of 75 groundwater bodies (16 quaternary and 59 pre-quaternary), only 5 groundwater bodies were classified as having poor quantitative status. Good chemical status was assigned to 83% of groundwater bodies, representing 76% of total groundwater volume. Poor chemical status was observed in 13 groundwater bodies (7 quaternary and 6 pre-quaternary) accounting for 24% of total groundwater volume.

The analysis showed that even if complementary measures are taken to address poor ecological and chemical status, the objectives of the Water Framework Directive will not be achieved by 2015. Exceptions were requested for 640 surface water bodies (36% of the total number) totalling 9 030 km (47% of total length), and for the 13 groundwater bodies of poor chemical status. The reasons cited for the exemptions were technical unfeasibility of measures in the period given, cost, and lack of financial resources. Implementation of measures is planned for the next river basin management cycles by 2021 and 2027.

Source: MoE, 2009b.

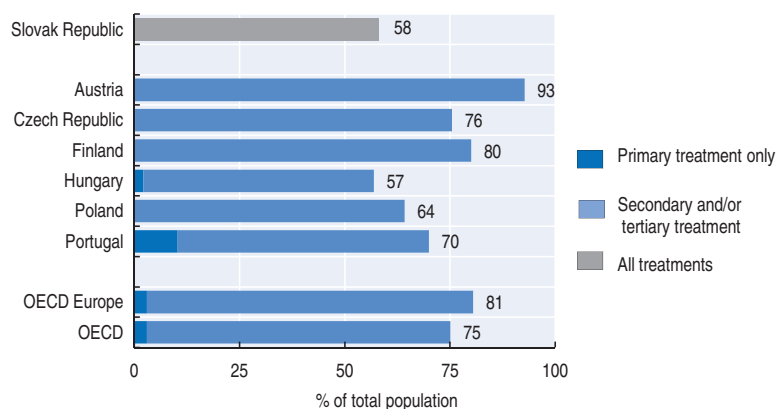
Key pressures and policy responses: water supply and sanitation

Trends of declining water use by industry and the population during the review period translated into a significant (nearly 40%) reduction in the amount of wastewater discharged to watercourses. As discharges fell, so did the pollutant load: chemical oxygen demand by 60%, insoluble substances by 57% and biochemical oxygen demand by 46% (MoE, 2010a). Progress in expansion of sewerage, combined with an extensive system of pollution charges for wastewater, led to a reduction in direct discharges of untreated water to around 5% of total discharges (MoE, 2010a).³³

However, only modest progress was made in extending coverage of wastewater collection and treatment infrastructure (treatment of household and industrial wastewater in most cases). The number of wastewater plants increased from 350 to 570, but capacity

rose by only 15% (MoE, 2010a). The share of the population connected to wastewater treatment plants increased from 51% in 2000 to 58% in 2009, a moderate pace compared to neighbouring countries that faced similar challenges, such as the Czech Republic and Hungary, and well below the government target for 2013 of 81% (MCRD, 2009). With such a connection rate, Slovakia remains one of the lowest-ranking OECD countries in this respect (Figure 3.5).³⁴ Most treatment plants (89%) use lower-performance mechanical-biological processes, even though the entire Slovak territory is considered “sensitive”, requiring nitrate and phosphate removal technologies in agglomerations above 10 000 population equivalent.³⁵ Around 25% of sewers are thought to be in a poor state, leading to contamination of groundwater by microbiological pollutants (MoE, 2010a).

Figure 3.5. **Population connected to public wastewater treatment plants, 2009^a**



a) Or latest available year.

Source: OECD, Environment Directorate.

StatLink  <http://dx.doi.org/10.1787/888932496235>

Development of public sewerage has fallen behind the development of public water supply networks. The share of population supplied with drinking water from public supply networks reached 86% in 2009, a slow increase from 83% in 2000.³⁶ The pace of infrastructure development has to be accelerated if the government’s target of 91% by 2013 is to be achieved (MCRD, 2009). Efforts are also needed to improve the existing water pipelines, as losses during distribution are high (29% in 2008) (MoE, 2010c).

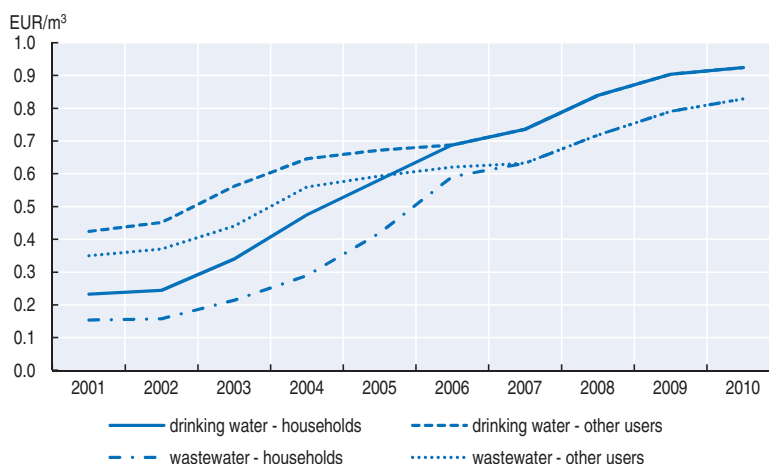
The quality of drinking water is generally good: 99.5% of analyses complied with sanitary limits in 2008. Some 92% of samples meet drinking water quality demands for all indicators (MoE, 2010a). However, microbiological contamination (especially by coliforms) is found in drinking water samples. The situation is more problematic for private water sources for individual use, where 80% to 85% of samples do not comply with hygienic requirements, thus posing a risk of danger to human health (SEA, 2009).³⁷

Although transition periods were agreed for meeting the obligations of the EU Urban Wastewater Treatment Directive, steps have been taken to speed up development of the water supply and treatment infrastructure. The most important was the transformation of five regional state-owned water supply and sanitation enterprises into joint stock water companies, a process completed in 2004. A majority of Slovakia’s water and wastewater infrastructure is now operated by 14 water companies owned by municipalities but operated as separate entities. Three of them (in Tren in, Poprad and Banská Bystrica) are operated by foreign multinational companies. However, there are still over 100 small

municipal companies that manage small local water and sanitation infrastructure. Efforts are still needed to increase management, planning and technical capacities of large water companies, and the structure and management of small municipal utilities should also be reviewed. Possible options include separating them from the municipalities and creating autonomous utilities, and further consolidating smaller units into larger companies.

The transformation process increased the transparency and efficiency of utility operations and allowed further reforms. These included eliminating large differences in tariffs between industrial consumers and households for both drinking water and wastewater collection and treatment (Figure 3.6).³⁸ Before 2003, household charges for drinking water supply and wastewater treatment were nearly 50% lower than those for other users and did not cover actual service costs (MoE, 2010c). Over a very short period, 2003-06, the charges were raised dramatically and uniform levels for water and wastewater services for various users had been set by all water companies by 2007.³⁹ In 2007, the maximum profit allowed was reduced, resulting in a lowering of prices. However, the charges have increased again since 2008 as eligible costs and inflation have risen.⁴⁰ An annual 5% increase in charges for discharge of wastewater through the public sewage system was introduced in 2009 to support investment in the wastewater sector arising from EU commitments (RONI, 2009).

Figure 3.6. **Average price of drinking water supply and wastewater collection for households and other users, 2001-10**



Source: Regulatory Office for Network Industries.

StatLink  <http://dx.doi.org/10.1787/888932496254>

Oversight of water and sanitation tariffs was strengthened by moving the regulatory function from the Ministry of Finance to the Regulatory Office for Network Industries in 2003.⁴¹ Since then charges have been determined under a price-cap method taking account of eligible costs, an adequate profit for operators, an annual inflation rise, an efficiency factor and an investment development factor.⁴² This method contributed to the increasing cost recovery of operations (which in most cases is now close to 100%), and the protection of consumers' rights against any unjustified and inadequate increase in service charges (MoE, 2010c, RONI, 2009).

The funds available for the development of water and sanitation infrastructure increased significantly during the review period. Initially, EU funds played an important

seed role: around EUR 360 million in EU funding (including from the pre-accession ISPA programme, as well as Cohesion and Structural Funds) was spent on the development of water and wastewater infrastructure between 2001 and 2006 (GHK, 2006). The EU funds were combined with state budget funds (around 20% of the total) and water utility resources (accounting for around 40-50% of the total). A further 10% or so was financed through commercial lending. The EU funds played an increasingly important role in funding of water and wastewater infrastructure, with their share in annual expenditure increasing from around 20% in 2006 to 38% in 2008. About EUR 900 million was allocated from EU funds for the second planning period (2007-13) for water supply and sanitation (MoE, 2007). The total spent by water utilities increased significantly, from EUR 70 million in 2004 to EUR 312 million in 2009 (MoE, 2010c).

Thus far, efforts have focused mainly on reconstructing and upgrading wastewater treatment plants and reconstructing the sewer system. Over the next five years, the emphasis will be on developing new sewerage and treatment capacity and upgrading existing plants. The investment in sewerage and wastewater treatment should be addressed in parallel, especially in light of the need to renovate existing sewers. Further efforts are needed to reduce the high leakage rate (nearly 30%) in the sewerage system. Significant investment is also needed to upgrade combined sewer overflows, reconstruct trunk sewers and construct stormwater detention tanks (MoE, 2010a). Another significant challenge will be to increase drinking water and sewerage connection rates to new houses, as inhabitants have refused to join the networks citing high collection charges and a requirement that they finance the connection. A low connection rate threatens the financial viability of water service networks. The government should examine options for addressing this problem, including providing direct subsidies or incorporating the cost of connection into the overall capital cost.

Even with increased funding from the EU and national sources, meeting all EU obligations will be challenging. Estimates show a significant funding gap for requirements of the Urban Wastewater Treatment Directive: in 2010, there was a backlog of EUR 1.2 billion worth of investment that had not been implemented in 2007-09 (MoE, 2010c). Little room exists to raise funds from increased water and wastewater tariffs, which have increased rapidly and are close to cost-recovery level for operating expenditure. Some opportunities exist to increase water abstraction charges, which do not cover abstraction costs and are currently regulated by the Regulatory Office for Network Industries (MoE, 2010c). The challenge will be to prioritise and phase investments over time to focus on areas with the best cost-benefit ratio and the highest positive impact on water resources. The classification of the whole of Slovakia as a “sensitive” area under the Urban Wastewater Treatment Directive should be reconsidered, with a view to prioritising the most sensitive areas. A comprehensive evaluation of the state of the infrastructure, remaining needs and available resources, as was done in 2006 before launching the second phase of EU structural funding, could provide a good basis for priority setting. Further reform of water utilities should also be carried out, to reduce costs and increase operating efficiency. The second generation of the river basin management plans should provide an important vehicle for analysis and further actions.

Key pressures and policy responses: reducing agriculture’s impact on water

Overall water pollution levels from agricultural nutrients is well below that for many EU15 countries, and concentrations in water bodies have been stable or in some areas even declined. Reduction of livestock numbers (especially cattle and pigs) has cut the use of manure in fertilisation. Pesticide consumption was roughly stable over the review period

(Chapter 6). However, in some regions, agriculture run-off pollution is a concern, especially in western Slovakia, as there has been a rise in surpluses of nitrogen (but not phosphorus) as a result of a growing use of nitrogenous fertiliser since 1999 (OECD, 2008). The increase, which accelerated in 2008, will translate into increased pollution of surface water and groundwater in some intensively farmed areas.

Slovakia has undertaken several measures to reduce the environmental impact of farming on water quality and quantity. The 2004-06 rural development plan, jointly funded by the EU and Slovakia, provided for agri-environmental programmes, including basic area payments conditional on adoption of environmental farm management practices, support for conversion of arable land to permanent pasture and payments for organic farming (OECD, 2008). In the 2007-13 planning period, agri-environmental programmes are strengthened and expanded (Chapter 6). EU membership since 2004 has also required the adoption of EU environmental policies that significantly affect the agricultural sector, most notably the Nitrates Directive. As a result, about 60% of Slovakia's farmland is designated as nitrate vulnerable, and the 2004 Water Act was amended to set more stringent technical requirements (*e.g.* regarding manure storage and application) to reduce water pollution in these areas. However, the agricultural land area under nutrient management plans declined sharply, largely due to farmers' lack of capital to invest in manure storage and treatment technologies (OECD, 2008).

Agriculture is largely rain-fed, so use of irrigation is limited, accounting for only 1% of the total farmland area, mainly for horticulture. Most water for irrigation is drawn from surface waters; high-pressure rain guns are the main technology used (OECD, 2008). Farming's share in national water use decreased from 7% in 2001 to 3% in 2009. Agricultural use of surface water declined by over 90% in the same period, largely because the irrigated area was halved following the privatisation of some irrigation projects. Other factors included lack of investment in irrigation infrastructure and relatively high water prices (Chapter 6).

Towards integrated water management

Slovakia's approach to water management started to undergo a major overhaul during the review period, one that is not yet completed. The process was launched in 2003, when responsibility for water management was moved from the Ministry of Agriculture to the MoE. Then the introduction of the Water Act in 2004 harmonised Slovak water legislation with the EU Water Framework Directive and introduced the river basin approach. Two main river basin districts were designated, for the Danube and the Vistula.⁴³ Ten river sub-basins were established: Danube, Morava, Váh, Hron, Ipel', Slaná, Bodrog, Hornád and Bodva in the Danube basin, and Dunajec-Poprad in the Vistula basin.⁴⁴ Management plans were prepared in 2009 for all sub-basins (MoE, 2010d).

The development of river basin management plans included assessing the human impact on surface – and groundwater bodies and carrying out economic analysis of water use (completed in 2005), establishing programmes for surface – and groundwater monitoring and defining the status of protected areas (by 2006), and developing programmes of measures (2009). Draft versions of the plans were finalised in 2009 and subject to wide consultation with stakeholders (MoE, 2010d). The process was completed by the adoption of the Water Plan of the Slovak Republic in 2010. The plans are now being evaluated by the European Commission, but the measures are gradually being implemented. Progress in

achieving objectives is expected to be assessed in six-year cycles (by 2015, 2021 and 2027), with the river basin management plans being updated where necessary.

The development of river basin management plans was a very positive step, but concerns were raised during consultation about the scope and depth of analysis and consistency and transparency in the process of preparing the plans. The major weaknesses identified included inaccurate assessment methodologies, missing scenarios in the programmes of measures, non-viable estimates of pollution reduction, and poor calculation of the effectiveness and efficiency of proposed measures. These problems can still be addressed if the draft plans are reviewed and revised on the basis of stakeholder comments. Preparation of the second generation of ten river sub-basin plans should stimulate more detailed analysis and help in calibrating measures. Identification of competent authorities at the subdistrict level should help in co-ordinating development and implementation of measures and addressing conflicts between water users.

Better connections should also be made between the implementation of river basin management plans and financing, in particular, the use of charges for water abstraction and wastewater discharges. These charges can be important instruments in managing river basins. A particular example concerns abstraction charges introduced in 2005, including charges (per MWh and volume-based) for the use of hydropower potential of water flows at hydraulic structures (differentiated by size of installed output) (MoE, 2010c). These energy-related charges and earlier charges for surface water abstraction are currently collected by the state-owned Slovak Water Management Enterprise (SWME) Banská Štiavnica, the main provider of raw water to users across Slovakia. In the future they should be the major source of funding at the river basin level.

More emphasis should be given to flood prevention in integrated river management. Steps taken under the flood protection programme of 2000-10 included development of a flood warning and forecast system and investment measures (amounting to EUR 170 million) carried out by SWME Banská Štiavnica. However, estimates show around a EUR 450 million shortfall of funding for flood prevention. The situation is aggravated by increased housing construction being permitted on flood plains, which implies a potential for higher damage and rescue costs in case of flooding. Additional efforts are needed, in addition to the EUR 140 million allocated for flood prevention in 2007-13 (MoE, 2007).⁴⁵ The Flood Protection Act adopted in 2010 should result in further measures and has already led to the launch of 23 pilot projects costing EUR 600 000. However, more emphasis should be placed on integrating flood protection into river management plans and on better use of nature protection and land use planning policies in flood prevention.

3.3. Waste and materials management

Objectives and policy framework

The 2001 Waste Act⁴⁶ outlines waste management principles, in order of priority: prevent and restrict waste generation, foster material then energy recovery, and protect public health through environmentally sound disposal. The Act defines the duties and responsibilities of waste generators, municipalities and state authorities, and requires all actors concerned to regularly develop waste management programmes (OECD, 2002). Over the last decade, it has been amended repeatedly to adjust to EU legislation. Other regulatory instruments, concerning end-of-life vehicles, packaging, and waste electrical and electronic equipment (WEEE), have been adopted to transpose EU directives. A 2010

law requires municipalities to assure separate collection of paper, plastic, metal and glass. Because of political changes and organisational restructuring, Slovakia missed the deadline for transposing the 2008 Waste Framework Directive into national law. Neither a draft version of the legal text nor a schedule for implementation was available by December 2010 (EC, 2010a).

The MoE has developed national waste management plans, approved by the government, since 1993. They include quantitative targets and measures to achieve them. Since the previous review, two plans have been approved: in 2001 (for the period up to 2005) and 2006 (for the period up to 2010). From the gap between the 2006 objectives and the results achieved, the Slovak Environmental Agency concluded that the targets were too ambitious. However, this raises questions about the plan's analytical basis, the political priority given to the plan and the effectiveness of the measures proposed (SEA, 2010a). A new plan for 2011-15 is expected to be approved in early 2012.

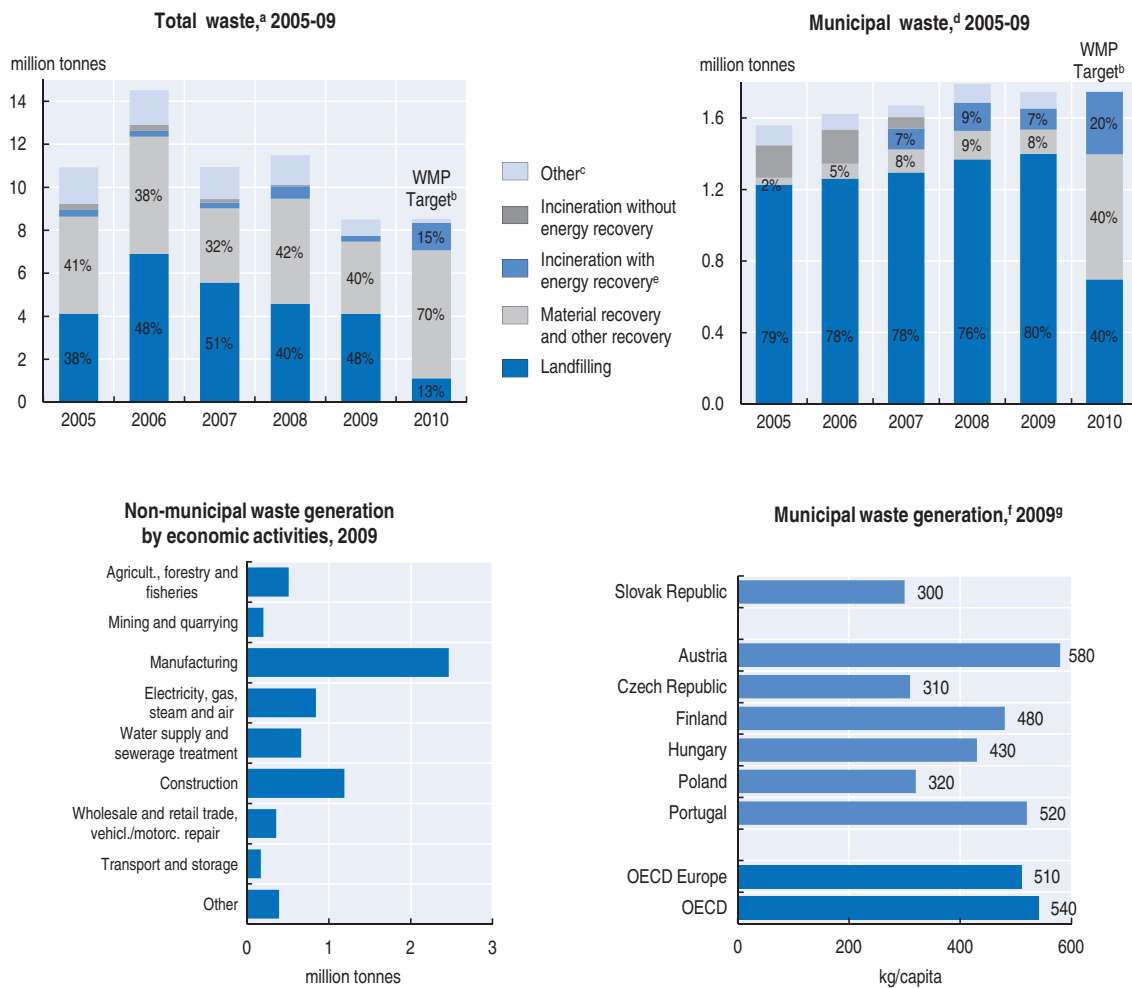
Material flows and resource efficiency

Slovakia's economy, at 18 tonnes of direct material input⁴⁷ per capita (44% from imports), has relatively low resource requirements compared to those of other European countries (EC, 2010b). Two-thirds of the material input is consumed domestically and one-third is exported. From 2000 to 2007, domestic material consumption⁴⁸ increased, but at a lower rate than GDP, leading to a fall in the material intensity of the Slovak economy by about 20% (Table 1.1). The overall increase in domestic material consumption was driven by rising consumption of construction minerals and wood; consumption of fossil fuel, food biomass and metal declined.

Waste generation

In 2009, 12.5 million tonnes of waste was generated in Slovakia, of which 8.5 million tonnes was put on the market,⁴⁹ down from 10.9 million tonnes in 2005, the reference year for the waste management plan then in effect. The decline was due to the economic crisis; waste generation is expected to increase with economic recovery and rising incomes. Non-municipal waste (mainly from manufacturing, from electricity, gas and water supply, and from construction) accounts for 80% of the amount generated, and municipal waste 20%. Municipal and non-municipal hazardous waste makes up 6% of the total generated (Figure 3.7). For the five-year period, generation of excavated soil and stones peaked in 2006 due to construction of highway feeders and the Sitina motorway tunnel in Bratislava. Transport infrastructure is expected to be the major driver of increased waste generation in the near term.

Between 2002 and 2008, industrial waste⁵⁰ generation was decoupled from economic growth in absolute terms (Table 1.1). Although changes in waste definitions over time necessitate caution when interpreting data, process modernisation may have helped slow industrial waste generation even as production continued to grow. In contrast, municipal waste generation grew steadily to 2008, albeit more slowly than private final consumption. With 300 kg of municipal waste generated per capita in 2009, Slovakia continued to be well below the OECD Europe average, reflecting the remaining gap in GDP per capita compared with more advanced economies. Between 2002 and 2009, the amount of hazardous waste treated off-site was broadly stable.

Figure 3.7. **Generation and treatment of waste**

a) Waste put on the market.

b) 2010 percentage targets of the Waste Management Plan applied to 2009 amounts.

c) Transfer and storage.

d) Including small construction waste not covered in the OECD definition.

e) Municipal waste: the decrease in 2005 and 2006 is due to incinerator closures.

f) In interpreting national figures, it should be borne in mind that survey methods and definitions of municipal waste may vary from one country to another. According to the definition used by the OECD, municipal waste is waste collected by or for municipalities and includes household, bulky and commercial waste, and similar waste handled at the same facilities. Slovak Republic: excluding small construction waste not covered in the OECD definition.

g) Or latest available year.

Source: Slovak Environmental Agency; OECD, Environment Directorate.

StatLink  <http://dx.doi.org/10.1787/888932496273>

Waste treatment and disposal

In terms of the overall amount of waste, Slovakia has made no clear progress on diverting waste from landfill and increasing recovery, but there have been variations in waste streams (Figure 3.7). From 2005-09, recovery of hazardous waste fluctuated between 20% and 30% of the amount put on the market but there was no clear trend of improvement. Slovakia fell short of most of its targets on hazardous waste management. The MoE has asked the Slovak Environmental Agency to prepare a strategy for hazardous waste management, including an implementation plan.

Separate collection of municipal waste rose from 9 kg to 23 kg per capita between 2002 and 2009, with notable progress in collection of plastic, hazardous components, paper and glass. More municipal waste is being recycled and composted, but material and biological recovery accounted for less than 10% of municipal waste treatment in 2009, a poor performance compared with other EU countries. Landfilling remains the predominant form of municipal waste management, accounting for 80% of the waste generated. Slovakia failed to achieve its reduction target on the amount of biodegradable municipal waste going to landfill. Nor has the country met its obligations under the EU Landfill Directive (1999/31/EC), which requires it to adopt a strategy for this purpose. Slovakia's landfill tax is among the lowest in the EU; increasing it would provide an incentive to divert waste from landfill.

Despite progress, recycling and recovery rates for packaging waste were below EU objectives in 2008.⁵¹ National targets for recovery, recycling and reuse of WEEE were achieved, with about 70% of hazardous WEEE and 80% of non-hazardous WEEE recovered. However, these objectives apply to the amount collected, which came to only one-third of the amount put on the market. With 3.6 kg of WEEE collected per capita in 2008, Slovakia fell short the EU collection target of 4 kg.⁵² The European Commission has asked Slovakia to address shortcomings in its waste legislation regarding collection facilities for electronic waste and mobile phone circuit boards. There is no facility for recovery of mobile phone batteries in Slovakia.

Boosted by a scrapping programme, the number of end-of-life vehicles treated rose sharply in 2009: nearly 68 000 vehicles were processed, compared to 700 in 2004 and 40 000 in 2008. The rate of vehicle reuse/recovery reached 89.6% and that for reuse/recycling was 88.8%. Slovakia met the relevant EU targets in 2006 (80% reuse/recycling) and 2007 (85% reuse/recovery). The country also achieved its objective of recycling 100% of used tyres.

Contaminated sites

As recommended in the 2002 OECD Environmental Performance Review, an inventory of contaminated sites was completed in 2008. In all, 1 819 sites were registered; of these, 880 were potential contaminated sites, and remedial measures have been taken on 685 sites. Half the contaminated sites posing high or significant risk to human health and the environment were landfills, but most polluted sites relate to the chemical industry. Remediation costs were estimated at EUR 1.2 billion, or 1.8% of GDP.⁵³ Carrying out site inventory before privatisation would have helped spur remediation by eliminating investor uncertainty (Bluffstone, 2007). However, while privatisation was progressing, Slovakia missed the opportunity to set a legal framework defining responsibilities for environmental remediation associated with the previous operation of state enterprises. In 2003, the MoE introduced a bill on contaminated sites, promoting environmental audits to determine responsibility for past damage, but it was not adopted.

Legal provisions allow financial resources from the National Property Fund to cover part of remediation costs by reducing the purchase price of the privatised asset, but the provisions have not been used. Current legislation does not put sufficient pressure on those responsible for the pollution, and in many cases the parties cannot be identified (SEA, 2010b). Financing arrangements for remediating orphan sites need to be made. In 2010, the government approved a state programme on contaminated sites for 2010-15 identifying particular sites as priorities and defining measures for a range of time horizons. EU funds are expected to finance the bulk of the programme, with cohesion funds paying 85% of the EUR 137 million allocated to contaminated sites over 2007-13.

Financing waste management

Although investment in waste management has grown in real terms since Slovakia's accession to the EU, it lags behind expenditure on other environmental concerns (Chapter 2). Efforts have focused on bringing waste treatment infrastructure into line with EU standards. More than EUR 40 million (75% of which was EU funding) was spent in the 2004-06 basic infrastructure operational programme to build and modernise 116 waste separation and recovery facilities, and to close or remediate 31 uncontrolled landfills. In addition, 30 incinerators for hospital waste were closed and 9 new plants for hospital waste were built. There is a pressing need for further investment on waste infrastructure to meet requirements of the Waste Framework Directive. In the operational programme on environment, EUR 434 million (including EUR 369 million in EU funding) is allocated to waste management for 2007-13.

Since 2004, as part of decentralisation, municipalities have collected local charges for managing municipal waste (except WEEE) and small construction waste. In 2006, the average annual fee was EUR 35 per household, amounting to 0.6% of household income (GHK, 2006). Over the period 2004-08, it grew by about 5% annually, slightly above the inflation rate. By law, charges have to be proportionate to the waste generated by the municipality's population, but waste fees are not differentiated by individual waste generation. These charges have to be in line with the cost incurred in providing waste management services. In practice, over 2004-09, revenue from these charges barely covered current expenditure by municipalities (mostly payments to private businesses), leaving nothing over for investment.

The private sector, through the Recycling Fund, is an important source of financing for separate collection. Producers and importers pay charges on products to be separated,⁵⁴ and the revenue goes to the fund. The revenue is to be spent within sectors in proportion to their contributions except for a part allocated to municipalities on the basis of evidence of separation and upon decision of the Recycling Fund Management Board. Between 2003 and 2009, the motor vehicle, plastic and paper sectors were the largest source of revenue and expenditure for the fund. Of the EUR 123 million spent in that period, only 8% was allocated to municipalities (Table 3.2). The poor performance of Slovakia in recycling would seem to

Table 3.2. **Revenue and expenditure of the Recycling Fund, 2003-09**

	Revenue ^a		Expenditure	
	EUR million	% in total	EUR million	% in total
Spent batteries and accumulators	3	2	2	2
Waste oil	9	6	8	6
Used tyres	9	5	8	7
Multilayer combined materials	3	2	3	2
Electric and electronic devices	8	5	9	7
Plastic	17	11	13	11
Lighting equipment containing mercury	–	–	–	–
Paper	16	10	16	13
Glass	9	6	7	5
Vehicles	70	44	41	34
Metal packaging	2	2	2	1
General sector			15	12
<i>of which: municipalities</i>			10	8
Total	157	100	123	100

a) From charges on products; total includes interest from loans.

Source: Recycling Fund.

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indicate that the Recycling Fund does not provide adequate resources to develop capacity for separate collection and recycling.

Foreign assistance, including EEA and Norway grants as well as a Swiss contribution, also supported upgrades of waste infrastructure and remediation of contaminated sites. It is unfortunate that Slovakia missed the opportunity for Global Environment Facility funds to build capacity for destruction of PCB waste⁵⁵ (Chapter 4).

3.4. Nature and biodiversity

Nature protection and biodiversity conservation

Overall performance

Over the last decade, the Slovak Republic took major steps towards meeting its broad goal of halting biodiversity loss. In particular, the 2002 Act on Nature and Landscape Protection (Nature Act) transposed the EU directives on birds (1979) and habitats (1992). In 2006, Slovakia adopted a concept of nature and landscape protection, in line with the EU strategy and action plan for biodiversity. Slovakia also made significant progress towards establishing its Natura 2000 network.

Slovakia has intensified its international co-operation, especially on wetland protection. It adopted a wetland programme for 2003-07, later updated for 2008-14, along with an action plan for 2008-11. Three additional Ramsar sites have been designated since 2000.⁵⁶ The Carpathian Wetland Initiative was approved as a Ramsar Convention regional initiative. The primeval beech forests of the Carpathians were added to Slovakia's UNESCO World Natural Heritage sites, and the area of the Aggtelek Karst and Slovak Karst cave site was extended.⁵⁷ In 2003, environment ministers of the Czech Republic, Hungary, Poland, Romania, Serbia and Montenegro, Slovakia and Ukraine signed the Framework Convention on the Protection and Sustainable Development of the Carpathians. The Carpathian Convention entered into force in 2006. It aims to protect and restore the unique and characteristic natural environment found in the Carpathians. The region, at 204 700 km², is the largest European area of natural forests, the last European refuge for many large mammals, the headwaters of several major European rivers and a habitat for many endangered animal and plant species (MoE, 2008). The Carpathians form part of the WWF Global 200, a list of the world's most biologically distinct eco-regions. In 2009, Slovakia adopted the protocol to the Carpathian Convention on the conservation and sustainable use of biological and landscape diversity.

Key challenges include inadequate financing of basic nature protection activities such as mapping, monitoring, building of information systems and assuring proper management of protected areas. There is also a lack of communication with the public as owners and users of land, and a related lack of public support for management of protected areas, particularly Natura 2000 sites. In particular, Slovakia needs to assess the management of protected areas (according to IUCN criteria and categories) and its effectiveness according to the framework developed by the IUCN World Commission on Protected Areas.⁵⁸ A new law on nature protection must be enacted for full compliance with EU regulations and international treaties.

Compared to other OECD countries, the proportion of threatened species is relatively low for birds and average for mammals and freshwater fish, but relatively high for reptiles, amphibians and vascular plants (Figure 1.1). Results of recent monitoring have not been optimistic. The protection status is unsatisfactory or bad for half of mammal species, half of vascular plants,

70% of reptiles and 90% of amphibians (Table 3.3). Although changes in IUCN categories make comparison over the last decade difficult,⁵⁹ it is clear that increased pressures from human activity have led to a slight increase in the number of endangered plants and animals (SEA, 2008). Since 2002, the 850 plant species and 792 animal species of European importance found in Slovakia have been legally protected under the Nature Act. Recovery programmes for critically endangered species are in place for 30 plant species and 15 animal species.

Table 3.3. Protection status of species of European importance, 2004-06^a (%)

Type of species	Favourable	Unsatisfactory	Bad	Unknown	Total
Mammals	5	30	20	45	100
Fish	10	10	–	80	100
Amphibians	5	70	20	5	100
Reptiles	30	60	10	–	100
Molluscs	30	10	30	30	100
Arthropods	30	10	30	30	100
Vascular plants	10	40	10	40	100
Other plants	20	40	30	10	100
Other species	–	100	–	–	100

a) Assessment of 200 species listed under Article 17 of the Habitats Directive.

Source: MoE.

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Slovakia has no general legislation on invasive alien species. The Nature Act prohibits import, possession, reproduction and trade in invasive species (and parts and products thereof) for the seven most problematic plant species.⁶⁰ For 2007-13, elimination of these seven species is part of the cross-compliance requirements for agricultural support. A 2005 MoE regulation prohibits possession of alien birds of prey, owls and red-eared sliders. A national strategy for invasive alien species is under development, based on the global and European strategies for invasive alien species.

Most of the critically endangered flora species come from biotopes that are endangered throughout central Europe, such as peatlands, wetlands, flooded meadows, salt meadows, and sands. In addition, the protection status is unsatisfactory or bad for 60% of forests, half of scrubland and 70% of grassland (Table 3.4).

Table 3.4. Protection status of habitats of European importance, 2004-06^a (%)

Type of habitat	Favourable	Unsatisfactory	Bad	Unknown	Total
Forest	40	40	20	–	100
Heath and scrubland	60	40	–	–	100
Scrub	50	50	–	–	100
Grassland	20	60	10	10	100
Peat	–	90	10	–	100
Rock	70	–	–	30	100
Freshwater	–	50	20	30	100
Coastal and halophytic	–	–	100	–	100
Sandy	–	100	–	–	100

a) Assessment of 66 habitats listed under Article 17 of the Habitats Directive.

Source: MoE.

StatLink  <http://dx.doi.org/10.1787/888932496672>

The extent of protected areas is relatively high by OECD standards (about 23%). However, most protected areas are in low protection categories,⁶¹ a fact that partly reflects the high share of the territory that is forested (40%, 1.93 million ha). Nearly 90% of the areas under protection are large enough to house viable populations of carnivores. The extent of protected areas increased only slightly over the review period (Table 3.5).

There has been a significant improvement in the condition of protected areas: 82% of the extent of small protected areas was in optimal condition in 2009, compared to 55% in 2000 (MoE, 2010a). Some 72% of Slovakia's forest area is certified.⁶²

The extent of protected areas will increase with Slovakia's growing participation in the Natura 2000 network. A high share of Slovak Natura 2000 sites are on forest land and, to a lesser extent, agricultural land (Table 3.5). The Slovak network is intended to cover the most representative biotopes of the Pannonian and alpine regions (Ambróz *et al*, 2009).⁶³

Table 3.5. Protected areas

Type of protected area	Slovak category of protection ^a	2002				2009			
		Number	Area (ha)			Number	Area (ha)		
			core area	buffer zone	total		core area	buffer zone	total
Large protected areas		23	843 368	238 124	1 081 492	23	840 472	270 128	1 110 600
Protected landscape area	2	14	525 547	–	525 547	14	522 582	–	522 582
National park	2 (3)	9	317 821	238 124	555 945	9	317 890	270 128	588 018
Small protected areas		1 086	106 263	6 124	112 387	1 084	104 228	7 750	111 978
Protected site	3 (3/4)	189	7 001	2 263	9 264	165	5 254	2 419	7 673
Nature reserve	3/4 (4/5)	376	11 767	243	12 010	387	13 141	244	13 385
National nature reserve	3/4 (4/5)	231	85 905	3 383	89 288	219	84 130	2 239	86 369
Private nature reserve		–	–	–	–	2	52	–	52
Nature monument	3/4 (4/5)	230	1 531	208	1 739	250	1 589	496	2 085
National nature monument	3/4 (4/5)	60	59	27	86	60	59	2 352	2 411
Protected landscape element		–	–	–	–	1	3	–	3
Protected tree		1 331	–	–	–	1 270	–	–	–
Sub-total ^b		1 109	949 631	244 248	1 193 879	1 116	944 700	277 878	1 222 578 ^c
% of total area ^b			19.4	5.0	24.4		19.3	5.7	25.0
Natura 2000 network									
Sites of Community Interest ^d						381			573 690
Special Protection Areas ^e						38			1 236 545
Sub-total ^f						419			1 440 448
% of total area ^f									29.4

a) The level of protection increases from 2 to 5. Levels in brackets refer to the buffer zone around protected areas.

b) Some protected sites overlap. The percentage of sites under national protection excluding overlap was estimated at 23% in 2011.

c) Of the total area in 2009, around 20% is on agricultural land.

d) Sites proposed to the European Commission under the Habitats Directive. Of the total area in 2009, 87% is on forest land and 10% on agricultural land.

e) Sites proposed to the European Commission under the Birds Directive. Of the total area in 2009, 53% is on forest land and 30% on agricultural land.

f) Sub-total calculated without overlap.

Source: MoE (2010a).

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Compared with its OECD neighbours (Austria, the Czech Republic, Hungary and Poland), Slovakia has designated a high share (25.2%) of its territory under the Birds Directive. The share is also high compared with the EU27 average (11.4%). As regards the Habitats Directive, the share of Slovak territory designated (11.7%) is broadly in line with the OECD neighbours' shares but lower than the EU27 average (13.7%). The Natura 2000 target of

nearly 30% is based on science reflecting EU criteria; the government elected in June 2010 has indicated in its manifesto for 2010-14 that it may review the target. Slovakia did not wait for EU policies to establish a countrywide network of protected areas: in 1992, the former Czechoslovakia established a “territorial system of ecological stability”, a network of bio-corridors along rivers and on land, interconnecting the protected areas (“bio-centres”). This system provided a good basis for building the Natura 2000 network.

The forest cover has remained stable in recent years. The state owns 41% of the forests and manages 55%. Some 53% of forests are in private ownership; property rights are not yet settled on the remaining 6%. Forest ecosystems⁶⁴ play a key role in protecting Slovakia’s biodiversity: 28% of the forest area is highly natural; 48% of forest ecosystems have been assessed as ecologically stable or prevalingly ecologically stable; and the management of almost half of forests is subject to restrictions for nature protection. The share of natural renewal has increased, though it remains relatively low (34%). There is no database of endangered forest species, which makes their monitoring difficult.

Use of economic instruments for nature and biodiversity management

The MoE relies to some extent on economic instruments to achieve its nature and biodiversity policy objectives. The main instruments used are payments (financial compensation, financial contribution, purchase of protected land), fees (access fees, deterioration fees) and fines (Table 3.6). In addition to the instruments used by the MoE, Slovakia applies tax concessions on property, payments to landowners or land users (as part of EU co-financed support for agricultural policy, regional development policy and cohesion policy), and cross-subsidies via the Environmental Fund. There are no environmentally related taxes related to nature and biodiversity. Slovakia needs to evaluate the services rendered by ecosystems with a view to making them pay.

Table 3.6. Economic instruments used by the Ministry of Environment, 2002-10

Type of instrument	Article under the 2002 Nature Act	Amount (1 000 EUR)	Remarks
Financial contribution	60	145	Since 2005, on request. MoE budget.
Financial compensation		10 176	Since 2003. MoE budget.
restricted land use	61	..	
damage caused by protected species	97-102	..	On request.
Right of first refusal	63	..	Depends on MoE budget availability.
Entrance fees	58	..	Proceeds go to MoE.
Deterioration fee	95	..	Since 1994. Proceeds go to Environmental Fund.
Fines	90	2 000	Proceeds go to Environmental Fund.

Source: MoE.

StatLink  <http://dx.doi.org/10.1787/888932496710>

The MoE grants financial compensation for restriction on land use imposed by the Nature Act and for damage to livestock caused by protected species. The level of compensation for restriction on land use is based on income loss, calculated according to a formula; 95% of beneficiaries are private forest owners.⁶⁵ For damage to livestock, beneficiaries (livestock holders) must fulfil eligibility criteria, such as having a shepherd and established fences. Compensation applies primarily to damage by large carnivores, mostly bear, wolf or lynx.⁶⁶ It may also apply to damage to farmed fish by beaver and cormorant.

Owners or users of protected land or of members of a protected species can receive a financial contribution in exchange for carrying out an agreed activity such as eradicating an invasive species in a protected area or hosting protected storks or bats.

Landowners willing to sell protected land must give the MoE the first chance to buy it, at market price. The ministry may refuse, depending on the funding available. EU funds are available under the LIFE programme to help the MoE buy or lease protected land, reducing the need for the MoE to resort to the right of first refusal.

Entrance fees apply to part of protected areas open to the public. The State Nature Conservancy sets a minimum rate for such fees, which municipalities can decide to increase. The proceeds are collected by municipalities on behalf of the MoE (or, in the case of one national park, the Nature Conservancy). An exception is the access fee for visiting caves, which is collected by the Slovak Caves Administration on behalf of the Nature Conservancy.

A deterioration fee is charged for destruction of protected species and protected habitats, whether unapproved (in which case the fee serves as a fine) or as part of an approved infrastructure development (*e.g.* destruction of trees to build a highway). The level of the deterioration fee is based on a societal value published in the official journal of the MoE for each type of habitat, plant, animal, bird and tree (*e.g.* EUR 2 600 for a bear). The level actually charged can be higher or lower than the societal value (*e.g.* higher for a female carnivore able to bear young, lower for habitats that were previously degraded). The proceeds of the fee go to the Environmental Fund.

Fines for violating nature legislation can be up to EUR 10 000 for physical bodies and up to EUR 30 000 for legal bodies. The proceeds go to the Environmental Fund, part of which finances inspection.

Landowners can benefit from a municipal property tax reduction on land used for nature (a protected area). Tax breaks are also granted on: i) biotopes such as marshes; fens, sodium-rich soil (*solonetz*), peat bogs and groves; ii) windbreaks; and iii) protection zones of water sources.

Since Slovakia joined the EU in 2004, projects on nature and biodiversity have been co-financed by EU Structural and Cohesion Funds. Beneficiaries have been the Nature Conservancy, the Caves Administration, the Slovak Environmental Inspectorate and the Slovak Environmental Agency.

Since 2007, the EU has provided support to the Natura 2000 network, though it is still a very small part of total EU support to Slovak agriculture (Table 3.7). The rate of Natura 2000

Table 3.7. EU support to Slovak agriculture, 2007-13^a (EUR million)

Type of support	2007-13	Comment
Total Common Agricultural Policy (CAP) ^b	2 562	Includes EU (77%) and national (23%) co-financing
2nd axis of CAP: environment and countryside	1 242	Nearly half (48%) of total CAP expenditure
Agri-environmental measures	338	
Forest-environmental measures	25	
Natura 2000 network	11	68% on forest land and 32% on farmland
Sub-total	374	30% of CAP expenditure under axis 2

a) Planned allocation under the European Agriculture Fund for Rural Development and national co-financing.

b) Includes three axes: axis 1 refers to "improving competitiveness for farming", axis 2 to "environment and countryside" and axis 3 to "quality of life and diversification of the rural economy".

Source: EC, 2010.

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payments (EUR 95/ha/year for permanent grassland, EUR 47/ha/year for forest at the highest level of protection) is often not enough, however, to compensate farmers or forest owners for income loss. Apart from these payments, there are very few payments explicitly based on specific environmental outcomes; most agri-environmental payments, for example, are based on acreage or headage.

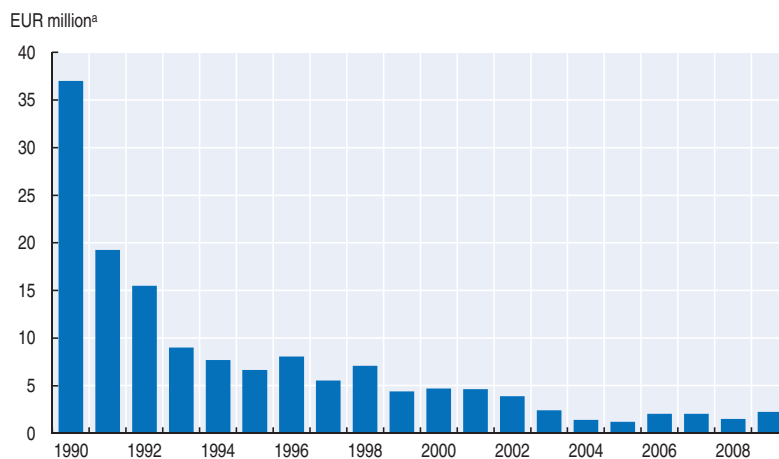
Funded primarily via pollution charges on air and water, the Environmental Fund⁶⁷ redistributes the proceeds as cross-subsidies to the whole range of environmental management activities, including nature and biodiversity.

Financing of and public expenditure on nature and biodiversity management

Nature and biodiversity management is financed directly through three main sources: the state budget (the main source), the Environmental Fund, and EU funds and programmes such as LIFE. In 2010, about EUR 56 million was allocated from the state budget to the MoE's nature department and agencies in charge of nature protection (the Nature Conservancy, the Caves Administration, a zoo and a museum). In 2005-09, annual disbursements for nature and biodiversity from the Environmental Fund amounted to EUR 6.5 million or 2% of total expenditure from the fund. Since 2004, the LIFE programme has provided EUR 1.1 million per year to finance the management and restoration of Natura 2000 sites in Slovakia.

By comparison, in recent years the agriculture sector has received EUR 366 million per year from the state budget and EU funds (Table 3.7), and forest management around EUR 24 million per year. The latter includes EUR 14 million for forest management activities by public forest enterprises and private forest owners, and EUR 10 million for the Ministry of Agriculture's forest department and affiliate agencies. Public expenditure on forest management has decreased over the last decade in both nominal and real terms (Figure 3.8).

Figure 3.8. **Public expenditure on forest management, 1990-2009**



a) At constant 1990 prices.

Source: Ministry of Agriculture.

StatLink  <http://dx.doi.org/10.1787/888932496292>

Nature and biodiversity management is also financed by the EU via the Common Agricultural Policy (CAP) and Cohesion and Structural Funds. In 2004-06, EUR 8 million was allocated to nature and biodiversity from EU Structural Funds, with the EU providing 75% and the state budget 25%. The total represented 5% of total EU and state funds on environmental infrastructure. For 2007-13, Structural Funds include EUR 4 million a year

for biodiversity and nature protection, and EUR 7 million a year for protection of the natural heritage. Also in 2007-13, the EU started to co-finance the Natura 2000 network, providing EUR 1.5 million a year. In addition, EUR 11 million was redirected in 2010 from the CAP first axis (“improving competitiveness for farming”) to biodiversity activity through the rural development programme as part of the CAP “modulation” process.⁶⁸

Since 2008, Slovakia has no longer been eligible for funds from the Global Environment Facility, which is intended for developing countries.

Landscape management

Landscape management is a key element of Slovakia’s nature and biodiversity protection policy. It is an integral part of the Nature Act and of the concept of the territorial system of ecological stability, which includes protected landscape areas. A bill on landscape planning, aimed at improving management of Slovakia’s natural and landscape assets, was prepared seven years ago but has not yet been enacted.

Slovakia’s natural and landscape assets, along with its cultural assets, offer great potential for tourism development. Although tourism in Slovakia is little developed as an industry⁶⁹ (lacking a proper legal and institutional framework, as well as financial support for marketing and promotion), the spatial distribution of accommodation already overlaps considerably with the main natural tourist destinations (national parks, protected landscape areas).⁷⁰ In recent years, demand for hiking and cycling in national parks has been increasing.

The territorial system of ecological stability was designed as a binding and integral part of land use planning but it is not always put in practice. Based on the model of Switzerland, local authorities that prepare land use plans may be required to justify their decisions with reference to environmental and landscape planning legislation. The aim is to limit consumption of agricultural and natural space and to contain dispersed urbanisation by enhancing the integration of biological and landscape diversity goals into local spatial planning. To this end, Slovakia needs a national inventory of natural landscapes, sites and monuments.

As is done (to a limited extent) in Austria, payments could be made from the tourism industry to local farmers to help them provide tourism-related services such as accommodation. Preserving small-scale farming in alpine regions would also serve to provide a desirable backdrop for ecotourism.

More generally, opportunities for co-financing of nature and landscape conservation measures as well as agri-environmental measures by the tourism sector, which benefits from the positive environmental externalities offered by these measures, should be explored.

Slovakia should consider taxation of capital gains generated by sales of agricultural and forest land to developers, as is done in Spain. Such capital gains taxes could be used to encourage greater density in existing construction areas and to slow the formation of new ones.

Developers could be required to pay a one-off tax to offset the negative impact of infrastructure development on natural habitats within a protected area, as in Portugal. The deterioration fee acts as a kind of tax, but a parliamentary decision in 2008 limits its scope to tree cutting.⁷¹

Following the French model, Slovakia could consider introducing a nature tax on building permits reflecting the external costs of construction on nature and biodiversity regardless of whether the construction takes place within or outside a protected area.

Notes

1. Slovakia signed the accession treaty on 16 April 2003 and became an EU member on 1 May 2004.
2. Other areas with transition periods included control of VOC emissions resulting from petrol storage and distribution, packaging and packaging waste, waste electrical and electronic equipment, limit values and quality objectives for mercury discharges by sectors other than chlor-alkali electrolysis, limit values and quality objectives for discharges of certain dangerous substances, incineration of hazardous waste, and limitation of emissions of certain pollutants into the air from large combustion plants.
3. Regarding the Birds Directive, in June 2009 the Commission sent a second written warning to Slovakia for failing to designate enough Special Protection Areas (SPAs). The Commission cited Slovakia, along with Cyprus, as having major insufficiencies. Slovakia's SPA inventory had identified 40 areas eligible for special protection, but six were not actually designated as SPAs and five that had been designated were significantly smaller than recommended. As for the landfill directive, the Commission sent a second warning letter to Slovakia in March 2009 for inadequately transposing the EU legislation on the landfilling of waste into national law.
4. In October 2009, the Commission notified Slovakia that its national legislation was not entirely in line with the directive. A number of shortcomings were identified. Slovak legislation does not, for example, ensure that all plans and programmes likely to have significant effect on the environment are subject to environmental assessment. Under the directive, the public should be informed of why an impact assessment is not required for a specific plan or programme, but this requirement is not included under current Slovak law. Slovakia was given two months to comply with EU legislation. The Commission sent the reasoned opinion on the recommendation of the environment commissioner.
5. The study included nearly 2 000 interviews with more than 1 000 private entrepreneurs and companies.
6. The revision of classification resulted in the identification of 40 upper-tier (high-risk) establishments that fell under the classification of the EU Seveso II Directive and 38 lower tier (lower risk) facilities. The new obligations of business operators handling selected hazardous substances included issuing a report on registration of the business by the district environmental authority. Registered operators had to appoint a qualified person to oversee the management of hazardous operations, develop an accident prevention programme, introduce safety controls, carry out risk assessment and prepare safety reports and emergency plans. By 2008, all establishments had submitted safety reports and prepared internal emergency plans. In 2008, a register of qualified persons in the area of prevention of major industrial accidents included 249 professionals and 32 emergency technicians. Guidelines, courses and seminars are organised for operators and officials at subnational level. The emergency plans are tested with the aim of checking particular measures or demonstrating the functionality of parts of the system, such as information, evacuation and rescue, or the overall response to major accidents.
7. The directives on assessment of the effects of certain plans and programmes on the environment (2001/42/EC), providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice (2003/35/EC), and on public access to environmental information (2003/4/EC).
8. The EIA Act did not require the public authority to publish an "essential part of the reasons" for permit decisions. Moreover, under the Administrative Procedure Code a public authority was not required to state reasons for its decision.
9. The Slovak Environmental Agency is the principal technical advisory body to the MoE. It was financed by the MoE until 2001 but now receives only part of its funds from the ministry, the rest being project related. The State Nature Conservancy is a statutory body responsible for nature protection and biodiversity conservation. Outdoor air monitoring is mainly performed by the Slovak Hydrometeorological Institute under the direction of the MoE. The institute brings together the national meteorological service, the national hydrological service and the national air pollution service.

10. The Slovak Environmental Inspectorate is the main executive body on environmental policy.
11. Smaller projects implemented at regional level are overseen by the regional environment offices under MoE supervision. The regional offices have to approve permits to be issued by municipalities.
12. District offices provide relevant municipalities with data from the registries and oversee municipal execution of national environmental protection measures. They also provide municipalities with expert assistance in application of laws municipalities enforce on behalf of the national environmental protection administration.
13. Municipalities play an important role in managing local environmental issues, which include local air pollution, water and waste management, nature protection, environmental impact assessment, building, and land use planning. They also provide and manage public services such as water supply, sewerage and wastewater treatment, waste management, and public green spaces. Municipalities may impose fees (*e.g.* on operators of small air polluting activities) and charges (*e.g.* for waste disposal on landfills). They may also grant real estate tax exemptions on environmental grounds.
14. There are also provisions for civil liability proceedings that provide for the right to compensation for environmental damage or damage to property, and for protection of the owner in connection with the use of the property and prevention of damage.
15. The Slovak Hydrometeorological Institute provides real-time data for all monitored pollutants from all continuous monitoring stations of the National Air Quality Monitoring Network as well as information on snow cover and data on the hydrological situation and development on Slovak watercourses.
16. Until 2011 there were nine centres under the Slovak Environmental Agency: Rural Environment Protection, Environmental Policy Development, Environmental Informatics, Environmental Education, Urban Environmental Protection, Environmental Management, Waste Management and Basel Convention, Assessment of Regions' Environmental Quality, and Landscape Planning and Natural Energy Sources. Structural changes in 2011 reduced these to four: Environmental Informatics, Landscape Planning and Environmental Education, Waste and Environmental Management, and Natural and Energy Resources Planning.
17. This meta-information system is a key element implementing the INSPIRE Directive, which established infrastructure for spatial information to support EU environmental and environmental-related policies. The directive addresses 34 spatial data themes needed for environmental applications, with key components specified through technical implementing rules. INSPIRE is based on the infrastructure for spatial information established and operated by the EU27.
18. The plan provides a general framework and understanding of priorities in environment and health, and a basis for raising environment and health higher on the political agenda. It puts priority on food safety, air pollution, drinking water provision, health in the work environment, housing, environmental health services, public relations and relations with NGOs, and education and training in environmental health.
19. The procedures cover dissemination of Slovakia's commitments stemming from international treaties and agreements as well as the texts of regulations, concepts, programmes, plans and projects regarding the environment. The scope of the Act also covers reports concerning the environmental situation in Slovakia, permits with a significant impact on the environment and studies on environmental impact.
20. One change was a 2007 amendment to the Act on promotion of highway construction. The amendment abolished the rights of local citizens' groups and environmental NGOs to participate in permit proceedings. Previously their comments had to be taken into account in decision making on the permit and they had the right of recourse to the courts. The government perceived these rights as an obstacle to rapid construction of highways. Despite a declaration by the government's Legislative Council that the proposal did not comply with the EU Directive on public participation, the Cabinet and later Parliament approved the amendment. Changes reducing public participation in EIA procedures, also introduced in 2007, were redressed in 2010.
21. For example, in cases concerning environmental liability and use of genetically modified organisms, recourse to judicial review is limited by the condition that at least 100 natural persons must support the NGO's position in the procedure.
22. Directive 2001/81/EC on National Emission Ceilings for Certain Pollutants.
23. Forming a coherent bonded mass by heating metal powders without melting.
24. The only limit value in force for heavy metals concerns lead. The arsenic, cadmium and nickel limit values have to be met in 2012.

25. Replacing the 1991 Clean Air Act.
26. Act 401/1998 on charges for air pollution as amended.
27. Slovakia was granted transitional arrangements to comply with the EU directives on large combustion plants (2007), IPPC (2007, 2011), VOC emissions from storage of petrol (2007) and incineration of waste (2006).
28. The Environmental Fund was dissolved in 2001 and established again in 2005. In between the taxes accrued to the state budget.
29. In the regions of Bratislava, Trnava and Nitra in western Slovakia, drinking water is drawn entirely from groundwater in the Žitný Ostrov, an area lying between the Danube and its tributary Malý Dunaj (Little Danube) that is the biggest natural groundwater resource in central Europe. Industrial use includes cooling for power generation by the Vojany thermal power plant (from the River Laborec) and two nuclear power plants: Jaslovske Bohunice (from the River Váh) and Mochovce (from the River Hron).
30. Household consumption fell from 123 litres per capita per day in 2000 to 90 litres in 2009.
31. DEHP, an organic compound with good plasticising properties, is considered a potential endocrine disruptor.
32. Surface water quality was affected in 50 cases and groundwater in 51 cases.
33. Pollution charges apply to holders of discharge permits. They are based on municipal and industry monitoring of the effluent for BOD, insoluble substances, crude oil products, pH and dissolved organic salts. The Environmental Fund collects the charges, which are earmarked for water and sanitation investment, mostly in municipalities of fewer than 2 000 inhabitants (Chapter 2).
34. The situation varies across the country, however. The region with the highest connection rate is Bratislava (87%) and those with the lowest are Nitra (46%) and Trenčín (47%). Generally, the larger the urban area, the higher the connection rate: 89% in urban centres of over 150 000, 71% in urban areas between 15 001 and 150 000, 28% in areas between 10 001 and 15 000, and as low as 15% where the population is between 2 001 and 10 000.
35. The Urban Wastewater Treatment Directive requires countries to assure full connection to sewerage and wastewater treatment with nutrient removal by the end of 1998 in agglomerations of more than 2 000 people located in areas considered sensitive, and full sewerage connection with secondary wastewater treatment by the end of 2005 in agglomerations of over 10 000 located in sensitive areas. Since all of Slovakia was considered sensitive and the country was not in a position to achieve the target upon EU accession in 2004, transition periods were agreed for meeting the first requirement by 2010 and the second by 2015. No deadline was set for assuring adequate wastewater treatment in urban areas smaller than 2 000 people (it was 2005 for earlier EU members).
36. As with wastewater connection rates, drinking water supply coverage shows regional differences: the Bratislavský and Trnavský regions in the west have the highest connection rates (99% and 97%, respectively) while in the Trenčiansky and the Prešovský regions 73% of the population is connected.
37. Faecal contamination, nitrates and iron are the most frequent parameters exceeding the limits. The water quality of individual sources is affected by low technical status and insufficient depth of wells, but also sewage system failures.
38. A one-compound volumetric tariff is used. Metering of water use is common.
39. Individual water utilities were still allowed to differentiate water charges depending on eligible costs, reasonable profit and quantity supplied.
40. Between 2007 to 2010, prices increased slightly: the average charge for drinking water in households rose by 9% and the average price of wastewater services by 13%.
41. The office, established in 2001, has jurisdiction over the electricity, natural gas, district heating and water networks. Its main role has been to assure transparent, non-discriminatory and efficient economic competition in network industries and to determine and approve tariffs and methodologies for development. It can impose fines, issue orders and suspend or revoke licences.
42. Upon request by an owner or operator of public water or sewerage services, the regulatory office can exempt network industries from price regulation. In 2009, 29 exemptions were issued related to water supply charges in 51 municipalities and wastewater in 87 municipalities. In 2010, 38 decisions were issued on water supply in 73 municipalities and wastewater in 107 municipalities.

43. The Danube River Basin District covers 96% of the territory and drains to the Black Sea. The Vistula River Basin District covers 4% of the territory and drains to the Baltic Sea.
44. Slovakia water basin management plans are part of international plans co-ordinated by the International Commission for the Protection of the Danube River: the Danube international basin district and the international sub-basin of the Tisza (Chapter 4).
45. This included EUR 120 million from the Cohesion Fund and EUR 21 million from the state budget.
46. Which revised the 1991 Waste Act.
47. Domestic raw material extraction used by the economy plus imports of raw materials and manufactured products.
48. Direct material input less exports of raw materials and manufactured products.
49. For which the generator has no further use for his own purpose of production, and which is treated off-site.
50. Waste from mining and quarrying, manufacturing, and production of electricity, gas and water.
51. Slovakia was granted a derogation until 2012.
52. Slovakia had been granted a 24 month extension on the 2006 deadline for reaching the objective.
53. The total includes EUR 615 million already spent, and excludes remediation costs for potential contaminated sites.
54. The list of products and related charges are defined in MoE decrees 127/2004 and 359/2005.
55. More than half the USD 22 million budget granted to Slovakia over 2000-10 was allocated for a project to develop non-combustion technology to destroy PCB waste, but the project was not carried out because the main private co financer, responsible for the PCB pollution, went bankrupt.
56. Slovakia has 14 Ramsar sites covering 40 697 hectares or 0.8% of the national territory.
57. Slovakia has 633 ha of cave protection zones.
58. The Management Effectiveness Tracking Tool, developed by WWF and the World Bank in 2007, is being used for the Carpathian protected areas.
59. A new national red list of threatened species of plants and animals needs to be issued under the new IUCN categories and criteria.
60. Out of the 175 alien plant species found in Slovakia, about 20 can be categorised as invasive.
61. In terms of Slovak protection categories, 90% of protected areas (including buffer zones) are in low categories (2 and 3); the rest are in Slovak protection categories 4 and 5 (MoE, 2010a).
62. Most of the forest certification is by the Programme for the Endorsement of Forest Certification (63%) and to a lesser extent by the Forest Stewardship Council (9%).
63. Slovakia is a part of these two regions. The Pannonian region accounts for nearly 3% of EU territory, including parts of the Czech Republic, Slovakia, Hungary and Romania.
64. Some 60% of Slovakia's trees are deciduous and 40% coniferous.
65. Not all eligible landowners apply because the procedure for doing so is complex.
66. The number of large carnivores in Slovakia is uncertain. An EU project is attempting to assess the size of large carnivore populations EU-wide.
67. The Environmental Fund was established in 2005 as a public purpose fund of the MoE. Its predecessor, the State Environmental Fund, was formed in 1998 and dissolved in 2001. In 2002-04, part of that fund's receivables and payables were transferred to the MoE.
68. Following the CAP Health Check in 2008.
69. The impact of tourism on the economy has not yet been measured; there is no satellite tourism account.
70. Tourism facilities are allowed in parts of protected areas, particularly those with lower legal protection, such as large protected areas.
71. Previously the fee applied to destruction of all natural habitats on protected land.

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PART I
Chapter 4

International co-operation

This chapter reviews Slovakia's progress in ratifying and implementing environmental international conventions. It covers transboundary air pollution and watercourses as well as trade-related agreements on corporate environmental responsibility, hazardous substances and endangered species. The chapter also outlines Slovakia's contribution to regional co-operation on nature protection and wetland management. Progress in strengthening and mainstreaming the environment in official development assistance are also assessed.

Assessment and recommendations

There are several strong reasons for the Slovak Republic to play an active role in international environmental co-operation, particularly with neighbouring countries. Slovakia is both a major source and a recipient of transboundary air pollution; it shares watercourses which are subject to floods and transboundary pollution; and it is at the intersection of important ecosystems and hence a host to rich biodiversity. Slovakia has taken these responsibilities seriously, becoming a party to a range of international environmental agreements and actively supporting their implementation. For example, it hosts the International Water Assessment Centre that supports the Convention on the Protection and Use of Transboundary Watercourses and International Lakes; it initiated and co-ordinates the Carpathian Wetland Initiative; and it hosts the Basel Convention Regional Centre for Central Europe, which promotes implementation of the convention. Nevertheless, further efforts are needed to implement provisions of some multilateral environmental agreements, including the Convention on Biological Diversity and the Stockholm Convention on Persistent Organic Pollutants. EU membership in 2004 created new obligations and put pressure on the limited resources available for international environmental co-operation. In recent years, staff changes and budget cuts have contributed to a weakening of participation in international environmental processes. Slovakia now needs to elaborate a strategy for international environmental co-operation that has clear priorities and addresses implementation issues.

Slovakia has a small, open economy, underlining the need for appropriate measures to manage trade-related environmental risks. It has taken steps to implement the OECD Guidelines for Multinational Enterprises and OECD recommendations concerning the potential environmental impact of activities supported by export credits. Consumption of ozone-depleting substances (all imported) significantly decreased during the review period. Some progress has been made in enforcing trade-related conventions, but more and better-targeted inspections are needed. The monitoring and inspection of potentially illegal shipments of ozone-depleting substances are probably not sufficient for the detection of violations, and the number of controls on shipments of hazardous waste has declined even though illegal movements have been detected. Since 2008, neither the Slovak Environmental Inspectorate nor district environment offices have been able to impose penalties for breaches of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES).

Slovakia has been a donor country since 2003 and graduated from World Bank assistance programmes in 2008. As a member of the EU, it has accepted obligations to increase its provision of official development assistance (ODA). Nevertheless, in 2010 its ODA amounted to 0.09% of gross national income, well short of the 0.17% 2010 target for countries that joined the EU after 2002. Environment accounted for about 14% of development projects between 2004 and 2009. Bilateral assistance represented, in turn, about 27% of total ODA in 2010.

Recommendations

- Establish clear priorities for international environmental co-operation and strengthen related capacity.
- Strengthen implementation of ratified multilateral environmental agreements, and promote better co-ordination and communication among ministries, state agencies and other stakeholders involved (for example, in relation to the Convention on Biological Diversity and the Stockholm Convention).
- Strengthen bilateral and regional co-operation for the protection of transboundary waters, and promote implementation of the Danube River Basin Management Plan.
- Further strengthen inspection and enforcement of trade-related environmental conventions, remove legal obstacles to imposing penalties for infringement of CITES on Slovak territory, and continue programmes for training judges and prosecutors in environmental matters.
- Increase official development assistance, and its environmental component, in line with EU obligations.

1. Bilateral and regional co-operation

Bilateral co-operation with neighbouring countries (Austria, the Czech Republic, Hungary, Poland and Ukraine) in the area of environmental protection and management of transboundary waters is based mainly on agreements signed in the last decade of the 20th century. Since 2000, the following agreements and memoranda have been signed:

1.1. Bilateral co-operation

- Agreement with Austria on water management for boundary waters (Bratislava, December 2001).
- Agreement between the Slovak Ministry of Environment and the Hungarian Ministries of Environment and Interior on mutual exchange of data from early warning systems against radiation (Budapest, 25 April 2001).
- Agreement with Austria on implementation of the Convention on Environmental Impact Assessment in a Transboundary Context (Luxembourg, 14 October 2004).
- Agreement between the Slovak and Polish environment ministers on co-operation regarding geology (Bratislava, 10 July 2009).

1.2. Trilateral co-operation

- Memorandum of understanding between the Austrian Ministry of Agriculture, Forest Management, Environment, and Water Management, the Czech Ministry of Environment and the Slovak Ministry of Environment (Židlochovice, 30 August 2001).
- Memorandum of understanding between Slovakia, the Czech Republic and Austria on protection and management of the Central European population of great bustards (*Otis tarda*) (Austria, 28 November 2001).
- Joint declaration by Slovakia, the Czech Republic and the Austrian state of Lower Austria in support of the Climate Alliance main cross-border regions (St. Pölten, 6 September 2004).

Transboundary co-operation has been particularly strengthened in the areas of nature conservation and wetland management. Several nature protection projects have been undertaken with Austria, Germany and Hungary. The traditionally close co-operation with the Czech Republic has focused on implementation of EU legislation and international conventions.

In 2004, Slovakia, Austria and the Czech Republic requested that the floodplains of the Morava-Dyje-Danube confluence be designated as a trilateral Ramsar site. Four transboundary Ramsar sites have been declared with Hungary: the Upper Tisza and Tisa River alluvium in 2003 and Ipoly Valley and Poiplie in 2007. Co-operation at the Slovak-Polish border has been linked to the Natura 2000 network, joint programmes for protected areas, co-ordinated care of selected fauna species, and monitoring of protected and invasive flora species.

Bilateral co-operation on transboundary waters is co-ordinated by joint government commissions and the working groups that they establish to address specific issues. Attention has been focused primarily on water quality, monitoring, and co-operation in emergencies. The aim has generally been to establish a sound scientific basis for water management. The judgement of the International Court of Justice regarding the dispute between Slovakia and Hungary on the Gabčíkovo-Nagymaros dam project¹ remains unenforced because interpretations of its provisions differ (OECD, 2002).

Bilateral co-operation is not limited to neighbouring countries. Slovakia has benefited from bilateral co-operation with countries such as Switzerland and Germany, and has shared experience with countries including Serbia and Ukraine. Co-operation with Serbia focused on the accession process for the EU and the experience of the Slovak Environmental Fund.

Box 4.1. Visegrad Group co-operation

The Visegrad Group (also called the Visegrad Four or V4), established in 1991, is an alliance of the Czech Republic, Hungary, Poland and Slovakia for the purpose of co-operation and furthering European integration. Co-operation takes place at all levels, from high-level political summits to expert meetings, non-government organisations, research bodies and cultural institutions. Co-operation is not institutionalised to a significant degree with the exception being the International Visegrad Fund, established in 2000; it has an annual budget of EUR 6 million, with equal contributions from each country.

On the initiative of the Slovak minister of environment, meetings of V4 environment ministers have been held regularly since 1999. This commitment was reaffirmed in 2004 on the occasion of the V4 countries' accession to the EU. Slovakia held the presidency of the Visegrad Group from 1 July 2010 to 30 June 2011. The main priorities in this period were:

- eco-efficient development under the EU's Europe 2020 strategy and the sustainable development and climate change strategies of the V4 countries and the EU;
- waste management, with particular emphasis on waste prevention, recycling and energy recovery, and including responsibility for illegal transboundary shipments of waste;
- strengthened co-operation on chemical and industrial safety, including on preventing and remediating environmental damage;
- the post-2010 biodiversity target and the new EU biodiversity strategy, which are key priorities for V4 countries;
- continuation of expert-level co-operation on flood protection and flood risk assessment.

Environmental protection is also promoted in research. The V4 Academies Forum has focused on modernisation of traditional energy production and development of alternative energy sources; climate change and its economic and social impact; water as a strategic natural resource, notably preservation of its quality and protection of water sources; comprehensive study of interactions between individual components of ecosystems and links among various biotopes; and study of the impact of civilisation on ecology, with the aim of optimising environmental management and assuring sustainability.

Source: Visegrad Group, www.visegradgroup.eu.

2. Transboundary issues

2.1. Transboundary air pollution

Slovakia is party to the 1979 Geneva Convention on Long-range Transboundary Air Pollution (CLRTAP) and its eight protocols. It ratified three of the protocols during the review period: the 1998 protocols on heavy metals and persistent organic pollutants (POPs) in 2002, and the 1999 Gothenburg Protocol in 2005. After good progress in the 1990s, emissions of SO_x, NO_x, ammonia, mercury and dioxins/furans were further reduced, albeit more slowly, until 2008 (Chapter 3). Given the slowdown of economic activity in 2009-10, Slovakia is on track to achieve the objectives set under the CLRTAP protocols. In doing so, it will also fulfil the requirements of the EU Directive on National Emissions Ceilings, which sets 2010 caps on SO₂, NO_x, NMVOC and ammonia emissions consistent with the CLRTAP (Table 4.1). Despite this good record, emission intensities per unit of GDP are higher in Slovakia than in OECD Europe. Slovakia has some of the highest heavy metal emissions per unit of GDP in Europe.

Table 4.1. Performance compared to international targets for air emissions

	Protocol		Commitments		Performance		
			Target period	Target (% reduction)	Observed period	Change (%)	
CLRTAP							
SO ₂	Gothenburg	(1999)	1990-2010	-80	1990-2009	-88	
NO _x	Gothenburg	(1999)	1990-2010	-42	1990-2009	-61	
NMVOC	Gothenburg	(1999)	1990-2010	-6	1990-2009	-54	
Ammonia	Gothenburg	(1999)	1990-2010	-37	1990-2009	-62	
Heavy metals							
Cadmium	Aarhus		(1998)	1990 cap	0	1990-2009	-83 ^a
Lead	Aarhus		(1998)	1990 cap	0	1990-2009	-67
Mercury	Aarhus		(1998)	1990 cap	0	1990-2009	-87
Persistent organic pollutants							
Polycyclic aromatic hydrocarbons	Aarhus		(1998)	1990 cap	0	1990-2009	-39
Dioxins/furans	Aarhus		(1998)	1990 cap	0	1990-2009	-73
Hexachlorobenzene	Aarhus		(1998)	1990 cap	0	1990-2009	-62
EU Directive on National Emissions Ceilings							
SO ₂				2000-2010	-13	2000-2009	-50
NO _x				2000-2010	21	2000-2009	-20
NMVOC				2000-2010	103	2000-2009	-5
Ammonia				2000-2010	22	2000-2009	-22

a) Emission factor for glass production was revised since the previous inventory.

Source: EMEP, officially reported emission data, February 2011.

StatLink  <http://dx.doi.org/10.1787/888932496748>

The Slovak Republic is both a major source and a major recipient of transboundary air pollution. In 2008, 83% of SO_x was exported (mainly to the Russian Federation, Poland, Hungary and Ukraine) and 85% of depositions in Slovakia came from transboundary sources (mainly in Poland, Bosnia and Herzegovina, Serbia and Hungary). NO_x depositions from transboundary sources reached 93% in 2008 (mainly from Poland, Germany, Hungary and Italy), while 94% of Slovak emissions were exported (mainly to the Russian Federation, Ukraine, Poland and Hungary) (EMEP, 2010). With reduction of European emissions, acidic

precipitation over Slovakia has fallen, as has the share of forests damaged by the air pollution. Nevertheless, it will take much longer to restore the forest ecological balance to its original state.

2.2. Transboundary watercourses

Since 1999, Slovakia has been party to the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes. The Slovak Hydrometeorological Institute hosts the International Water Assessment Centre (IWAC), a joint platform for scientists and policy makers to respond to challenges in water policy and implementation at national, transboundary and international levels. IWAC was formally launched in Bratislava in 2009, with Slovakia providing the financial, technical and human resources for its operation. IWAC also promotes implementation of the Water and Health Protocol, which Slovakia ratified in 2001.

Slovakia is a contracting party to the Danube River² Protection Convention and member of the International Commission for the Protection of the Danube River (ICPDR) which co-ordinates its implementation. The ICPDR promotes policy agreements and the setting of joint priorities and strategies for improving the state of the Danube basin (ICPDR, 2008). In 2009, Slovakia held the ICPDR presidency and promoted implementation of the EU Water Framework Directive.

Slovakia is a member of the ICPDR Accident Emergency Warning System. This is activated whenever there is a risk of transboundary water pollution, or when threshold danger levels of hazardous substances are exceeded. Slovakia provides data to the Trans-National Monitoring Network for water quality and the information system for the Danube (Danubis). Following the Danube floods of 2002, Danube countries adopted the Action Programme for Sustainable Flood Protection (2004) to manage flood risk for the protection of human life and property. In February 2010, ICPDR ministers adopted 17 sub-basin flood action plans, which are in line with the action programme and the 2007 EU Floods Directive. The plans cover the entire Danube catchment. They review the current situation and set out hundreds of concrete measures that Danube countries should take to protect populations from floods and mitigate flood damage and losses. The Slovak authorities helped their Hungarian colleagues respond to an accident involving a burst reservoir of toxic sludge near an alumina plant in Hungary on 4 October 2010.

In December 2004, ministers of ICPDR countries signed a memorandum of understanding on Tisza basin co-operation. Its aim was the elaboration of an integrated river basin water management plan and a flood protection programme for the Tisza River basin, shared by Slovakia, Hungary, Serbia, Romania and Ukraine. The draft Integrated Tisza River Basin Management Plan, which was made available for public consultation in August 2010, is an outcome of a joint project by the United Nations Development Programme and the Global Environment Facility (GEF).

Slovakia is also a party to the 1948 Convention regarding the Regime of Navigation on the Danube (Belgrade Convention), co-ordinated by the Danube Commission, which aims to strengthen economic relations in the region and keep the entire Danube navigable. The Danube Commission, together with ICPDR and the International Sava River Basin Commission, initiated the 2007 Joint Statement on Guiding Principles for the Development of Inland Navigation and Environmental Protection in the Danube River Basin. Slovakia is also involved in the WANDA project (for "Waste management for inland navigation on the

Danube”), which aims to find common solutions for a sustainable, environmentally sound, transnationally co-ordinated approach to ship waste management for Danube cargo vessels. The project is funded by the South East Europe Transnational Co-operation Programme of the European Union, with a budget of EUR 1.6 million. It is being implemented between 2009 and 2012.

3. Trade and environment

As a member of the World Trade Organization (WTO), Slovakia has been actively involved in negotiations on trade and environment. It co-ordinates its positions within the EU regarding reduction or elimination of tariff and non-tariff barriers to environmental goods and services. It gained support for its proposal to add solar collectors and limestone bricks to the list of environmental goods.

3.1. Corporate environmental responsibility

Slovakia adheres to the OECD Guidelines for Multinational Enterprises, promoting responsible business conduct relating in particular to the environment. The national contact point is at the Ministry of Economy, which published the guidelines in Slovak on the ministry website. Outward investors that receive government subsidies are to commit themselves to follow the guidelines (OECD, 2010). A few companies (mostly large multinational corporations) drive efforts related to corporate social responsibility (CSR) in Slovakia. The prevailing understanding of CSR is limited to job creation and job security. CSR is often defined by what it is not (i.e. not inflicting harm) rather than in terms of positive social and environmental criteria (UNDP, 2007).

Slovakia is a member of the OECD Export Credit Group. The Slovak Export-Import Bank, EXIMBANKA SR, follows the revised OECD Council Recommendation on Common Approaches on Environment and Officially Supported Export Credits. Projects are screened using internal “principles on evaluation of export impact to the environment in the country of destination” (last updated in February 2010). The bank takes part in the ongoing discussions on export credits for climate change mitigation and water projects, and co-operates with relevant ministries, particularly the Ministry of Economy.

In 2010, EXIMBANKA SR reported two category B projects (projects with less significant impact on the environment). They were reported to the OECD and assessed by the Czech Export Credit Agency.³ EXIMBANKA SR has signed several agreements with experts certified by the Ministry of Environment (MoE) to assess the need for environmental impact assessment (EIA) and to categorise submitted projects in accordance with the Common Approaches.

3.2. Ozone-depleting substances

Slovakia has met the targets set by the Montreal Protocol and its amendments.⁴ In 2000, the majority of obligations set in EU Regulation (EC) 2037/2000⁵ were transposed into national legislation. Since 2004, EU policy and regulations on ozone layer protection, which are more stringent than the Montreal Protocol, have been directly applicable in Slovakia.

Slovakia does not produce ozone-depleting substances, and its consumption of such substances (mainly in cooling agents, detection gases, solvents and cleaning chemicals) has decreased by more than half since 2000. All ozone-depleting substances used in Slovakia are imported. Small amounts of chlorofluorocarbons (CFCs) have

been used in accordance with agreed exemptions for laboratory and analytical uses. Hydrochlorofluorocarbons (HCFCs) have been used only for servicing of refrigeration and air conditioning equipment. Hydrobromofluorocarbons (HCFCs) have not been used since 1997, nor methyl chloroform since 1996. In 2000, import and export of all controlled substances, including methyl bromide, from and to non-signatory countries were prohibited and a licensing system for trade of controlled substances was introduced. Slovakia phased out methyl bromide ahead of schedule.

The volume of collection, recycling, recovery and disposal of substances damaging the ozone layer is low. No countrywide system for collection and recovery of cooling agents is in place, and questions have been raised about the economic viability of such a system. Individual companies provide recovery, recycling and disposal services. Cooling agents are recycled (546 kg in 2005, 512 kg in 2007) or destroyed in a hazardous waste incinerator. Halons are stored or exported (*e.g.* to the Russian Federation in 2007), in accordance with the provisions of the protocol and EU law.

The Slovak Environmental Inspectorate controls implementation of regulations on ozone layer protection, in co-operation with customs officers. No cases of illegal traffic or trade have been detected in the last ten years, though the number of checks is relatively low: 10 in 2005, 16 in 2009.

3.3. Hazardous waste

Between 2002 and 2009, the amount of hazardous waste put on the market (rather than treated on site) was stable. Environmentally sound management of certain types of hazardous waste (*e.g.* polychlorinated biphenyls, healthcare waste) is a challenge, as Slovakia has no adequate infrastructure for their disposal. Since 2004, Slovakia has met its obligations under the Basel Convention and the 1995 amendment according to EU regulations.⁶ The Treaty of Accession of the Slovak Republic to the EU set transitional arrangements: imports of green-listed waste for recovery are subject to prior notification and consent; the MoE has to block imports for recovery by facilities benefitting from temporary exemptions under specific directives (*e.g.* hazardous waste incineration, integrated pollution prevention and control). Slovakia hosts the Basel Convention Regional Centre for Central Europe, which promotes implementation of the convention.

Imports of hazardous waste increased slightly, from 1 070 tonnes in 2002 to 1 123 tonnes in 2008. They were mainly copper compounds, mercury compounds, organic solvents (excluding halogenated solvents) and waste from production and preparation of pharmaceutical products. Exports of hazardous waste, mainly spent catalysts, increased fivefold, reaching 3 429 tonnes in 2008. Belgium was the main destination.

The Slovak Environmental Inspectorate performs controls on transboundary movements of waste in co-operation with customs authorities. Slovakia also collaborates with other European countries in the framework of the IMPEL-TFS⁷ network. The number of controls increased from 21 in 2002 to 125 in 2007 but has significantly decreased since then, to 12 in 2009. Cases of illegal movements have been detected (*e.g.* in 2007, illegal import of waste from Austria, illegal export to Hungary).

3.4. Persistent organic pollutants

In 2002, Slovakia ratified the Aarhus Protocol to the Convention on Long-Range Transboundary Air Pollution (CLRTAP) and the Stockholm Convention on Persistent

Organic Pollutants (POPs). A national implementation plan for the Stockholm Convention was prepared with the support of the GEF and approved by the government in May 2006.⁸

There is no intentional production of POPs (pesticides or PCBs) in Slovakia. Persistent organic pesticides were never produced in Slovakia, but stockpiles remain (18 tonnes were reported in the 2006 inventory) on former farms, and some are probably not reported as waste. From 1959 to 1984, 21 500 tonnes of PCBs were produced in Slovakia, used mainly in what was then Czechoslovakia for production of capacitors, paints and varnishes (MoE, 2006). This production led to extensive contamination of water and sediments around the factory in Košice region. Financing the destruction of accumulated PCBs and remediation of the contaminated area is a continuing challenge for Slovakia as the producer went bankrupt. In 2009, according to the national report to the convention, there were 566 tonnes of PCBs in equipment containing more than 0.05% PCBs and in volumes greater than 5 litres, 116 tonnes of PCB-contaminated waste equipment and 450 tonnes of PCBs in service equipment.

Slovakia has developed an action plan to address unintentional production and releases of dioxins, furans, PCBs and HCB. Downward trends for POP emissions were recorded in the 1990s as metal production fell and industrial processes were closed or modernised. Since 2000, emissions of HCB, PCBs and polycyclic aromatic hydrocarbons have increased because of consumption of diesel in road transport, wood burning in the residential sector and a rise in copper and cement production. Slovakia is gradually enlarging the general requirement to apply best available techniques and best environmental practices to POPs. Emissions from uncontrolled burning and non-industrial processes are a growing problem.

3.5. Transboundary movement of certain dangerous chemicals and pesticides

Slovakia acceded to the Rotterdam Convention in 2007. The Ministry of Economy serves as the national focal point. The export and import of certain dangerous chemicals and pesticides is regulated by the Chemical Act No. 67/2010 transposing the EU regulation on such trade.

The Ministry of Economy must issue its consent to import, export or put on the market certain dangerous chemicals or chemical preparations subject to the prior informed consent procedure, after receiving opinions from the health, environment and agriculture ministries. It also informs relevant customs and EU bodies about export and import, and controls compliance with the Act. Customs authorities inform the Ministry of Economy about trade in chemicals and preparations that is not in compliance with the Act. Trade in such chemicals does not appear to be frequent; only a few import cases were reported during the review period, involving 1,2-dichloroethane, ethylene oxide and mercury dichloride.

3.6. Endangered species

Accession to the EU significantly influenced implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The main European regulations⁹ were transposed into national legislation in 2005, in some cases with stricter provisions; examples include the restriction on export of native protected species not born and bred in captivity, and measures on registration and marking of species (Ó Críodáin, 2007). These provisions have enabled the Slovak authorities to discover several specimens that were illegally traded in other member states.

The Slovak Environmental Inspectorate is responsible for CITES enforcement. One person works on CITES issues in each of the four regional environment offices. In addition, officers of the 80 district environment offices assist with in-country CITES controls. Inspectorate officers have the right to seize CITES specimens (EC, 2006). They work closely with customs and police, providing expert advice. The police focus on serious crimes, which are beyond the power of the inspectorate. Between 2002 and June 2010, more than 500 violations of the related Act and EU regulations were detected, mostly during inland controls by the inspectorate and district officers. The MoE has organised many training courses on CITES, EU law and enforcement for police, customs officers, and staff of the inspectorate and district offices. In 2010, training for judges and prosecutors was organised for the first time.

Slovakia ranks among the EU countries with the most stringent penalties; *e.g.* the highest prison sentences (up to eight years) for violations of the Wildlife Trade Regulations. In 2008, two people were given conditional prison sentences of two years. However, in the same year the Act was amended in a way that prevents the imposition of penalties for unlawful conduct on Slovak territory. In practice, inspectors and district officers can now only confiscate specimens and require corrective measures; they cannot impose penalties for breaches of CITES or EU regulations, though serious criminal cases handled by the police and violations of CITES identified by customs can be punished.

4. Nature protection

The country's geographic position in the centre of Europe, and on the boundary of the Carpathian Mountains and Pannonian Plain, allows for rich diversity of flora and fauna. During the review period, Slovakia became party to several multilateral agreements focused on biodiversity, nature and landscape protection: the 2000 Cartagena Protocol on Biosafety (2003); the 2000 European Landscape Convention (2005); the 2003 Convention on the Protection and Sustainable Development of the Carpathians (2004); and the 1946 International Convention for the Regulation on Whaling and its Protocol (2005). In addition, it signed the 2008 Protocol to the Carpathian Convention on Conservation and Sustainable Use of Biological and Landscape Diversity (2009). These agreements and EU law have provided the framework for adoption of national protection measures.

Slovakia has achieved significant progress in wetland management and implementation of the Ramsar Convention. The government adopted a programme and action plan for wetland management in 2003 (for the period up to 2007), which was later updated for 2008-14¹⁰ (the action plan covers 2008-11). The legal basis for wetland protection is provided by the 2002 Act on Nature and Landscape protection. Slovakia has 14 Ramsar sites. Several projects on wetland management and restoration and on public awareness have been implemented, funded by international and national sources. Since 1999, Slovakia has implemented a common strategy on nature conservation with Austria and the Czech Republic in the floodplains of the Morava-Dyje-Danube confluence. Achievements of this co-operation have been recognised by the Ramsar Convention on several occasions. Every three years, Slovakia organises the meeting of the Trilateral Ramsar Platform.

In 2004, Slovakia initiated the establishment of the Carpathian Wetland Initiative, which in 2009 was formally endorsed by the Ramsar Convention Standing Committee as a regional initiative (Box 4.2).

Box 4.2. Carpathian Wetland Initiative

The Carpathian Wetland Initiative (CWI), initiated by Slovakia in 2004, aims to achieve improved and co-ordinated implementation of the Ramsar Convention and its strategic plan in seven countries of the mountainous Carpathian region. The region is a major freshwater resource and is known for its great biodiversity and cultural richness. The CWI provides a platform for co-operation by the secretariats of the Ramsar Convention and the Carpathian Convention. It is co-ordinated by the Slovak State Nature Conservancy.

The CWI strategic targets for 2009-11 are aimed at the collection and sharing of information on wetland ecosystems, including transboundary ecosystems; promotion of co-operation at international, regional and national levels; wetlands assessment and monitoring; integrated river basin management, especially in shared catchments; wetland restoration; and capacity building and public awareness.

In the first stage, the initiative was supported by a Slovak-Norwegian project on a Network of Carpathian protected areas and Ramsar sites (2004-05). It was then funded by voluntary contributions from countries involved (mainly contributions from Slovakia, the Czech Republic and Hungary), as well as the Ramsar core budget and project resources.

Source: Carpathian Wetland Initiative (2008), Ramsar Convention on Wetlands.

Slovakia has fulfilled formal requirements set by the Bonn Convention on the Conservation of Migratory Species of Wild Animals¹¹ and the Bern Convention on the Conservation of European Wildlife and Natural Habitats.¹² It has provided a voluntary financial contribution to the Bern Convention annually. A draft national strategy on invasive alien species and management plans for some animal species have been submitted for approval. Recommendations of sites for the European Diploma of Protected Areas have been reflected in project proposals.

Implementation of the Convention on Biological Diversity (CBD) is based on the National Biodiversity Strategy of Slovakia, adopted by the government and endorsed by Parliament in 1997. The action plan for 2003-10 defined more than 80 strategic directions for achieving the objectives of the strategy. In 2008, an evaluation of the plan's implementation for 2004-06 was prepared. A further update of the strategy and action plan is needed, to reflect outcomes of the tenth conference of parties to the convention in 2010. The co-ordination of activities, especially with the agriculture sector, could be improved.

The Slovak Republic became a party to the European Landscape Convention in 2005 and has adopted a legal basis for its implementation. The executive unit for the convention is at the Slovak Environmental Agency. The MoE is responsible for co-ordinating and promoting co-operation between stakeholders in the management, planning and sustainable development of the landscape (nature conservation, conservation of biological and landscape diversity, conservation of world cultural and natural heritage, etc.). In the period from November 2007 to May 2008, when Slovakia chaired the Committee of Ministers of the Council of Europe, the MoE organised the seventh meeting of the Council of Europe workshop on implementation of the convention, with the theme "Landscape Design and Management: Integrated Spatial Management".

Slovakia is organising the seventh regional European Ramsar Convention meeting and the third meeting of the parties to the Carpathian Convention (both in 2011) and has offered to host the secretariat of the Carpathian Convention and the co-ordination unit of the Carpathian Network of Protected Areas.

Seven Slovak sites are on the UNESCO list of world cultural and natural heritage,¹³ including two transboundary nature sites.

5. Official development assistance and the environment

Although Slovakia is not a member of the OECD Development Assistance Committee (DAC), development assistance has become an integral part of Slovak foreign policy. EU membership has required Slovakia to engage in the common European system of development assistance. In 2008, Slovakia graduated from the World Bank assistance operations, shifting from receiver status to that of provider of development aid.

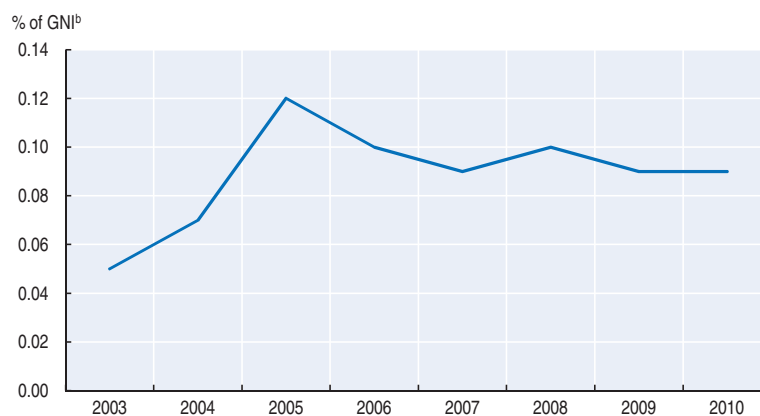
5.1. Official development assistance

In 2005, in keeping with EU requirements, Slovakia committed to increase the volume of its official development assistance (ODA) to 0.17% of gross national income (GNI) by 2010 and to 0.33% of GNI by 2015. Net disbursements increased between 2002 and 2005, but have since decreased. At 0.09% in 2010, the ODA to GNI ratio remains some distance from the target (Figure 4.1).

Since 2003, Slovakia has provided assistance to developing countries under the Mid-term Strategy of Official Development Assistance for 2003-08. In May 2009, the government approved the Mid-term Strategy for 2009-13.

The legal framework for provision of ODA was established by the 2007 Act on Official Development Assistance, which entered into force on 1 February 2008. It specifies that poverty reduction and promotion of sustainable development in developing countries are among the main goals of the country's ODA. The mid-term strategy, prepared for a period of at least five years, defines main principles and sectoral and territorial priorities for bilateral, trilateral and multilateral ODA. An annual program of ODA, building on the mid-term strategy, specifies priorities for a given fiscal year. It is prepared by the Ministry of Foreign Affairs and submitted to the government.

Figure 4.1. Official development assistance, 2003-10^a



a) Preliminary data for 2010.

b) Gross national income.

Source: OECD-DAC (2011), *Development Aid Database*.

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The Ministry of Foreign Affairs is the national co-ordinator for ODA. The Slovak Agency for International Development Co-operation was established in January 2007 as the main

body overseeing project cycle management and administration, administration of funds, and educational and communication activities. A committee comprising the Ministry of Foreign Affairs and observers from non-government stakeholder groups evaluates projects.

Bilateral and multilateral assistance

In 2003-08, bilateral ODA focused mainly on the countries of the western Balkans, especially Serbia and Montenegro and Bosnia and Herzegovina. Projects addressing the environment included building institutional capacity concerning climate change and capacity building for implementation of Ramsar and Carpathian conventions. In 2004-09, 14% of development projects were related to environmental sustainability (notably access to safe drinking water and basic sanitation). On some projects, Slovakia co-operated with the Canadian development agency, including on financing. Slovakia has pledged EUR 9 million in fast-start financing to developing countries for climate action over 2010-12.

The strategy for 2009-13 defined a revised list of priority countries and sectors. ODA is being channelled to 3 programme countries¹⁴ and 13 priority countries,¹⁵ with the former receiving the biggest share of ODA. Infrastructure development with a positive impact on sustainable development and environmental protection is a key target of the strategy.

In 2009, multilateral contributions (mainly including contribution to the European Commission) accounted for 75% of total ODA flows. The MoE contributed EUR 143 000 to several international environmental organisations and conventions: the International Union for Conservation of Nature, the UNEP Environment Fund, CITES, the UN Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Montreal Protocol on Substances that Deplete the Ozone Layer.

5.2. Global Environment Facility

Between 2000 and 2010, the Global Environment Facility (GEF) granted USD 22 million to Slovakia for ten national projects helping the country meet its obligations under the Convention on Biological Diversity (CBD), UNFCCC, Stockholm Convention and Montreal Protocol. More than half this budget was allocated for a project to develop non-combustion technology to destroy PCB waste, but the project was not carried out because the main private co-financer, responsible for the PCB pollution, went bankrupt. Additional funds have been channelled to Slovakia through global and regional projects, mainly focused on Danube River protection, energy efficiency, and phasing out HCFCs and methyl bromide. Because Slovakia joined the European Union in 2004 and graduated from the World Bank assistance programmes in 2008, it is not eligible for GEF assistance in the 2010-14 programming period.

Notes

1. In 1992, Slovakia built the Gabčíkovo dam after Hungary backed out of a 1977 treaty in which it and what was then Czechoslovakia agreed to build a joint dam project. In 1997, after Hungary and Slovakia went before the International Court of Justice, the court ruled that both had breached their legal obligations and that the treaty was still in force.
2. Most of Slovakia (96%) lies in the Danube basin.
3. Both projects were insured by the Czech agency and reinsured by EXIMBANKA SR.
4. Including the Beijing Amendment, in force in Slovakia since 2002.
5. Replaced by Regulation (EC) 1005/2009 in January 2010.

6. Council Regulation 259/93/EC and, since 2007, Council Regulation 1013/2006.
7. EU Network for the Implementation and Enforcement of Environmental Law, cluster on Transfrontier Shipment of Waste.
8. An updated version of the plan is in preparation; it would include the new substances added to the convention.
9. Council Regulation (EC) No. 338/97 on the Protection of Species of Wild Fauna and Flora by Regulating Trade Therein, and Implementing Regulation No. 865/2006.
10. The updated programme has four strategic goals: sustainable use of wetlands; conservation and management of wetlands of international importance; international co-operation; and capacity building of institutions responsible for implementation of the Ramsar Convention.
11. According to the fourth national report on CBD implementation (2009), there are 13 endangered migratory species from appendix I of the Bonn Convention in Slovakia and 40 migratory species that have an unfavourable conservation status from appendix II. Within the scope of the Bonn Convention, Slovakia assesses the impact of various activities on migratory species, as well as incidents of migratory birds flying into electric power lines, and takes measures for the conservation of the species listed in appendix I. Special attention is given to certain endangered and vulnerable species, such as great bustard, golden eagle, imperial eagle, peregrine falcon and saker falcon. A report is prepared on Bonn Convention implementation in Slovakia every three years.
12. The fourth national report on CBD implementation lists 39 strictly protected flora species from appendix I of the Bern Convention, 121 strictly protected fauna species from appendix II and 61 protected fauna species from appendix III.
13. The historical mining town of Banská Štiavnica and its surroundings; the town of Levoča Spišský Hrad (castle) and associated cultural monuments; the village of Vlkolínec; the Aggtelek Karst and Slovak Karst caves; the Bardejov Town Conservation Reserve; the primeval beech forests of the Carpathians; and the wooden churches of the Slovak Carpathians.
14. Afghanistan, Serbia and Kenya.
15. Albania, Belarus, Bosnia and Herzegovina, Montenegro, Ethiopia, Georgia, Kyrgyzstan, the former Yugoslav Republic of Macedonia, Moldova, Sudan, Tajikistan, Ukraine and Vietnam.

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PART II

Selected issues

PART II
Chapter 5

Climate change and energy

This chapter examines Slovakia's progress in meeting the Kyoto Protocol target, reducing the energy intensity of its economy, and increasing the use of renewable-energy sources. It assesses the factors underlying this progress, and the challenges facing Slovakia to meet its 2020 targets. The chapter reviews the institutional and policy framework for climate change mitigation and the main policy measures put in place to reduce greenhouse gas emissions, in particular from electricity and heat generation, energy use and transport. The extent to which market mechanisms (such as emissions trading, energy prices and taxes, and road charges) are used to provide incentives to reduce emissions is also discussed.

Assessment and recommendations

As of 2008, the Slovak Republic had already overachieved its target under the Kyoto Protocol of reducing its greenhouse gas (GHG) emissions by 8% in the 2008-12 period compared with 1990 levels. Economic restructuring, changes in the fuel mix, and efficiency gains were the main drivers for the dramatic decrease in GHG emissions in the 1990s. Emissions stabilised between 2000 and 2008 despite rapid economic growth. This resulted in a marked drop of the energy and carbon intensities of the economy, the largest decreases among OECD countries. However, Slovakia remains among the most energy- and carbon-intensive OECD economies. Emissions are projected to grow in the post-Kyoto period, especially in the transport and industry sectors, creating potential challenges for Slovakia to meet its mid- and long-term reduction targets.

Slovakia has made progress in mainstreaming climate change consideration in sectoral policies. It reinforced inter-institutional co-ordination on climate change and energy policies, with the establishment of a working group (in 2005) and a high-level Commission for the Climate and Energy Package (in 2008). However, climate change has not been high on the political agenda, partly due to the lack of demanding international commitments in the last two decades. The national climate change policy is largely shaped by energy-security considerations and the EU energy- and climate-related legislation. Slovakia has not yet developed a clear and comprehensive framework linking climate, energy and transport policies at the national level, as well as a climate adaptation strategy. Looking forward to the more challenging future emission trends, there is a need for strengthened economic and scientific analyses to support decision-making and to enhance Slovakia's participation in the climate debate at European and international levels.

Slovakia's participation in the EU Emissions Trading System (EU ETS) has been characterised by an overallocation of allowances, all given for free. This has represented an implicit subsidy to participating installations and has reduced the effectiveness of the system. The revision of the EU ETS for the period 2013-20, with an EU-wide emissions cap and the auctioning of allowances, is expected to improve effectiveness and efficiency. In 2011, the government levied a tax on windfall profits deriving from the excess allocation of allowances, although this approach has been questioned by the European Commission. Slovakia removed several energy subsidies and tax exemptions, including on natural gas and coal used by heating companies. However, it continues to support electricity generation from domestic coal; several exemptions from excise duties continue to apply, including to households and energy-intensive industries. This could encourage wasteful consumption. Prices of energy products used in the residential sector and in industries not covered by the ETS are relatively high; however, their tax components do not always adequately reflect GHG emission costs.

Slovakia has made limited use of the Kyoto Protocol flexible mechanisms. Due to the dramatic decrease in GHG emissions in the 1990s, and the overachievement of the Kyoto target, Slovakia has a large surplus of government emission rights that can be traded in the global carbon market. Slovakia established a Green Investment Scheme (GIS) in 2009, subsequently revised, to collect proceeds from the sale of these rights and to reinvest them

in environmental and climate mitigation projects. However, the delay in setting up a GIS has hindered effective and transparent use of the trading mechanism.

Transport is one of the few sectors in which energy consumption and GHG emissions have increased since 2000, and are projected to grow faster. Freight road transport increased significantly, especially after Slovakia's accession to the EU. Rapid economic growth and rising international trade volumes, supported by heavy investment in road infrastructure, stimulated road transport. Rising living standards have also stimulated car ownership and use. This, together with the lack of efficient and reliable alternative transport modes, including rail and urban transport, may explain the growing demand for road transport despite increasing fuel prices. A positive step forward was the recent introduction of a distance- and emission-based electronic toll system for heavy vehicles travelling on main roads. Some regional authorities also differentiated the annual tax on commercial vehicles by emission levels. However, in 2010, the government lowered the diesel tax rate, aiming to compensate for the increase in road tolls and to attract freight transit.

Until recently, Slovakia had made relatively slow progress in developing renewable energy sources. Preliminary data indicate that the 2010 target to provide 19% of gross electricity consumption from renewables was met, although mainly due to a decrease in electricity consumption. In the second half of the 2000s, a feed-in tariff was introduced, which stimulated production of electricity from renewables, especially biomass, and from cogeneration. Several other forms of investment subsidies have also been made available. However, they entail potential overlaps and oversubsidisation. The 2010 National Renewable Energy Action Plan aims at obtaining 14% of final energy consumption from renewable sources by 2020. The plan correctly targets the sectors with the highest potential, such as small-scale power generation and biomass for heating. Despite recent progress, non-economic barriers, such as complex administrative procedures, insufficient grid capacity, and lack of information and technical expertise, remain major obstacles to extensive use of renewable energy.

An energy efficiency legislative framework, mostly based on EU directives, is in place. However, more resolute efforts on implementation are needed to reap the benefits of low-cost energy-efficiency improvements, especially in the building and transport sectors. Slovakia's first National Energy Efficiency Action Plan (NEEAP 2008-10) identifies the intermediate and final energy saving targets, the measures to achieve them, the expected impacts and costs of each measure, and the associated financial requirements. The NEEAP addresses the main barriers to the adoption of energy-efficient solutions in the various sectors of the economy, including weak participation of the private sector and insufficient public awareness. Commendably, it places emphasis on developing an appropriate monitoring, evaluation and enforcement system. However, it is unclear how the measures were selected, how their potential impacts and costs were assessed, and whether such measures will achieve the energy-saving target at the least cost. The NEEAP focuses on technical energy efficiency and awareness raising, and less attention is given to developing economic incentives for energy and emission saving behaviours. In May 2011, the second NEEAP (2011-13) was adopted.

Recommendations

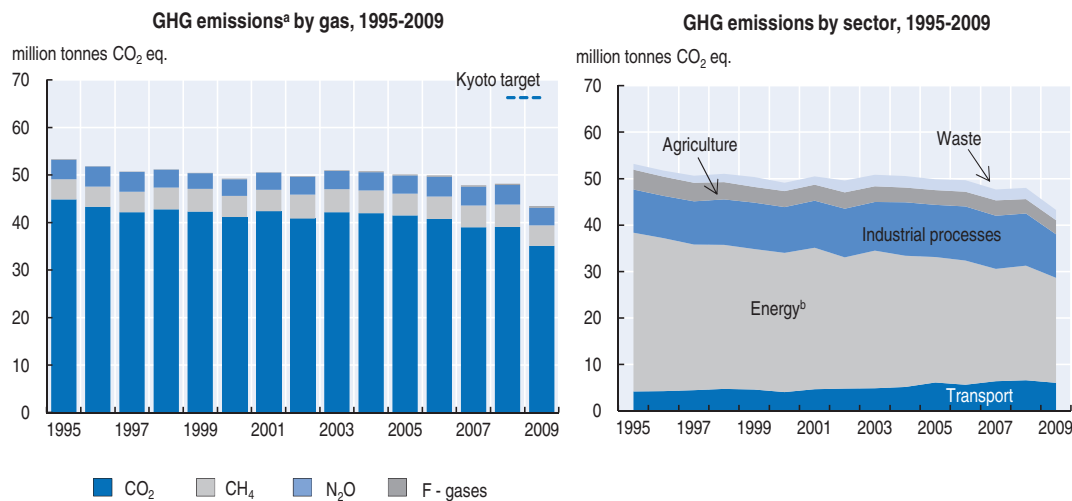
- Consolidate the inter-institutional co-operation platform and extend its activities to the strategic design and assessment of climate change, energy and transport policies; strengthen the system to monitor implementation of GHG emission reduction policy measures, extending it to their related financial and economic costs, with a view to assessing and improving overall cost-effectiveness.
- Regularly assess the efficiency and effectiveness of mechanisms to support renewable energy sources, considering their environmental and economic implications, the impacts of feed-in tariffs on electricity prices, and the potential overlap among different forms of support; decrease feed-in tariffs in line with technological progress and phase out all support schemes for renewable energies as they become competitive with conventional energy sources; further streamline administrative and permitting procedures for the installation of renewable energy plants.
- Improve the effectiveness of Slovakia's participation in the EU ETS and use of the Kyoto Protocol flexible mechanisms by ensuring transparency of transfers of emission allowances and revenue use, and fully implementing the Green Investment Scheme.
- Continue to gradually phase out coal subsidies and tax concessions for energy use by households and in energy-intensive industries, with a view to encouraging changes in energy-consumption patterns and contributing to fiscal consolidation.
- Consider restructuring taxes on energy products used in sectors not covered by the EU ETS by including a CO₂ tax component; consider raising the tax rate on diesel with a view to making the tax treatment of automotive fuels consistent with climate change objectives.
- Extend to cars the existing distance-based and emission-differentiated road tolls applied to heavy goods vehicles.
- Speed up modernisation of rail infrastructure, improve public transport services and develop alternative modes to road transport.

1. Greenhouse gas emission performance

The Slovak Republic, as an Annex I party to the United Nations Framework Convention on Climate Change (UNFCCC) and a Kyoto Protocol party since 2002, has undertaken an international commitment to reduce greenhouse gas (GHG) emissions by 8% below 1990 levels in the 2008-12 period. As of 2009, total GHG emissions – excluding those from land use, land use change and forestry – were more than 40% below the 1990 level at 43.4 million tonnes of CO₂ equivalent (Mt CO₂eq.) (Figure 5.1).

As in many former transition economies, this significant drop in emissions was primarily driven by significant changes in economic activity since 1990, involving economic restructuring towards a greater share of services in GDP, changes in the fuel mix and greater efficiency. GHG emissions remained relatively stable between 2000 and 2008. Total primary energy supply (TPES) fell about 9% from 2008 to 2009 due to the economic crisis, leading to a dip in GHG emissions. Emissions may increase slightly by 2012 due to the recovery of economic activity and rising emissions from the transport sector and industry. Nevertheless, Slovakia will largely meet its commitment under the Kyoto Protocol (Figure 5.1).

Figure 5.1. GHG emissions by gas and by sector



a) Excluding emissions/removals of the land use, land use change and forestry sector.

b) Emissions from the combustion of fuel (excluding transport) and fugitive emissions.

Source: National submission to UNFCCC, April 2011.

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However, according to government projections, GHG emissions excluding land use, land use change and forestry will grow by 20% to 30% in the period to 2020, depending on whether additional measures are implemented. Transport and industrial processes are expected to contribute the most to this increase (MoE and Slovak Hydrometeorological Institute, 2009).

CO₂ intensity

Significantly reduced CO₂ emissions, combined with strong GDP growth and a low population growth rate, resulted in a sharp drop of the economy's carbon intensity as measured by CO₂ emissions per unit of GDP (using purchasing power parities). This was the sharpest decline in any OECD country (Figure 5.2). However, the carbon intensity of the economy remains above the OECD Europe average and among the highest in the OECD. Per capita emissions have also decreased, slightly above the OECD Europe decline. CO₂ emissions have decreased more rapidly since 1990 than TPES, leading to a drop in the carbon intensity of the energy supply (Figure 5.2). This is in part because the largest declines in energy consumption since 1990 have occurred in the manufacturing industries, the heaviest fossil-fuel users in the Slovak economy even today. In addition, changes in the power generation fuel mix have led to further reduced emissions.

Sectoral trends

CO₂ accounted for over 80% of Slovakia's GHG emissions in 2009, and 77% of CO₂ emissions come from fossil fuel combustion, including in transport. Most of the rest comes from industrial processes. The strong decline in GHG emissions since 1990 is largely due to reductions in energy-related CO₂ emissions (Figure 5.1), which decreased 36% from 1990 to 2008 (IEA, 2010).

Emissions from electricity and heat production account for 24% of CO₂ emissions from fuel combustion, and dropped over 34% from 1990 to 2008, though electricity and heat output

did not significantly decline over the period (IEA, 2010). Besides reduced demand, notably in industry, the fuel mix for electricity and heat production has become less carbon intensive; nuclear power, hydropower and renewables have all increased while coal has decreased. As a result, emissions per kWh of heat and electricity generation have declined considerably.

Other energy industries, such as petroleum refining and the manufacture of solid fuels, account for approximately 13% of energy-related CO₂ emissions. Emissions from this subsector have increased by nearly 15% since 1990, though they have remained relatively stable since 2000 (Figure 5.1).

Industry accounts for approximately 36% of Slovakia's CO₂ emissions when those from electricity and heat are allocated to consuming sectors. This sector, which accounts for about 30% of total final energy consumption (TFC), was significantly affected by economic changes in the 1990s; GHG emissions have correspondingly declined dramatically since 1990 (Figure 5.1). Industrial consumption of more CO₂-intensive coal and oil has also declined. The major GHG-emitting industrial branches are mineral products, chemicals, and iron and steel.

One of the few sectors in which CO₂ emissions have increased is transport (Figure 5.1). It accounts for about 19% of fossil fuel-related CO₂ emissions, and the share has nearly tripled since 1990. As in many OECD countries, most transport-related emissions are from road transport, which accounts for over 80% and is up by nearly 43% since 1990. Energy consumption in rail transport has declined by 65% in the last two decades (Section 5).

CO₂ emissions from fuel combustion in the residential, commercial and public sectors have decreased most dramatically since 1990, by nearly 60%. The share of the commercial and public sectors in TFC has declined since 1995, but that of the residential sector has remained relatively steady. Nevertheless, CO₂ emissions have dropped some 31% in the residential sector due to a fuel switch from coal and oil to electricity and gas.

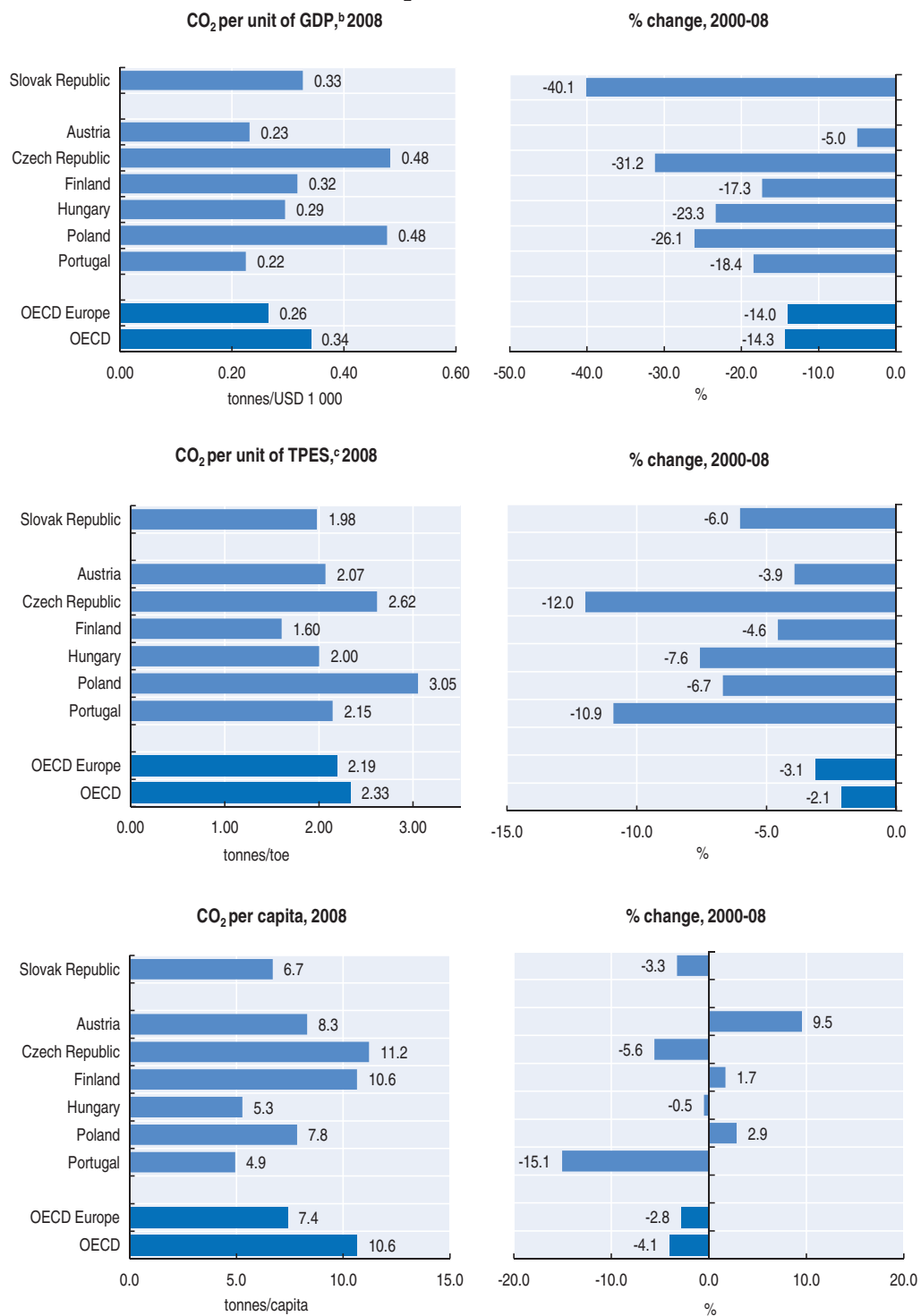
GHG emissions from agriculture are no longer very significant, accounting for about 7% of total emissions. Since 1990, these emissions have fallen by nearly 58%, largely due to decreasing cattle numbers (Figure 5.1). The land use, land use change and forestry sector is a sink rather than a source of emissions and remained relatively stable at 8-10% of total GHG emissions until 2004, when sink levels were reduced by half due to a severe wind and pest problem.

Non-CO₂ gases

Non-CO₂ gases – methane (CH₄), nitrous oxide (N₂O) and fluorinated gases (HFCs, PFCs and SF₆) – account for some 19% of total GHG emissions. A decline in agriculture has led to strong decreases in N₂O emissions, with fewer animals and reduced use of fertiliser. However, nitric acid production has led to a slight increase in N₂O emissions since 2002, though overall N₂O emissions have decreased more than 40% since 1990 (Figure 5.1).

Emissions of methane have also declined, although more moderately (Figure 5.1). Nearly half of methane emissions are produced in the waste sector, approximately 30% in the energy sector (gas) and a little over 20% in agriculture. While emissions from agriculture have decreased since 1990, those from solid waste disposal have increased, and fugitive methane emissions from the extraction and distribution of oil and gas also remain significant, particularly since Slovakia is a transit country for oil and gas coming into Europe.

The largest increases in non-CO₂ gases are in fluorinated gases (F-gases) used in industrial processes. Emissions of HFCs and SF₆ have increased since 1990, while those of perfluorochemicals (PFCs) have decreased significantly. HFC emissions have also increased since the mid-1990s as HFCs have been used to replace PFCs. Though emissions may be increasing, fluorinated gases account for less than 1% of total GHG emissions (Figure 5.1).

Figure 5.2. CO₂ emission^a intensities

a) Includes CO₂ emissions from energy use only; excludes international marine and aviation bunkers; sectoral approach.

b) At 2005 prices and purchasing power parities.

c) Total primary energy supply.

Source: OECD-IEA (2010), CO₂ Emissions from Fuel Combustion; OECD (2011), OECD Economic Outlook No. 88; OECD-IEA (2011), Energy Balances of OECD Countries Database.

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2. Policy and institutional framework

Slovakia's GHG emission reduction target under the Kyoto Protocol was the main climate-related objective over the review period. As was indicated above, this objective is likely to be largely met for 2008-12. Slovakia has also been participating in the EU Emissions Trading System (EU ETS) since 2005, which implies a cap on emissions from energy production and energy-intensive manufacturing (Section 3). For the post-Kyoto period, Slovakia, like other EU countries, is committed to complying with the EU Climate and Energy Package, which sets targets for GHG emissions, renewable energy sources and energy savings to 2020.¹ The targets that apply to Slovakia are:

- Limit the increase in GHG emissions in sectors not covered by the EU ETS to 13% above the 2005 level.
- Increase the share of renewable energy to 14% of gross final energy consumption.
- Cover 10% of transport fuel consumption by fuels produced from renewable sources.
- Contribute to the 20% EU-wide reduction in energy use. Like other EU countries, in the framework of the EU directive on energy end-use efficiency (2006/32/EC), Slovakia is expected to reduce final energy consumption by 9% relative to the 2001-05 average by 2016. In addition, the 2008 Slovak Energy Security Strategy established a target of reducing final energy consumption by 11%, relative to the 2001-15 average, by 2020.

In addition, the country will continue to participate in the EU ETS: emissions from the sectors it covers will be subject to an EU-wide cap from 2013, which will be progressively lowered to limit emissions to 21% below the 2005 level in 2020. These GHG emission reduction targets appear challenging for Slovakia, even though the country will be allowed to increase emissions in non-ETS sectors. Indeed, as noted above, emissions are projected to increase even in the most favourable scenario, especially in transport. Table 5.1 summarises the main policies and measures in place to achieve these targets, and their related emission reduction potential.

Table 5.1. Major climate change mitigation policies and measures

Policy/measure	Type of measure	Status	GHG affected	GHG emission reduction potential 1 000 tonnes CO ₂ eq.		
				2010	2015	2020
ETS Directive (2003/87/EC)	Economic instrument	Implemented	CO ₂ CH ₄ N ₂ O	983	1 372	1 802
EU Climate and Energy Package	Economic instrument; regulation	Adopted	CO ₂ CH ₄ N ₂ O	1 585	2 578	2 643
Energy Efficiency Act (Act 476/2008 Coll.)	Regulation	Adopted	CO ₂ CH ₄ N ₂ O	38	38 ^a	38
Biofuels Directive (2003/30/EC)	Regulation	Implemented	CO ₂ CH ₄ N ₂ O	262	418	631
Regulation 842/2006/EC on certain fluorinated greenhouse gases	Regulation	Implemented	HFC _s	2	82	117
Waste Directive (2006/12/EC)	Regulation	Implemented	N ₂ O	262	418	631
Nitrates Directive (91/676/EEC)	Regulation	Implemented	N ₂ O	412	409	427

a) Updated projections indicate a GHG emission reduction potential of thousands tonnes CO₂ eq. 238 in 2015.

Source: Ministry of Environment and Slovak Hydrometeorological Institute, 2009.

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The Ministry of Environment (MoE) is responsible for developing the national climate change mitigation and adaptation policies and is the focal point to the UNFCCC. Several other institutions are involved, including: the Slovak Hydrometeorological Institute and Slovak Environmental Agency, with technical support and GHG emission monitoring and reporting responsibilities; the Ministry of Economy, in charge of energy policy; the Ministry of Transport, Infrastructure, Construction and Telecommunications, responsible for transport policy and energy efficiency in buildings; and the Ministry of Agriculture and Rural Development, involved in the promotion of biomass as a source of energy, among other areas (IEA, forthcoming).²

Slovakia has made progress in mainstreaming climate change consideration in sectoral policies and in reinforcing inter-institutional co-ordination. In 2005, it established the Inter-ministerial Working Group on Climate Change, which co-ordinated the preparation of the national communications to the UNFCCC and the EU ETS allowance allocation plans. A high-level Commission for the Climate and Energy Package (at secretary of state level) was established in 2008 under the joint supervision of the ministries of environment and economy. The main driver for co-operation was the need to prepare national positions for negotiating at EU level. The commission has provided a good climate governance example and its mandate could be extended to the development and follow-up of a national climate change strategy. Slovakia regularly monitors GHG emissions and progress towards targets, and reports to the UNFCCC and the EU.

However, despite such co-ordination efforts, a sectoral approach to policy development still prevails. Co-ordination efforts have focused on climate and energy policies, while there is much scope for improvement as regards transport policy and infrastructure development. Overall, for most of the last decade, climate change was not high on the political agenda, partly due to the lack of challenging international commitments. The negotiation and launch of the EU Climate and Energy Package were pivotal in fostering debate and a more active climate policy in Slovakia. However, Slovakia has yet to develop a clear, comprehensive framework linking climate, energy and transport policies at the national level, as well as a climate adaptation strategy. Moreover, mechanisms to systematically analyse the cost-effectiveness of the climate policy mix have not been put in place. There is also a need for strengthened economic and scientific analyses to support decision making and enhance Slovakia's participation in the climate debate at European and international levels.

3. Market mechanisms and price signals

3.1. Kyoto Protocol flexible mechanisms

Slovakia has made limited use of the Kyoto Protocol flexible mechanisms. As of 2010, it had implemented only one Joint Implementation project, on landfill gas recovery. As in other former transition economies, Slovakia has a large surplus of assigned amount units (AAUs) under the Kyoto Protocol, amounting to about 90 Mt of CO₂ eq over the commitment period. More than half this amount has already been sold in a controversial and non-transparent deal for a very low price (EUR 5.05 per AAU). The resulting reputational damage, together with delays in setting up its Green Investment Scheme (GIS), hindered Slovakia's ability to sell AAUs on the international carbon market (Tuerk *et al.*, 2010).

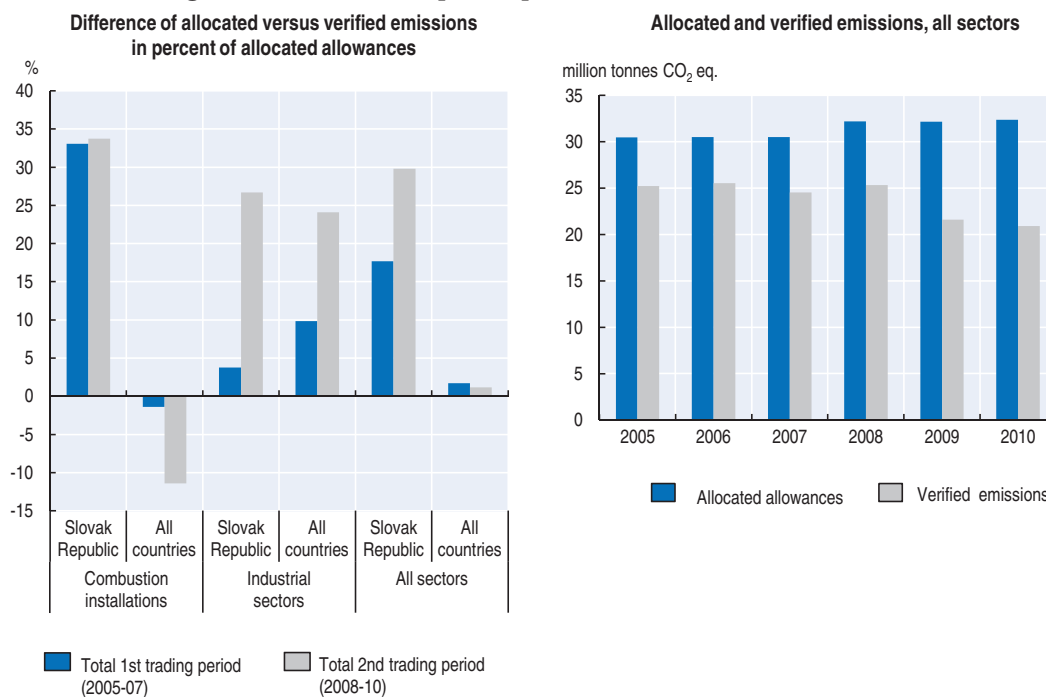
In a bid to restore confidence among potential buyers, Slovakia established the GIS in 2009. Like other such systems, the GIS collects proceeds from sales of AAUs and reinvests them in environmental and climate mitigation projects. Most public buyers choose seller

countries that can assure effective and transparent use of revenue. Therefore, it is essential for Slovakia to enhance its implementation capacity and put in place credible mechanisms to monitor and verify emission reductions and financial flows. It could consider, for example, establishing a system of independent audits, including by international auditors accredited by the UNFCCC, as set up in other Central and Eastern European countries (Tuerk *et al.*, 2010). To maximise effectiveness, the GIS should target projects capable of delivering emission reductions that are additional to other implemented measures and/or that cannot adequately be addressed by Joint Implementation (*e.g.* because they involve many small-scale projects, such as energy efficiency in buildings).

3.2. EU ETS

The EU ETS, as outlined in the first and second national allocation plans, covers the largest energy users and CO₂ emitters. It covers about 65% of Slovakia's annual GHG emissions. During the first trading period (2005-07), there was an excess supply of allowances in Slovakia, even more than on average in the whole system. The surplus of allowances (*i.e.* the difference between allocated and verified emissions) represented 18% of the allocation to Slovakia, as opposed to less than 2% in the whole market. The Slovak energy generation sector benefitted the most from this overallocation, while on average in other countries the energy industries were short of allowances and had to buy them (Figure 5.3).

Figure 5.3. **Slovakia's participation in the EU ETS, 2005-10**



Source: European Environment Agency.

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Slovakia's verified emissions have been consistently below the allocations since the EU ETS started in 2005 (Figure 5.3). The annual average allowance allocation was increased by about 6% for the second trading period (2008-12) to allow for expected economic growth and to include additional installations. As in the previous trading period, all allowances

were allocated for free, and the majority of them went to power plants, cement factories and refineries. The first three years of the second trading period saw an even higher surplus of allowances in both the energy and manufacturing sectors. This surplus accounted for nearly 30% of the allocation to Slovakia, as compared to about 1% for all participating countries (Figure 5.3). However, this may be partly due to the recession.

The EU ETS has provided inadequate incentives for participants to reduce emissions, largely because of the constant overallocation of allowances. The impact on Slovakia's GHG emissions has been modest: verified emissions remained virtually constant between 2005 and 2008 before dropping in 2009 as a consequence of the recession (Figure 5.3). The free allocation of excess allowances is an implicit subsidy to operators in the trading sectors.

The government acknowledged this in 2011 by introducing a tax on excess emission allowances registered in 2011-12, aiming to hit the windfall profits resulting from the free allocation. It expects to collect EUR 150 million in 2011-12, to be partially invested in reducing the energy intensity of the economy. The tax would be levied on the value of the excess allowances, irrespective of whether they are sold. The European Commission questioned whether the tax could potentially reduce participants' incentive to curb emissions.³ Slovak authorities say the tax is designed so that emission reduction incentives are preserved, because it is not levied on the surplus of allowances resulting from reduced emissions (due to abatement efforts or reduced production). The tax on excess allowance could reduce the implicit subsidy to some sectors, but removing tax exemptions for energy products used in energy-intensive industries (the vast majority of which participate in the ETS) would probably be a more straightforward and efficient way of cutting benefits accruing to large emission sources, as well as of providing incentives to reduce energy consumption (see below).

3.3. Energy prices and taxes

Electricity and fuel for stationary use

The electricity and gas markets have been progressively liberalised. However, many segments of the electricity, gas and heat markets continue to be regulated, including the prices of electricity and natural gas for households and small businesses (IEA, forthcoming).⁴ Prices of oil products and coal are no longer regulated, being largely linked to international markets. The energy market regulator (Regulatory Office for Network Industries) has steadily raised end-use prices to phase out cross-subsidies from industrial to domestic customers (IEA, 2005). The energy market reforms have led to dramatic increases in energy prices.⁵ Overall, energy prices in Slovakia are above the OECD Europe average. Furthermore, as household income has not yet caught up with the European average, real energy prices (using purchasing power parities) are much higher than in other European countries (Chapter 2 and Table 5.2).

Energy taxes in Slovakia generally exceed the minimum levels required by EU legislation, and the same rates apply to business and non-business use. In particular, a uniform tax rate applies to diesel used for transport and heating. In 2008, excise duties were introduced on electricity, coal and natural gas. In 2011, a number of tax exemptions on energy products were removed, including on natural gas and coal used by district heating companies. However, a number of partial or total exemptions still apply, including to natural gas and coal used for electricity and combined heat and power (CHP) generation; electricity and coal for households; and electricity used in energy-intensive industries (i.e. if the cost of

Table 5.2. **Energy prices in selected OECD countries, 2010**

	Electricity		Oil			Natural gas	
	Industry (USD ^c /kWh)	Households (USD ^d /kWh)	Industry ^a (USD ^c /t)		Households ^b (USD ^d /1 000 L)	Industry (USD ^c /10 ⁷ kcal)	Households (USD ^d /10 ⁷ kcal)
			HS	LS			
Slovak Republic	0.169	0.319	x	444.8	x	534.7	1 053.7
Austria	0.154 ^e	0.229	..	601.1	885.4	..	841.8
Czech Republic	0.144	0.264	438.4 ^e	421.6	1 368.3	530.5	1 136.3
Finland	0.095	0.144	..	623.8	847.6	350.4	408.9
Hungary	0.160 ^f	0.325 ^f	..	542.5	..	611.4 ^f	1 130.1 ^f
Poland	0.120 ^f	0.280 ^f	475.9	583.6	1 536.7	454.8	1 240.4
Portugal	0.127 ^f	0.245 ^f	x	651.6	1 304.3	484.1 ^f	1 091.8 ^f
OECD Europe	0.139 ^f	0.210 ^f	..	585.9	875.4	460.6 ^f	886.9 ^f
OECD	0.107 ^f	0.143	..	..	833.6	291.4 ^f	645.5 ^f
SVK price/OECD Europe	140% ^f	156% ^f	..	76%	..	112% ^f	124%
SVK price/OECD	182% ^f	223%	..	..	..	177% ^f	171%

.. not available; x not applicable; c confidential.

a) HS High-sulphur oil, LS Low-sulphur oil.

b) Light fuel oil.

c) At current exchange rates.

d) At current purchasing power parities.

e) 2008 data.

f) 2009 data.

Source: OECD-IEA (2011), *Energy Prices and Taxes Database*.

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electricity represents more than half the average own costs of the product manufactured). By lowering end-use prices, these exemptions may reduce incentives to use energy efficiently. Slovakia should reconsider such excise duty exemptions to encourage permanent changes in consumption patterns and contribute to fiscal consolidation (Chapter 2).

Transport fuel

Transport fuel prices increased between 2002 and 2008, in line with world market prices. In 2009, the price of diesel for commercial use was among the highest in the OECD; in particular, it was higher than in neighbouring countries, which had probably caused a certain amount of cross-border fuel tourism, especially by heavy goods vehicles. However, tax rates have not been adjusted for inflation since 2004 and are lower than in a number of other OECD countries.

In 2010, the diesel tax, already below the tax rate on petrol, was reduced by about 23% to compensate for the introduction of the new road toll system (Section 5.1). As a consequence, the price of diesel for commercial use is now below the OECD Europe average and broadly comparable to those in neighbouring countries (Figure 2.5). As was the government's intention, the lower tax rate has attracted transit carriers to fill up their tanks in Slovakia and, according to the Ministry of Finance, resulted in 14.5% growth in diesel consumption in 2010. Thus this tax policy choice is inconsistent with GHG emission reduction objectives; it also makes taxation even more favourable to diesel, whose combustion emits more CO₂ and other pollutants per litre than petrol.⁶ In addition, from a revenue raising perspective, the increase in fuel consumption was not high enough to cover the decline in tax revenue resulting from the lower rate (IREF, 2011). On these grounds, Slovakia should reconsider the

decision to reduce the diesel tax. On the whole, Slovakia could consider raising fuel tax rates in a bid to control the strong demand for road transport, although this might be difficult in practice due to the relatively high pre-tax prices, social acceptability considerations, and fuel price competition with neighbouring countries.

Fuel taxes and carbon prices

Overall, Slovakia, like most countries, is far from having a unique carbon price. Ideally, a single carbon price should be applied across all sectors of the economy to reduce GHG emissions where it is the cheapest to do so. When converted in terms of CO₂ emissions, tax rates on heavy oil and coal remain below the price of CO₂ emissions prevailing in the EU ETS (EUR 15 per tonne of CO₂). Calculations suggest that the excise duties on coal and oil should increase to EUR 34 and EUR 48 per tonne, respectively, just to internalise the social cost of CO₂ emissions (Table 5.3). Moreover, the implicit carbon price derived from the excise on natural gas is much above those on more carbon-intensive fuels such as coal and oil. From a climate mitigation perspective, this represents an implicit subsidy to dirtier fuels. The implied carbon prices shown in the table are likely to be overestimated because of the exemptions and because the costs of other negative externalities are not accounted for.

Table 5.3. **Excise duties on fuels and implied carbon prices, 2010**

Fuel	Excise duty (EUR/unit)	CO ₂ emission factor (kg CO ₂ /unit) ^a	Implied carbon price of excise duty (EUR/t.CO ₂)	Implied excise duty at (EUR 15/t.CO ₂)
Premium unleaded petrol (1 000 litres)	514.50	2 301.8	223.5	34.5
Diesel (1 000 litres)	386.40	2 641.3	146.2	39.6
Heavy oil (tonne)	26.55	3 190.0	8.3	47.8
Kerosene (1 000 litres)	481.31	2 529.9	190.2	37.9
Coal (tonne)	10.62	2 295.3	4.6	34.4
Natural gas (MWh)	13.27	184.8	71.8	2.8

a) UK Department for Environment, Food and Rural Affairs.

Source: OECD-IEA (2011), *Energy Prices and Taxes Database*; OECD calculations.

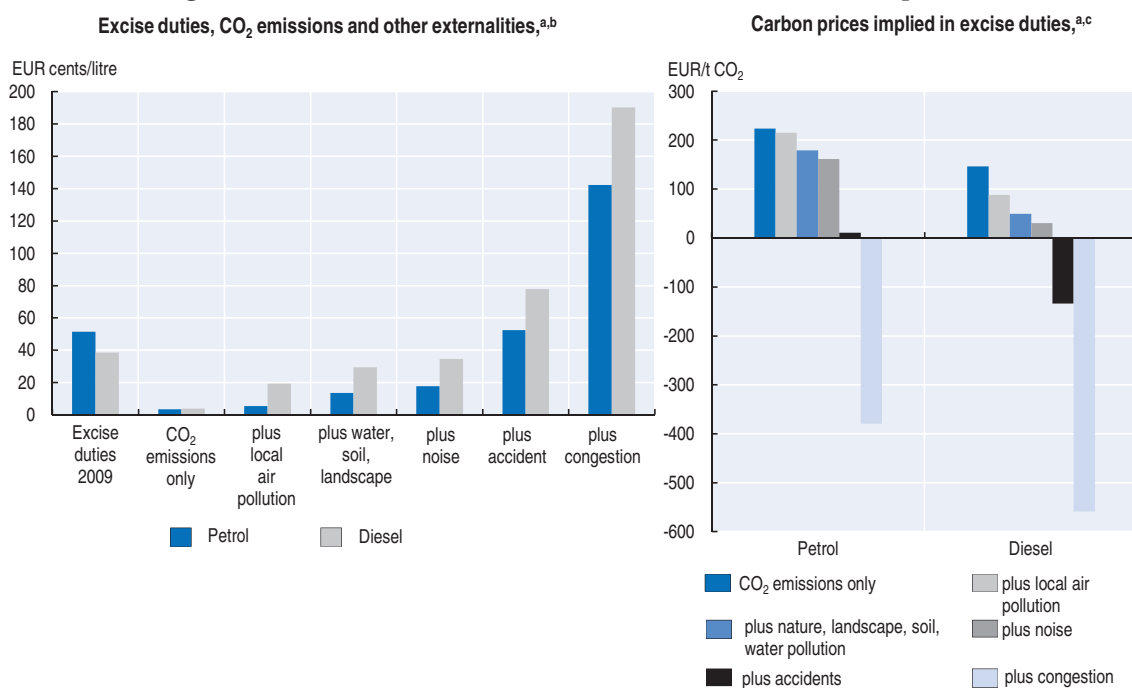
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On the other hand, as in any country, the implied CO₂ price in excise duties on transport fuels is much higher than if they were designed exclusively to reflect the average price of an emission allowance in the ETS. The implied carbon price of diesel is well below that of petrol. Accounting for the excise duties in terms of the environmental and social costs of road transport, without considering other reasons to impose such taxes, would require the consideration of other externalities (Figure 5.4). When the costs of local air pollution, noise and other environmental impacts are considered, the implied carbon prices in the automotive fuel tax rates decrease significantly, reaching about EUR 161 per tonne of CO₂ for petrol and EUR 30 for diesel (2010 prices). They become negative if the costs of accidents and congestion are also taken into account (Figure 5.4).⁷ Nevertheless, excise taxes might not be the most efficient way to deal with some externalities, including accidents and congestion.⁸

In addition to phasing out current tax exemptions, Slovakia could adjust excise duties on energy products to reflect a carbon price component, thereby extending carbon pricing

to sectors excluded from the EU ETS (residential, commercial, transport and low energy-intensive industries). Although there may be competitiveness and security of energy supply considerations involved in setting excise duties, Slovakia could consider increasing the tax rates on under-taxed products, such as coal and oil used in sectors outside the EU ETS, to include a CO₂ tax component (Table 5.3). However, any such rises would need to be complemented by measures to compensate low-income households and small businesses to avoid a switch to even dirtier but cheaper fuels (Chapter 2). As mentioned above, the diesel tax should be increased to correct for the diesel-petrol tax distortion and achieve tax parity in the long term.

Figure 5.4. **Excise duties on automotive fuels and carbon prices, 2010**



- a) Calculations assume: fuel consumption of litres 7.5/km 100 for petrol and litres 6/km 100 for diesel; CO₂ emissions of kg CO₂ 2.3/litre of petrol and kg CO₂ 2.64/litre of diesel; values of externalities in EUR cent/km (at 2000 prices): local air pollution, petrol: 0.1; local air pollution, diesel: 0.6; noise: 0.2; nature, landscape, soil and water pollution: 0.4; accidents: 1.7; and congestion: 4.4; the values of externalities are converted to 2010 prices.
- b) Calculations assume a carbon price of EUR 15/tonne CO₂. The graph compares the fuel excise duties applied in the Slovak Republic in 2010 with the external costs associated with automotive fuel use. For example, the column “plus local air pollution” indicates the value of the emissions of CO₂ and local air pollutants due to the use of petrol and diesel; the column “plus congestion” indicates the total value of the externalities associated with fuel use.
- c) The implied carbon price is computed as the amount of the tax levied per litre times the amount (kg) of CO₂ emitted by burning one litre of fuel times the amount needed to reach one tonne of CO₂ emissions. The basis of the calculation is the excise tax from which external costs are deducted, normalised to EUR/tonne of CO₂. The graphs shows how the carbon price implied in the excise duties of petrol and diesel decreases depending on which other externalities are taken into account.

Source: OECD-IEA (2011), *Energy Prices and Taxes Database*; CE DELFT (2008); OECD calculations.

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4. Climate change and energy policy

Slovakia's energy mix is largely reliant on fossil fuels, mostly imported from the Russian Federation. The role of natural gas has been steadily increasing, especially in the well-developed district heating network (Box 5.1). The fuel mix for electricity generation has become less carbon intensive and is dominated by nuclear power (Figure 5.5).

Box 5.1. Energy structure and trends

Energy mix

While Slovakia has experienced sustained GDP growth since 1995, with 2009 representing the first drop in GDP in over 20 years, its TPES has remained relatively stable, though it dropped in 2009 as a result of economic downturn (Figure 5.5). The energy mix is still largely reliant on fossil fuels, with coal, oil and natural gas accounting for 70% of TPES in 2009. The fossil-fuel mix is dominated by natural gas, at 27% of TPES, followed by coal products at 23% and oil at 20%. The share of coal has steadily declined since 1995, with nuclear power and renewables taking up the slack. Renewable sources of energy made up 7.6% of TPES in 2009, dominated by solid biomass and hydropower.

Similar changes have occurred in the fuel mix in the electricity and heat sector, which has become less carbon-intensive since 1990. Electricity generation is dominated by nuclear power at 54%, with renewable energy sources contributing 19% and coal 16.5% (Figure 5.5). Coal's share has dropped since 1995, a decline offset by nuclear power. In addition, the vast majority of coal and oil products in the power sector is used in CHP plants, while gas is used only in CHP and heating. Power plant efficiency levels remain lower than for most OECD countries, particularly for coal plants, where the average efficiency level was below 30% in 2007. While the total share of renewables in electricity generation has stayed around the same level since 1995, it has become more diverse. In 1995, hydropower was almost the only renewable source of electricity. In 2009, though hydro still accounted for 90% of renewable-sourced electricity, solid biomass, renewable waste, biogas and wind also contributed.

Energy use

Energy intensity (TPES per unit of GDP) has declined significantly as TPES has held steady and GDP has risen, largely due to structural changes in the economy along with efficiency gains. While energy intensity in 2009 was 0.16 tonnes of oil equivalent (toe) per USD 1 000, slightly above the OECD average and well above the OECD Europe average, it declined by nearly 39% from 2000 to 2009 (Figure 5.5).

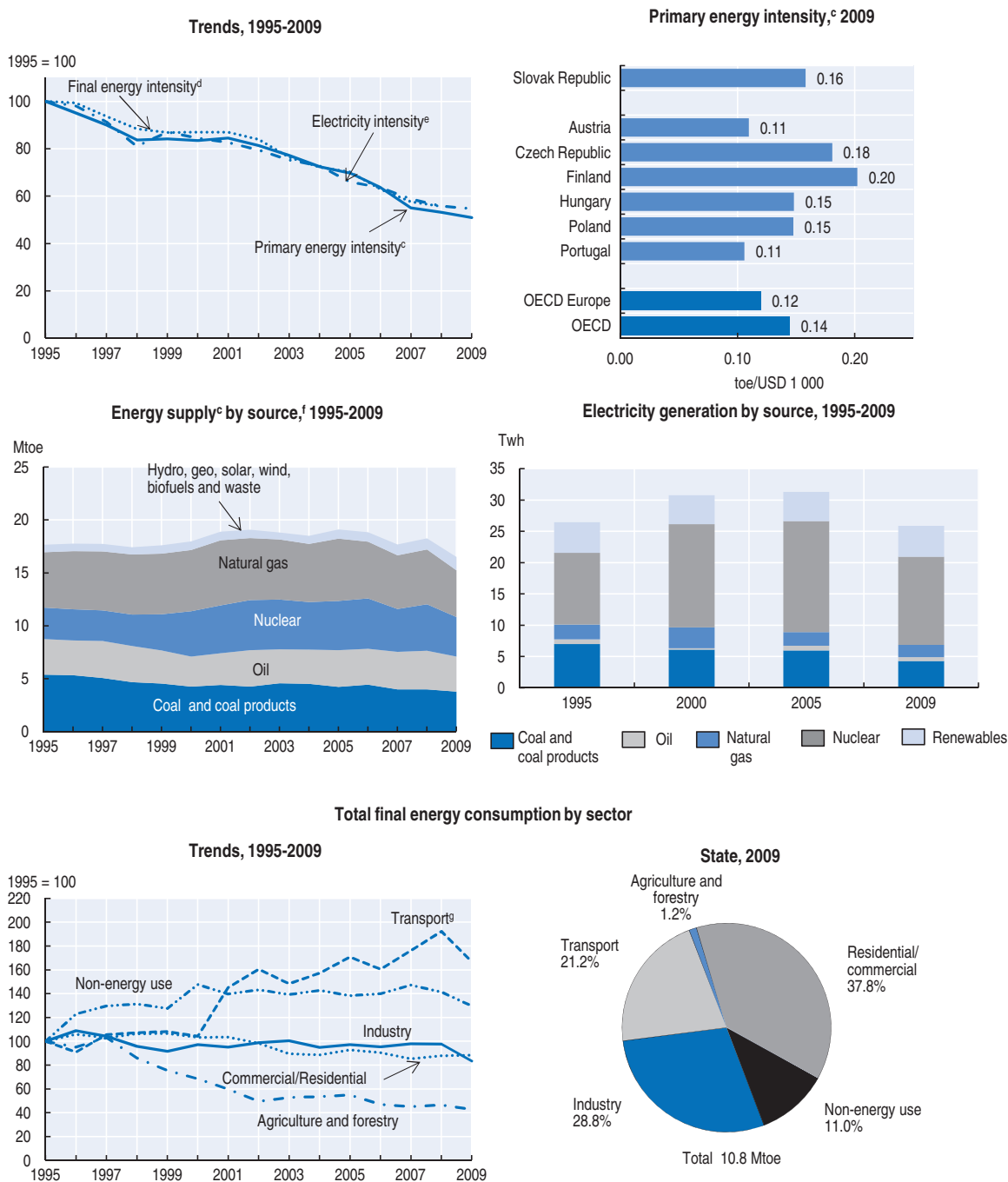
Total final consumption (TFC) has fluctuated since 2000; after having increased between 2006 and 2008, it dropped by 8% in 2009 as a result of the economic downturn. Industry accounted for about 30% of TFC in 2009, and the share has remained largely stable since 2000. After a sharp decrease in the early 1990s, energy consumption in industry remained fairly stable for most of the 2000s before decreasing in 2009 due to the recession (Figure 5.5). Overall, consumption of more carbon-intensive fossil fuels has declined more than consumption of less carbon-intensive gas and electricity since 1990.

Transport represents 21% of TFC, a major increase since 2000, when it accounted for 13% (Figure 5.5). Total consumption of energy in transport has increased 60% since 2000. This increase has been driven by road transport, which accounts for 80% of the sector's energy consumption. Much transport of both freight and passengers has shifted to road (Section 5). As Slovakia is a key transit country for gas from the Russian Federation, gas use in pipeline transport accounts for a large share of energy consumption in the transport sector.

Taken together, the commercial (including services), public and residential sectors are the country's largest final energy consumers, accounting for nearly 38% of TFC. Energy consumption in these sectors has dropped by 15% since 2000. Energy prices for electricity, heat and especially gas have significantly increased for households since 1998 (Section 3), while improved energy efficiency in buildings has also led to a decline in energy use.

Figure 5.5. **Energy^a structure and trends**

Energy per unit of GDP^b



a) Excludes international marine and aviation bunkers.

b) GDP at 2005 prices and purchasing power parities.

c) Total primary energy supply per unit of GDP.

d) Total final consumption of energy per unit of GDP.

e) Electricity consumption per unit of GDP.

f) Breakdown excludes electricity trade.

g) Including pipeline transport from 2001.

Source: OECD-IEA (2011), *Energy Balances of OECD Countries Database*; OECD (2010), *OECD Economic Outlook No. 88*.

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The share of renewables has hovered between 15% and 19% of electricity output; while hydropower remains the main renewable source, the use of biomass grew considerably in the second half of the 2000s. Taken together, fuel-mix changes have led CO₂ emissions per kWh of heat and electricity generation to decline considerably. The overall energy intensity of the economy steadily decreased in the last two decades, although it remains well above the OECD Europe average (Figure 5.5). The high energy intensity is explained by the sustained predominance of heavy industries in the economy.

Slovakia's energy policy is largely driven by EU requirements and security considerations. The 2006 Energy Policy of the Slovak Republic sets forth three key objectives to 2020: i) sufficient and efficient electricity production; ii) security of energy supply; and iii) reduction of the economy's energy intensity. A broad set of policies is envisaged to meet these strategic goals, including improving efficiency of power generation and energy consumption, increasing the use of renewables and combined heat and power (CHP), and supporting alternative transport fuels. All these, together with extended use of nuclear power, are also expected to contribute to GHG emission reduction objectives.

4.1. Energy efficiency

Most energy efficiency-related EU legislation has been transposed and now forms much of the country's energy efficiency policy. Included are the directives on energy end-use efficiency, buildings and labelling of appliances, and the regulation on CO₂ emission standards for new passenger cars. Several subsidy programmes are in place to support energy efficiency improvements, especially in buildings and industry. The programmes are financed by national and European funds, including EU Structural Funds (Chapter 2). The Slovak Energy Efficiency and Renewable Energy Finance Facility (SLOVSEFF), under the aegis of the European Bank for Reconstruction and Development and the Slovak Ministry of Economy, and the Bohunice International Decommissioning and Support Fund are the main financial instruments in supporting investment in energy efficiency and renewable sources. However, as indicated by the 2010 *OECD Economic Survey of the Slovak Republic*, there is a multiplicity of funds often targeting the same objective. This is likely to lead to overlapping support instruments and misallocation of resources (OECD, 2010).

While efficiency of heat and power generation has improved, until recently less attention has been given to energy efficiency in end-use sectors. A significant potential in achieving low-cost savings remains in buildings and transport, and Slovakia is lagging in implementing the International Energy Agency recommendations on energy efficiency (IEA, 2009).⁹ Relatively poor awareness and a lack of technical expertise and training are key barriers to energy efficiency. Slovakia should move towards a rigorous implementation of its comprehensive legal framework to ensure that energy savings are realised. Measures aimed at improving technical energy efficiency would need to be supplemented by awareness-raising initiatives and demand-side measures to avoid rebound effects (OECD, 2010).¹⁰ In particular, as indicated earlier, the removal of some tax exemptions and the adjustment of excise duties on primary fuels would encourage energy saving.

National Energy Efficiency Action Plans

The National Energy Efficiency Action Plans (NEEAPs) set a target of achieving annual savings of 4 135 TJ in final energy consumption over 2008-16. This corresponds to the indicative 9% savings on final energy consumption from 2001-05 as determined by EU directive on energy end-use efficiency and energy services (2006/32/EC). In line with the

directive, the first NEEAP (2008-10) also provided an intermediate target of a 3% reduction in final energy consumption by 2010, in line with most other EU countries. The second NEEAP (2011-13) was adopted in May 2011.

The first plan put in place a set of diverse measures to address all major end-uses. The measures considered institutional, legislative, organisational and financial requirements and needs. Several appeared to be cost-effective and realistic (EC, 2009a). While many measures had existed throughout the review period, the first NEEAP was useful in aggregating them and indentifying the need for additional measures. Measures in industry and horizontal or cross-cutting programmes were expected to deliver the largest share of energy savings (Box 5.2 and Figure 5.6). The horizontal measures were expected to be

Box 5.2. National Energy Efficiency Action Plan (2008-10)

Cross-cutting or horizontal measures were to account for most of Slovakia's targeted energy savings, according to the first NEEAP. These included educational, training and awareness programmes and the development of an Energy Efficiency Act (which was approved and entered into force in 2009), criteria for public procurement, and a monitoring and evaluation system. Most were new measures, with implementation beginning in 2008 or 2009.

The first NEEAP identified the buildings sector as accounting for 26% of TFC and outlined measures applying to residential, commercial and public sector buildings. Several were already in place, such as building regulations and energy certification and inspection requirements, along with subsidies and grants for energy efficiency measures in residential buildings. The new measures largely involved strengthening efficiency requirements within building and related regulations, and strengthening energy audit and certification programmes. Vague measures directed towards supporting more innovative approaches to buildings were also mentioned, such as low-energy and passive houses, but it was not clear exactly what form this would take.

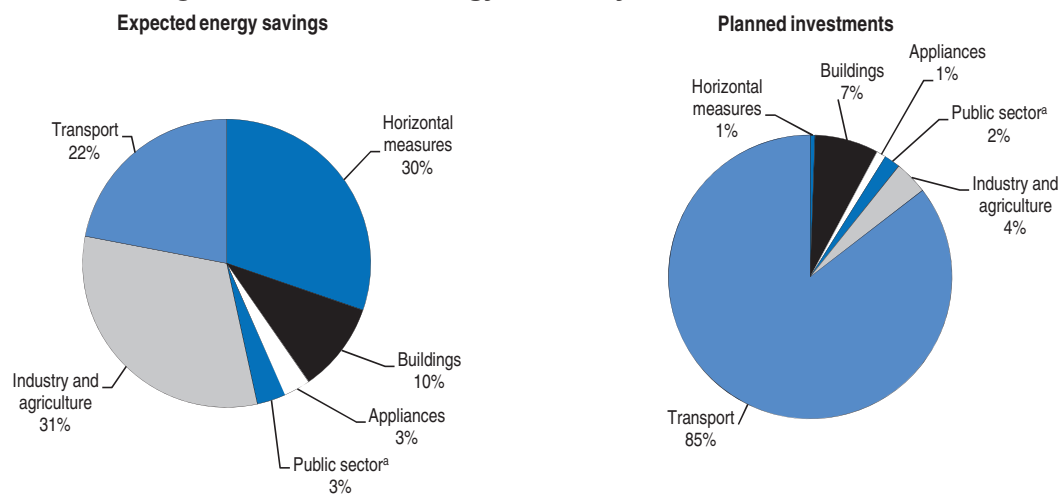
Like most countries, particularly in the EU, Slovakia has a standards and labelling programme for appliances. New measures constitute continued implementation of EU directives for energy-using products, information campaigns and training for importers and vendors of appliances, as well as a three-year plan to support replacement of large residential appliances with highly efficient ones. The plan did not mention replacement of lighting equipment (bulbs, fittings), though it is generally considered very cost-effective.

The public sector measures were, however, quite focused on public lighting.¹¹ The plan indicated that very few measures previously focused on the public sector. The new measures set minimum energy efficiency requirements for public lighting and provided funding to upgrade existing public lighting.

The plan indicated that no specific measures had been undertaken in industry. Most existing measures outlined did not seem to focus on end-use of energy in industry, concentrating instead on efficiency of energy production. The new measures focused on improving the efficiency of energy use, including funding for energy audits and upgrading monitoring and management systems and equipment. Some measures were aimed at innovation and technology transfers, though it was unclear how these would take place.

Finally, several innovative new measures were proposed for transport, focusing on broad optimisation of infrastructure through means including fees, public transport and development of intermodal infrastructure designed to shift freight from roads to rail and inland waterways. Tax reforms to benefit cleaner vehicles were also planned, as standards and technical requirements for vehicles were already in place and progressing in line with EU regulations.

Figure 5.6. National Energy Efficiency Action Plan, 2008-10



a) Excluding buildings.

Source: National Energy Efficiency Action Plan, 2008-10.

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the cheapest, accounting for 1% of the overall financial requirement of EUR 133 million in 2008-10. Savings in the industrial sector were also expected to be delivered at a relatively low cost. At the other extreme, 85% of the NEEAP cost was attributed to investment in the transport sector, supported by EU funds for about half, due to the need for infrastructure development (Figure 5.6).

NEEAP 2008-10 was well structured and provided a high level of detail about the background and context for measures in different sectors. It was organised by sector, and for each provided a list of existing measures in place for 2008-10 and a list of new or planned measures. For each measure, the plan indicated implementation period, expected cost, potential funding sources, whether monitoring systems were in place and the expected impact: high, medium or low. It also emphasised the development of a monitoring, evaluation and enforcement system. The level of success of all other measures depends in part on how well they can be implemented, which requires strong monitoring, evaluation and enforcement.

However, the share of savings associated with each sector did not seem to accurately reflect savings potential, and the classification of expected costs and impacts was unclear (EC, 2009a).¹² There were several measures expected to provide a “low” contribution towards meeting the target at a “high” cost.¹³ Moreover, the first NEEAP did not indicate the role of the EU ETS and the impact it could have on certain industrial sectors, nor did it clarify whether the measures were to apply only to installations covered under the EU ETS or to support those that were not. The large share of potential savings from this sector was not very clearly demonstrated, either, and it could be that part of these savings may be attributed to the ETS.

4.2. Renewable energy sources

Electricity and heat generation from renewables

Slovakia supports renewable-based electricity and CHP through regulatory measures, financial incentives and investment subsidies. For example, the Programme for the Promotion of Biomass and Solar Energy Use in Households provides state aid for installation of biomass-fired boilers and solar collectors. Regulations give renewables preferential access

to distribution networks, reduce costs borne by producers of renewables and cogeneration, and require large distribution system operators to preferentially purchase electricity based on renewables to cover distribution losses.

There has been renewed concern regarding the risk posed by intermittent power sources (notably wind and solar) to system integrity, as well as fear that supporting such sources would increase the price of electricity. These concerns have led the government to plan reform of certification and licensing procedures for such facilities. All solar and wind plant construction is suspended until at least the end of 2011, as the Ministry of Economy will not issue approval certificates until regulatory changes have been considered and implemented. However, it is not clear to what extent the restrictions on wind and solar development are justified.

Feed-in tariffs

Electricity from renewables is mainly supported through a feed-in tariff introduced in 2006. This incentive has been effective in stimulating the development of renewables, especially biomass for CHP. A new system has been in place since 2009. The feed-in tariff is set annually by decree and guaranteed for 15 years. The feed-in tariff price comprises two components: a basic price for electricity and a “premium” that makes up the difference between this basic price and the tariff level set by the electricity regulator.¹⁴ The premium is paid only up to a capacity of 10 MW, or 15 MW in the case of wind, even when the total installed capacity is greater. The tariff is also reduced in proportion to additional state funding that the renewable electricity producer may receive.

The feed-in tariff system is designed to assure reasonable costs and the integrity of the transmission and distribution system. It seeks to limit the number of large-scale installations that come on line, and to limit the amount of government support to facilities beyond a certain capacity. The installation of small-scale facilities is further facilitated by simplified approval procedures.

Overall, Slovakia's feed-in tariffs are consistent with similar tariffs in other EU countries (Table 5.4). However, as in most countries, they are high compared to electricity prices, varying from about 3 times the electricity price for biomass to 11 times for solar. The subsidies implied by the feed-in tariffs (except for hydropower) were estimated to account for 0.05% of GDP in 2009. The largest share goes to biomass. When compared to similar support in other OECD countries, this amount seems moderate: in countries such as Germany, Italy and Spain, subsidies are estimated to reach some 0.19-0.34% of GDP (OECD, 2011).

Table 5.4. **Feed-in tariffs for electricity from renewable energy sources, selected OECD countries, 2010**

(EUR/MWh)	Wind – onshore	Solar – photovoltaic	Biomass	Hydro
Slovak Republic	50-90	270	72-100	66-100
Austria	73	290-460	60-160	..
Czech Republic	108	455	77-103	81
Hungary	..	97	..	29-52
Germany	50-90	290-550	80-120	40-130
Italy	300	360-440	200-300	220
Netherlands	118	459-583	115-177	73-125
Spain	73	320-340	107-158	77

Source: Europe's Energy Portal (feed-in tariff valid as of April 2010).

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However, the cost of abating one tonne of CO₂ emissions implied by the feed-in tariffs is estimated to be quite high: from about EUR 160 per tonne of CO₂ eq for wind to more than EUR 1 500 for solar (OECD, 2011). This is because renewables would displace energy produced from a relatively low-carbon fuel mix, of which nuclear power makes up more than half.¹⁵ Therefore, as in most countries, abatement costs are well above the carbon price prevailing in the EU ETS and vary by energy source, mainly because, leaving aside considerations of energy security and industrial policy, feed-in tariffs reflect the actual costs of investment in renewables.

Overall, as in other EU countries, the costs of Slovakia's renewable support policy and its interactions with the EU ETS should be considered. Support to renewables could encourage innovation and diffusion of emission-reducing technologies, beyond the incentives provided by the EU ETS. However, the OECD's analysis shows that, when a carbon price exists, applying other policy tools, including renewable or biofuel subsidies and targets, can lead to overlap and undermine cost-effectiveness (OECD, 2009a).

Biofuels

In the transport sector, the major policy measure for increasing the supply of fuels produced from renewable sources is the compulsory blending of biofuel and biodiesel, a measure that has been in place since 2006. Up to the end of 2010, 5.75% of the total quantity of petrol and diesel placed on the market had to be such blends. For 2011, an amendment to the blending requirement is expected in order to keep with the trajectory planned to meet the 2020 target. Slovakia also applies excise duty exemptions to certain biofuel blends (such as 7.05% ethyl tert-butyl ether in petrol and a 5% mix of diesel and esters), and excise duty reductions on biofuels consumed within a given tax territory. No specific support measures are in place for biofuels produced from waste, residue, non-food cellulosic material and lingo-cellulosic material, though the government expects to initiate these from 2015, when such sources may contribute to the biofuel share.

While the tax exemption is easy to implement, it is expensive for the government in terms of revenue foregone, with a high risk of overcompensation. The mix of tax exemptions and blending obligations guarantees achievement of the target and gives certainty to investors and industry (through the obligation), while compensating for the extra costs of biofuels and leaving the final price at the pump unchanged (through the tax exemption) (EC, 2009b). However, experience in OECD countries shows that biofuel production costs per unit of fuel energy are significantly above those for fossil fuels, implying that biofuel production will remain dependent on subsidies, especially in Europe (OECD, 2008).

Renewable Energy Action Plan to 2020

In line with EU requirements, in 2010 Slovakia issued a Renewable Energy Action Plan (REAP) to achieve its national target of increasing the share of renewables in gross final energy consumption from 6.7% in 2005 to 14% in 2020 (Table 5.5).

To achieve the target, REAP set forth sixteen measures, of which five have been implemented, five are to be implemented from 2011 and the rest are to follow later. Thirteen target the use of renewables for heat (and electricity in some cases) by promoting heat generation from biomass and biogas and the use of renewables in buildings and in the residential, public and business sectors. The use of renewables for heat is expected to meet about half the target (Table 5.5).

Table 5.5. **Renewable energy sources, 2005, 2010 and 2020 targets**

	% in consumption			Consumption ktoe
	2005	2010	Target 2020	Target 2020
Heating and cooling	6.1	7.6	14.6	820
Electricity	16.7	19.1	24	688
Transport	0.6	4.1	10	207
Total	6.7	9.5	14	1 572 ^a

a) Net of expected exports.

Source: Renewable Energy Action Plan.

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REAP emphasises the development and use of biomass, principally for heating and CHP.¹⁶ It identifies a strong biomass potential, supported by overcapacity for the use of biomass through production of briquettes and pellets, and a well-developed district heating network to which 77% of municipalities are connected. The government also hopes to reduce reliance on gas imports for heating. Agricultural and forestry programmes are planned to increase biomass supply. Coherent plans to develop sustainability criteria for biofuels, and measures to manage the potential impact of agricultural biomass development, are outlined. The plan identifies construction, reconstruction and upgrading of heat distribution systems as a challenge for increasing the share of renewables in heating.

Electricity production from renewables in 2020 will still largely come from hydropower, but the share generated by small hydropower plants is set to increase. Solid biomass and biogas are set to make up over 20% of the share of electricity production, with wind, solar and geothermal providing the remaining 11%. REAP also outlines the government's plan to institute reverse auctions for wind and solar power generation plants.¹⁷ The renewable energy industry generally welcomed this announcement, though it cautioned against pitfalls which could lead to plants winning bids and then never being built. Auction participants would need to be screened to ensure that they can all commit to their bids.

REAP provides a very clear outline of current administrative procedures and designation of responsibilities for renewable energy development, and identifies challenges and areas where measures are required, for example to reduce planning permit times for electricity generation facilities (currently up to three years) and to strengthen procedures at municipal level.

However, other than the potential for biomass, which is simply stated with no further reference, REAP gives no potential quantities, making it difficult to gauge whether targets are realistic. The measures described are not quantified in terms of associated renewables production or use, nor is it indicated which measures are expected to contribute the most. While several measures are planned to increase the biomass supply, there is little discussion of how to boost biogas use in district heating.

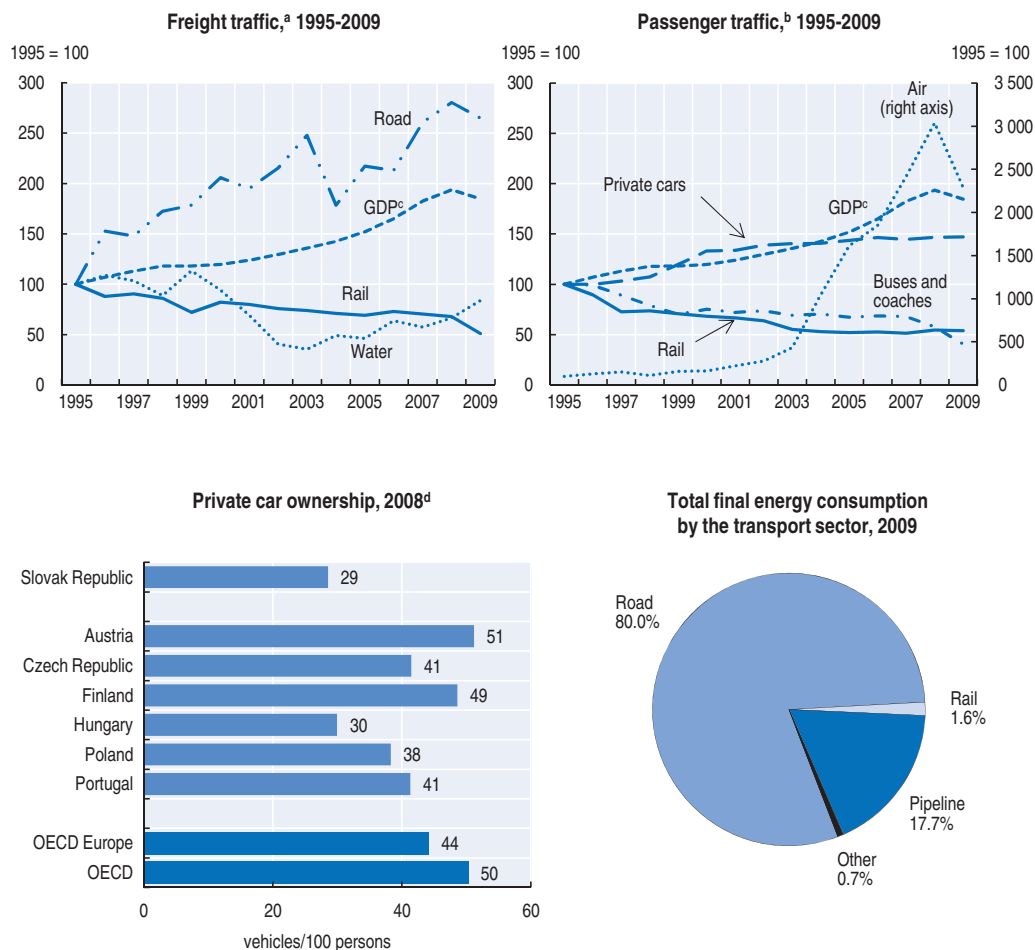
5. Climate change and transport policy

5.1. Transport trends and performance

Transport is one of the few sectors in which energy consumption and GHG emissions have increased since 2000, rising at a much higher rate than GDP growth. Road transport accounted for 80% of total energy consumption and for the vast majority of GHG emissions in transport in 2009 (Figures 5.1 and 5.7). The Slovak authorities forecast GHG emissions

from transport to grow by 23% to 36% between 2006 and 2020. Transport, particularly road, represents a key challenge for the achievement of Slovakia's mid-term GHG emission reduction targets.

Figure 5.7. **Transport trends**



a) Index of relative change since 1995 based on value expressed in tonne-kilometres.

b) Index of relative change since 1995 based on value expressed in passenger-kilometres.

c) GDP at 2005 prices and purchasing power parities.

d) Or latest year available.

Source: OECD, Environment Directorate; OECD-IEA (2011), *Energy Balances of OECD Countries Database*.

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Passenger and freight transport, measured in passenger- and tonne-kilometres, continued to grow over the review period, although both shrank in 2009 because of the economic slowdown (Figure 5.7). Yet the amount of goods transported increased only slightly, and passenger numbers actually decreased, indicating that longer distances for travel and haulage underlay the increase in passenger- and tonne-kilometres. EU accession in 2004, combined with economic expansion, accelerated trade with other EU countries and turned the Slovak Republic into a transit country.¹⁸ The economic expansion and growing trade, together with major investment in rail and road infrastructure (for example, the network of expressways doubled in length), increased travel and haulage distances.

Growth was especially noticeable in freight transport. Road freight transport (expressed in tonne-kilometres) rose 37% between 2000 and 2008, and accounted for the majority of haulage (some 75% in 2009, excluding transport via pipelines). Goods transport by rail decreased by 17% (Figure 5.7). Intermodal transport still accounts for a marginal share, though it increased significantly in the review period. In comparison with freight transport, passenger transport (expressed in passenger-kilometres) grew only modestly, by 12%. Private cars are the dominant form of passenger transport, with a share of about 70% in 2009. Rising living standards have led to an increase in the private car stock, although car ownership is still below that of most OECD countries and is expected to further increase with the country's economic convergence. Air transport is an emerging issue: although it still represents a relatively small share of passenger traffic, air traffic grew rapidly (nearly nineteen-fold) from 2000 to 2008 (Figure 5.7).

5.2. Policy measures

Overview and initiatives

Slovakia's environmental aims in transport policy are set out in a number of strategic documents, including its transport development strategy to 2020 and the EU-funded operational programme for transport for 2007-13. The main goal is to improve accessibility, reducing regional disparities and supporting economic development while continuously reducing negative impacts on the environment and on public health. To this end, several policy measures have been implemented, including infrastructure construction, vehicle modernisation and road tolls (see below).

Slovakia is continuing efforts to reduce the environmental impact of transport policy. Sustainable mobility is a "horizontal priority" in the 2007-13 operational programme for transport. The strategic environmental assessment of the programme concluded that it would "have a positive influence on the environment of urbanised areas of Slovakia" and would not have "a significant negative impact on the protected natural environment and landscape". The positive effects could include reduced traffic congestion and increased railway or waterway use. Nevertheless, new transport infrastructure might induce further vehicle use to access urban areas; fragmentation of habitats and migration corridors was anticipated in some projects. Extensive assessment and mitigation measures concerning environmental impacts are needed for the projects under the programme.

Fuels

As described earlier, rising crude oil prices pushed transport fuel prices up further in the first half of the review period (Figure 2.5). However, defying the general rule that consumption declines in reaction to high prices, transport fuel consumption in Slovakia kept rising as GDP grew (Section 5.1).

Slovakia has some tax incentives for environment-friendly transport modes, such as tax exemptions for electricity and natural gas used in rail, waterways and public passenger transport. In theory, these could help improve energy efficiency and promote further use of public transport. Thus far, however, they have not had sufficient effect to expand demand for these forms of transport.

Vehicles

Some application of green taxation to the regional annual motor vehicle tax for commercial vehicles has taken place. Some regions introduced emission categories as a basis

for the tax rate, which was originally based on parameters such as vehicle weight, number of axles (for trailers) and engine cylinder capacity (for passenger vehicles). In general, fuel taxes and road charges (see below) are more efficient in addressing CO₂ emissions than vehicle taxation, because they target car use, i.e. the activity generating the environmental costs (OECD, 2009b). However, the experience of other countries shows that vehicle taxes stimulate the renewal of the fleet towards more environment-friendly vehicles, provided that they are well designed and tax rates are linked to vehicles' energy and/or emission performance.

A scrapping programme for old vehicles (Box 2.1) spurred fleet renewal to some extent. Vehicle owners received a subsidy for scrapping obsolete cars, mainly pre-Euro standard, and replacing them largely with Euro 4 cars. Although environmental criteria were not a requirement for the subsidy, the EUR 25 000 ceiling on the new car price probably led buyers to select small- or medium-sized cars, most of which are more environment-friendly than large cars; it was estimated that cars sold thanks to the scrapping programme had emissions 5% lower (CO₂/km) than in the fleet as a whole. Nevertheless, scrapping incentives are not the most cost-effective way to reduce GHG emissions. In fact, estimates suggest that, at around EUR 4 760 per tonne of CO₂ saved in 2009, GHG emission reductions from this programme came at a much higher cost than the savings achieved in other sectors of the economy, for example, through the EU ETS (IHS, 2010).

Road tolls

The toll system was launched in 1996. It requires commercial and private users of selected expressways and motorways to buy stickers, available for a week, a month or a year at prices ranging from EUR 7 to EUR 50. There is no differentiation based on emissions, travel distance, or commercial or private use despite the fact that heavy goods vehicles are less energy efficient. In January 2010, a new system of "electronic tolls" was launched for freight vehicles and buses.¹⁹ The electronic toll, unlike the others, covers first-class roads in addition to expressways and motorways. It uses a GPS system that monitors an on-board unit in the equipped vehicles. Fees are based on length of tolled section, emission category and vehicle type. The system is flexible enough to accommodate future changes such as rate adjustments and additional differentiation. The annual cost per kilometre, including setting up and running the system, is markedly lower than for similar systems in countries including Austria, Germany and the Czech Republic²⁰ (MTPT, 2010).

The electronic toll system helps reduce environmental impacts because it is differentiated by emission category: Euro 0-2 vehicle owners have to pay much more than owners of vehicles classed as Euro 3-4 and up. However, there is not much difference between the Euro 3 and Euro 4 rates, providing little incentive to buy Euro 4 vehicles. Slovakia expects a 10% modal shift from road to rail for freight transport, but it is too early to assess the effect on this point. The country should evaluate the impact of the electronic toll system on emissions from transport, and adjust the system to reduce emissions more effectively. It could also consider extending the system to smaller vehicles, giving more incentives to low-emission vehicles and increasing disincentives for long-distance driving.

Infrastructure development

The 2004-06 and 2007-13 operational programmes for transport, financed by EU funds, focus on: i) construction and modernisation of rail and road infrastructure, especially connections to the EU transport network; ii) development of intermodal transport

infrastructure (terminals); and iii) integration of urban, suburban, regional and interregional public passenger transport. Analysis in the 2007-13 operational programme for transport indicates that the country's container terminal network is obsolete and below international standards (MTPT, 2007). Slovakia should further develop the rail network and public transport services to encourage modal shift (OECD, 2010). Any increase in fuel taxes or road charges are unlikely to be very effective in controlling transport demand until reliable and efficient alternatives to road transport for both passengers and freight are available (Box 5.3).

One problem with the Slovak rail system is that it lacks express lines and advanced logistics for international connections and information, and thus is less attractive for fast transport needs than the road transport system, in which expressways were rapidly developed. To increase the use of its railways, Slovakia will have to modernise routes, junctions, selected border crossing stations and the information network.

Despite major investment in rail, use of the railways did not increase (see also Chapter 2) (MTPT, 2010). Passenger rail transport has been a state-owned monopoly that is subsidised to assure transport services and protect employment. Such situations frequently result in vested interests and a lack of motivation to reduce costs, including labour costs. As seen in other countries, tendering of public services or privatisation could cut costs, which could positively contribute to fiscal consolidation (OECD, 2007). Slovakia's first private passenger railway operator is to commence service in March 2012 and is expected to provide more frequent services for a lower subsidy, which is a good first step. Slovakia should open rail transport further to the private sector and limit subsidies to operations in remote areas or to help keep prices competitive with those of more environmentally harmful forms of transport.

Box 5.3. Regional initiatives in Bratislava

The Bratislava urban area has undergone rapid motorisation, with transport having become a major source of CO₂ emissions in the region. The ratio of public to individual transport changed from 75:25 in 1993 to 59:41 in 2007. Likely factors explaining this shift include increased affordability of private cars and low satisfaction with public transport.* To increase the availability and use of public transport and satisfy residents' mobility needs, the region and the municipality developed an integrated transport system, defined in related legislation as "the connection of rail transport services with the urban transport system and suburban bus transport into one system of lines offering the advantages of unified tariffs, transport conditions and transport documents".

A key challenge for the system was tariff unification and allocation of revenue, since the tariffs for each type of transport was decided by different administrations. Therefore, in 2005 the Bratislava region and municipality established a business organisation, Bratislavská Integrovaná Doprava, to co-ordinate the integrated public transport system. As a result, tariffs are now unified and simplified: travellers need only one common ticket, with the price differentiated by zone and duration of its validity.

Experiences of integrated transport systems in other countries have shown that the number of public transport users increases if the system is clear and easy to use and offers price and time advantages (Poliaková, 2010). Bratislava should analyse the effect of the integrated transport system on residents' transport choices, and on emission reduction, in an effort to further improve effectiveness and attract more passengers.

* As revealed in a public opinion survey, in which many Bratislava residents said they felt that public transport services were of very low quality.

Source: UNDP and Bratislava Municipality, Sustainable Mobility in the City of Bratislava.

Notes

1. The EU Climate and Energy Package sets the following targets to be achieved by 2020: cutting EU GHG emissions by at least 20% compared to 1990 levels; meeting 20% of EU energy consumption from renewable sources; and reducing primary energy use by 20% compared with projected levels.
2. Other ministries involved in the definition and implementation of climate-related policies include the ministries of finance, foreign affairs, health, and education, science and sport.
3. In the 2008-12 period at least 90% of allowances had to be distributed for free.
4. Prices of heat produced from gas and domestic coal-fired CHP facilities and of electricity produced from domestic coal are also regulated.
5. Real energy prices for industry increased by nearly 60% between 2002 and 2008, much faster than in OECD Europe (+38%). In particular, gas prices more than doubled and electricity prices rose by over 60%. Real energy prices for households rose from 2002 to 2006 and have decreased since then. This recent trend was driven by the fall in oil prices while electricity and gas prices remained stable.
6. Although diesel vehicles generally consume less fuel per kilometre than petrol ones.
7. The total costs of local negative externalities vary considerably, depending on population density and time of day, fuel used, vehicle emission standards and the type of externalities considered.
8. The external costs of accidents could be covered by private insurance while those related to congestion are better taken care of by road/congestion pricing.
9. Responding to a request by the Group of Eight (G8 Summit, Gleneagles, 2005), the IEA formulated a set of energy efficiency policy recommendations covering 25 fields of action across 7 priority areas: cross-sectoral activity, buildings, appliances, lighting, transport, industry and power utilities. These 25 recommendations were presented to the G8 summit at Hokkaido, Japan, in July 2008.
10. Efficiency gains lower the relative price of energy and raise the disposable income of consumers. This may lead to wasteful behaviour and result in an overall increase in energy demand.
11. This is included as a separate sector since under the EU energy end-use Directive the public sector is meant to have an “exemplary” role in achieving the energy savings target.
12. For example, it is not clear why buildings would deliver fewer savings as compared with cross-cutting measures; also, an education and awareness-raising programme was classified as having a “high” contribution towards reaching the target, more so than public procurement criteria.
13. For example, a residential building support programme for efficiency measures that had been in place since 2000 was evaluated as having a “high” cost for a “low” contribution towards meeting the target, and was set to continue indefinitely.
14. The basic price, calculated by the regulator, is the price which distribution system operators must pay to purchase electricity. They are required to pay this price for electricity from renewables and high-efficiency cogeneration from installations within certain capacity limits.
15. The lower the carbon intensity of a country’s electricity mix, the higher the abatement cost associated with a given low-carbon technology.
16. Across all three sectors (heat, electricity and transport), the theoretical potential for agricultural biomass is 106 054 terajoules of heat.
17. The auction starts with the highest price for electricity a buyer is willing to pay for a maximum installed capacity. Renewable energy plant developers then submit bids, and the lowest bid wins.
18. Total exports and imports of goods increased by some 150% after EU accession.
19. The sticker system is still in effect for other categories (trucks of less than 3.5 tonnes and buses carrying fewer than nine people).
20. The cost in Slovakia is EUR 27 195/km, compared with EUR 36 726/km in Austria, EUR 53 924 in Germany and EUR 69 815 in the Czech Republic.

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PART II
Chapter 6

Agriculture and environment

This chapter examines the environmental performance of the agricultural sector, including impacts on soil, water and air. It reviews a range of policy measures that have been introduced by Slovakia to address agri-environmental issues since the transition to a market economy was initiated in the 1990s, including the removal of environmental harmful subsidies. The chapter also examines how adoption of the EU Common Agricultural Policy strengthened Slovakia's environmental regulation of the agricultural sector, and provided incentives for agricultural activities to generate environmental benefits.

Assessment and recommendations

The transition of the Slovak Republic towards a market economy, initiated in the 1990s, substantially reduced environmental pressures from agriculture. Pressures were further reduced in the 2000s due to policy reforms and investments linked to EU accession. As a result, many agri-environmental indicators (e.g. nitrogen and phosphorus balances, water use, ammonia emissions) showed positive trends in the 2000s. Nevertheless, agricultural practices still exert important pressures on the environment. Almost 60% of farmland is located in nitrate vulnerable zones requiring protection policies. Soil erosion is a widespread problem for arable land in mountainous (“less favoured”) areas, which make up 50% of agricultural land.

Rural areas account for 86% of the territory and 40% of the population. A significant part of EU farm support is channelled through a harmonised rural development programme that aims to improve competitiveness in the agriculture, food and forestry sectors, promote sustainable farming and forestry, and improve quality of life in rural areas. Although the programme has contributed to a decoupling of support payments from agricultural production and the associated environmental pressures, more could be done to link payments to environmental outcomes. A positive step has been the introduction of payments to help manage biodiversity on Natura 2000 sites which cover a high share of Slovakia’s territory. One outcome of agri-environmental policies is that, in 2009, organic agriculture accounted for 7.6% of farmland, exceeding the 2010 target of 7%. Payments to less favoured areas have helped maintain extensive forms of farming and prevent land abandonment in areas of high environmental and recreational value.

A fundamental challenge to improving environmental performance in the sector is the matter of property rights. Since transition to a market economy began, there has not been much progress in identifying landowners. As a result, the agricultural land market is not well developed, and 85% of farm operations are on leased land. From an environmental perspective, this reduces incentives to manage farmland in a longer-term, environmentally sound perspective. It also creates problems regarding management of voluntary agri-environmental programmes, which must be implemented for five consecutive years to receive payment.

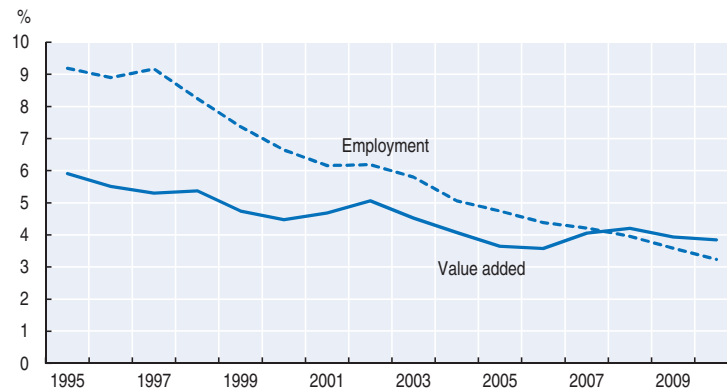
Recommendations

- Promote voluntary farm management plans in which environmental objectives going beyond national requirements would be eligible for additional support; promote fertiliser and manure management plans at the farm level in nitrate vulnerable zones.
- Consider how environmental outcomes could be better targeted in payments under the harmonised rural development programme, including Natura 2000 payments, other agri-environmental payments, and payments to maintain farming in less favoured areas.
- Strengthen incentives for more environmentally sound agricultural practices by accelerating the identification of landowners and the development of the land market.

1. Agriculture and the economy

The share of agriculture in the economy has continuously declined over the last 15 years, reflecting reform in the sector as well as the development of the industrial and service sectors (Figure 6.1). The share of agriculture in GDP declined from 6% in 1995 to around 4% in 2010, while its share in employment fell from 9% to 3%.

Figure 6.1. **Share of agriculture in the economy**



Source: OECD (2011), OECD Labour Force Statistics, Main Economic Indicators Database; OECD (2011), OECD National Accounts Database.

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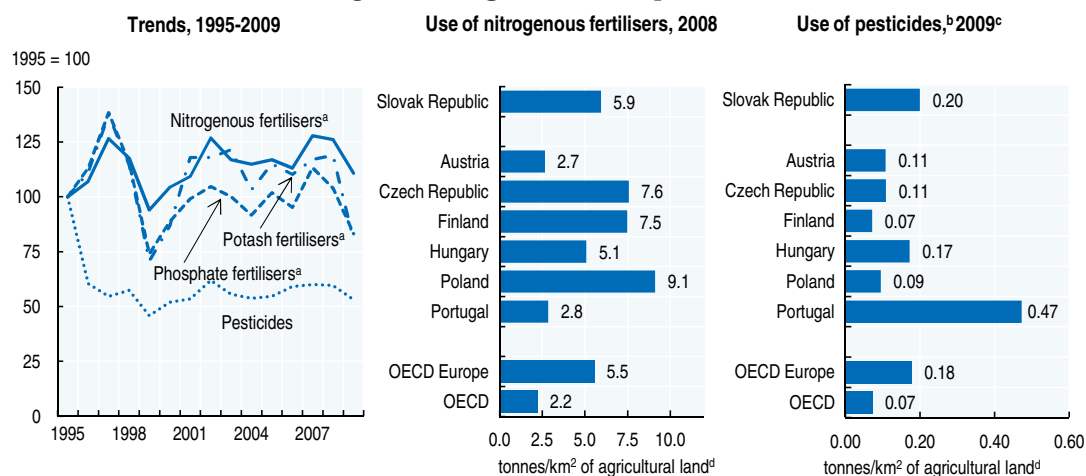
The reform of the agricultural sector, initiated in the 1990s, included price liberalisation and substantial reduction of input subsidies. However, the structure of the sector is still dominated by large-scale corporate farms (both co-operatives and commercial farms), which occupy 80% of the agricultural area (Božík *et al.*, 2009). Individual farming units that emerged during the political and economic reforms of the 1990s account for the remaining 20%. About 85% of farm operations, particularly corporate ones, are on leased land.

The removal of input subsidies in the early 1990s resulted in a drop in farm investment and a sharp decrease in the use of purchased farm inputs (fertiliser, pesticides, energy and water). The use of farm inputs later stabilised, and even began to rise slightly (especially nitrogen fertiliser), although the current level of use remains well below the peak of the late 1980s (Figure 6.2).

Agricultural reform resulted in a 10% reduction of agricultural output between 1993-95 and 2002-04, one of the largest decreases for any OECD country. While livestock numbers continue to decline, part of a longer-term trend since 1990, arable crop production has recovered and risen slightly since 2000, especially cereals, oilseeds and sugar beet. Slovakia is a net importer of agro-food products, with the share of agro-food imports in total imports around 4% and the share of agro-food exports around 6%.

Policy reforms resulted in a sharp decline in the number of farm animals (Figure 6.3). Since 1990, pig and cattle numbers have been reduced by about 70%. However the number of sheep and goats began to rise in 2006, partly due to the introduction of headage payments supporting sheep and goat production on grassland in “less favoured” areas.¹

The national strategic objectives of the agricultural sector, declared as state priorities, are: i) developing a productive and competitive agricultural sector; ii) providing efficient and effective stewardship of agricultural land and landscape on the whole Slovakian territory; and iii) providing food for the population.

Figure 6.2. **Agricultural inputs**

a) Based on value expressed in straight nutrient content.

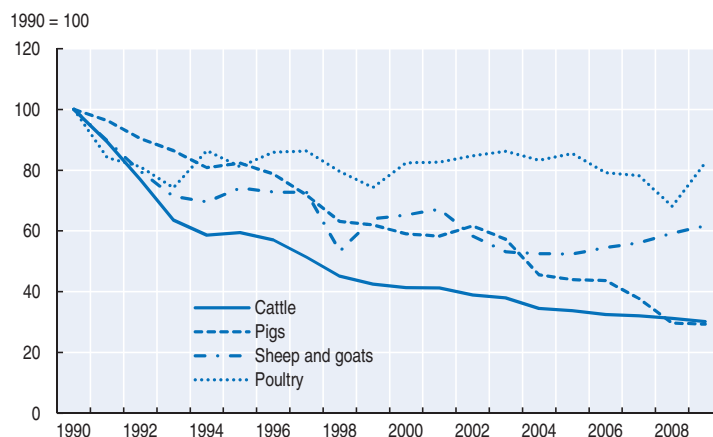
b) For many countries, sales are used as a proxy for pesticide use.

c) Or latest available year.

d) Arable area, permanent crop land and permanent grassland.

Source: FAO (2010), FAOSTAT Database; OECD, Environment Directorate, Slovak Statistical Office (2011), SLOVSTAT Database.

StatLink <http://dx.doi.org/10.1787/888932496482>

Figure 6.3. **Trends in livestock, 1990-2009**

Source: Slovak Statistical Office (2011), SLOVSTAT Database.

StatLink <http://dx.doi.org/10.1787/888932496501>

2. Environmental performance of the agricultural sector

Environmental concerns related to agriculture have changed significantly since 1990. With the reduction in farm production and input support, and the shift to a market economy, farming moved from an intensive production-oriented system to more extensive methods, with a major decrease in use of purchased farm inputs and a substantial reduction in livestock numbers. Before the transition, intensification of production led to excessive use of fertiliser and overstocking of livestock on fragile land, considerably increasing environmental pressures such as water pollution, soil pollution and erosion, and damage to biodiversity. In the 1990s, some of these pressures (notably soil erosion) persisted as a legacy of decades of damaging practices. The pressure on water quality and biodiversity has eased with substantial reductions in use of industrial fertiliser and pesticides, and

reduced livestock density. But agricultural water pollution continues (at a lower level) and land use change and cessation of farming has led to damage to biodiversity in some areas.

Soil erosion and soil quality

Soil erosion is a major and widespread environmental problem related to agriculture, due partly to the predominance of mountainous land but also to the high share of arable land in total farmland (70%). About 47% of farmland is potentially (in the worst-case scenario) affected by a medium to extreme risk of water erosion (greater than 10t/ha/year). The share of farmland at moderate to severe risk of water erosion remained stable between 1990-92 and 2002-04. The area at moderate to severe risk of wind erosion is considerably lower at 6% of agricultural land (2003-04), mainly in parts of the Danube and West Slovakian lowlands. Off-farm damage has also been significant, with flows of soil sediment impairing reservoir capacity and river ecosystems.

The quality of agricultural soil is degraded by other processes as well. Farm soil quality is affected by compaction, which concerned about 8% of farmland in the early 2000s; on a further 19%, compaction is in progress due to greater use of heavy machinery and inappropriate farming practices. Soil acidification, mainly near industrial areas, affected around 17% of farmland in the early 2000s. The problem of soil acidification diminished in the 1990s with lower acidifying emissions from industry, lower acidic fertiliser use and the liming of acidic soil. Levels of soil liming, however, are considered to fall well short of requirements, and the share of acid soil is likely to gradually increase. Waterlogged soil is another concern: over 20% of agricultural land is permanently affected by waterlogging, mainly because of high groundwater levels and soil structure.

Water pollution

Between 1990 and 2004, water pollution from agricultural activities declined, largely because of a sharp decrease in nutrient surpluses as fertiliser and pesticide use and livestock numbers fell in the 1990s. Since the late 1990s, however, nitrogen (but not phosphorus) surpluses and pesticide use have risen slightly, with pollution of surface water and groundwater in some intensively farmed areas no longer falling or in some cases rising somewhat. The lower livestock numbers (especially pigs and cattle) led to less manure being used in fertilisation.

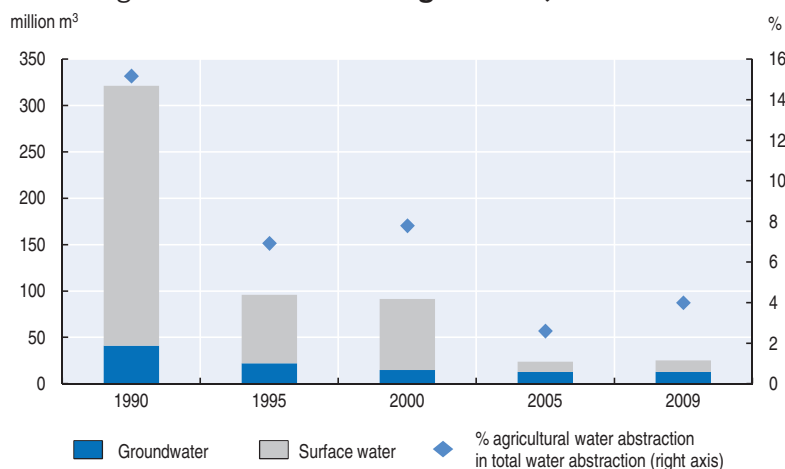
Agricultural pollution of water bodies from nutrients remains a concern in some regions, especially western Slovakia. Overall water pollution levels from nutrients are well below those for many EU15 countries, and concentrations in water bodies have been stable or declined in some areas. However, almost 60% of agricultural land is located in nitrate vulnerable zones, as defined in EU law. Despite reductions in nitrogen surpluses, 14% of groundwater monitoring points in agricultural areas exceeded EU standards on nitrates in drinking water between 1985 and 2002, though the same was true for only 1% of surface water monitoring points. Eutrophication of some water bodies has harmed aquatic ecosystems. Phosphorous pollution of surface water was much higher than for nitrates, with 30% of monitoring points in agricultural areas exceeding EU standards for drinking water (2002).

Water use

As agriculture is largely rain-fed, use of irrigation is limited. Moreover, the irrigated area has been substantially reduced, from around 18% of total agricultural area in the early 1990s to 2% in 2007-09, mainly in horticulture. The main factors in the sharp reduction of irrigated area are the privatisation of some irrigation projects, abolition of state subsidies

to maintain the irrigation network (previously run by the State Melioration Fund) and a lack of private investment in irrigation infrastructure. Farmers now chiefly use high-pressure rain guns. Another factor contributing to the reduction of water use in agriculture is the substantial reduction of livestock numbers. Overall, between 1990 and 2009, surface water use in agriculture fell by 96% and groundwater use by 69% (Figure 6.4).

Figure 6.4. **Water use in agriculture, 1990-2009**



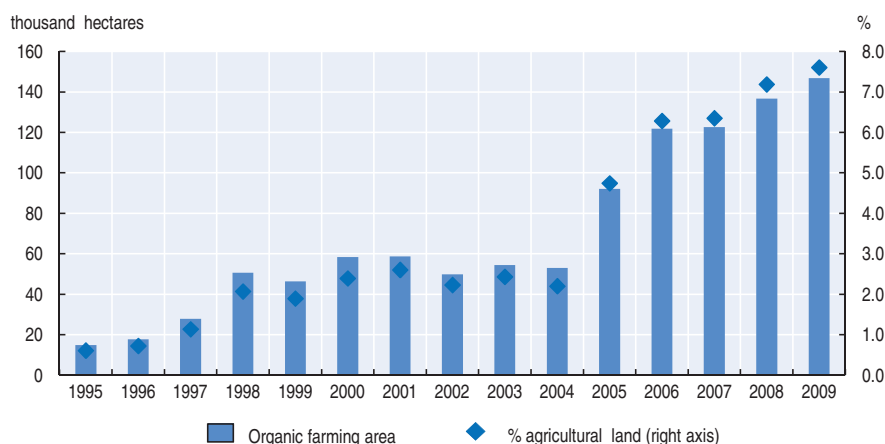
Source: OECD, Environment Directorate.

StatLink  <http://dx.doi.org/10.1787/888932496520>

Organic farming

Organic farming grew over the 1990s, and by 2004 accounted for 2.2% of farmland. After 2004, with EU accession, a more substantial increase in the organic farming area occurred due to the adoption of the Common Agricultural Policy (CAP) and provision of payments supporting organic farming under EU regulations on rural development plans. Slovakia had set a target for organic farming of 7% of farmland by 2010, but passed the target in 2009 with 7.6%. More than half the area under organic farming consists of extensively managed grassland and pasture (Figure 6.5).

Figure 6.5. **Area under organic farming, 1995-2009**



Source: CCTA, FAO (2011), FAOSTAT Database.

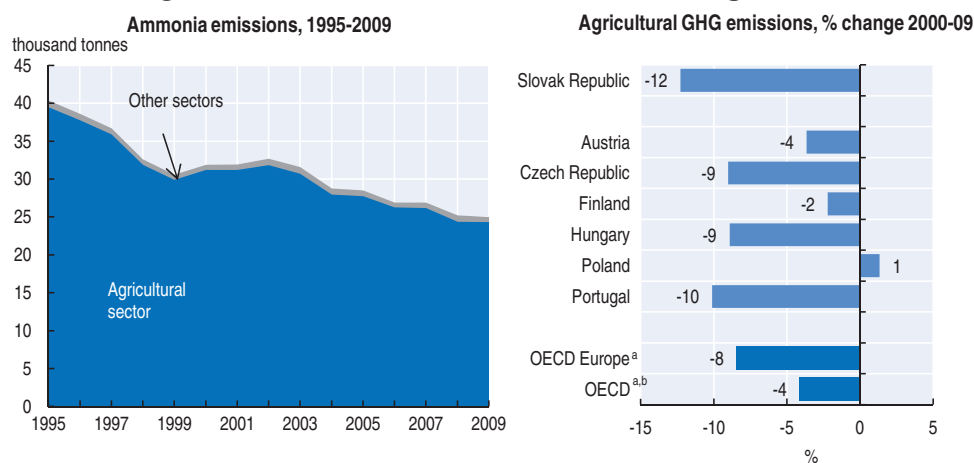
StatLink  <http://dx.doi.org/10.1787/888932496539>

Greenhouse gas emissions

Agricultural greenhouse gas (GHG) emissions, in terms of CO₂ equivalent, decreased by 56% from 1990 to 2008, the largest reduction for any OECD country. More recently, however, the level of GHG emissions in the sector has been fairly stable (Figure 6.6). By comparison, the overall reduction across the economy was 22%, and Slovakia's Kyoto Protocol commitment is to reduce total emissions by 8% in 2008-12 from 1990 levels. Agriculture's share of total GHGs fell by 3.3 percentage points between 1990 and 2008 to around 6%. Much of the decrease in agricultural GHGs was due to the reductions in livestock numbers (which cut methane emissions) and fertiliser use (lowering nitrous oxide emissions). Agriculture also contributed to the overall decline in GHG emissions by reducing direct on-farm energy consumption, expanding renewable energy production and increasing carbon sequestration in agricultural soil.

The decrease in emissions to air from agriculture from 1990 was among the largest in the OECD. Total ammonia emissions fell by 61% between 1990 and 2008 (Figure 6.6), and agriculture accounted for 96% of the emissions in 2008. The main reason for the reduction was the continuous decline in livestock numbers, especially cattle and pigs, as livestock account for over 90% of agricultural ammonia emissions. The drop in nitrogenous fertiliser use also contributed, though to a lesser extent. Total ammonia emissions having fallen to 24 422 tonnes by 2008, Slovakia has more than achieved its 2010 emission ceiling target of 39 000 tonnes under the Gothenburg Protocol.

Figure 6.6. Ammonia and GHG emissions in agriculture



a) Data refer to all current OECD member countries.

b) Data exclude Non-Annex I countries.

Source: EMEP, officially reported emission data, February 2011; national submission to UNFCCC, April 2011.

StatLink  <http://dx.doi.org/10.1787/888932496558>

On-farm energy consumption fell by over 70% between 1990 and 2008 (by comparison, total national energy consumption was down by 21%). It accounted for only 2% of total energy consumption. The decline was mainly due to the decrease in producer support (which led to lower production) and higher energy prices. On the other hand, a fuel tax refund granted to farmers has probably limited further reduction of fuel consumption in agriculture.

Renewable energy production from agricultural biomass is expanding, but still accounts for less than 3% of total primary energy supply. The main agricultural sources of renewable energy production are straw, used for heating; liquid cow manure to produce

biogas, with 24 biogas units in operation in 2004; and oilseeds, mainly rapeseed, used to produce 15 000 tonnes of biodiesel (methyl ester) in 2004, a year in which installed capacity for biofuel production was 125 000 tonnes.

3. Agricultural policy

Major policy changes were required for EU accession and membership. In the initial years of transition, in the early 1990s, despite the lack of explicit agri-environmental policy, the removal of government support for purchased farm inputs (*e.g.* input subsidies) and other production-related support (*e.g.* administered prices) contributed to a significant reduction in the intensity of farm production. That policy change also resulted in reducing pressures on the environment, as evidenced by a positive trend for many agri-environmental indicators (*e.g.* nitrogen and phosphorus balance, pesticide use, water use, ammonia emissions).

Agri-environmental payments were introduced in 1997 and organic farming in 1991. Policies to encourage sustainable farming practices and environmental protection were further developed during the EU membership process. The three EU pre-accession funds² included support for environmental purposes. Environmental protection has been a key objective in Slovakian agriculture since adoption of the CAP upon accession in 2004. Policies under the CAP are to be phased in by 2013.

Direct payments and incentives for environmental protection

Under CAP Axis 1 (improving competitiveness of the farming sector), a harmonised rural development programme provides for investment subsidies to Slovakian farmers (Table 6.1). Together with the fuel tax rebate,³ such input subsidies may affect production decisions and lead to misallocation of resources. Nevertheless, relative to all direct payments, the share of payments based on input use decreased from 26% in 2005 to 18% in 2010 (Table 6.2).

Table 6.1. **Direct payments, by programme**
EUR million

Programme	Funding	2004	2005	2006	2007	2008	2009	2010	% 2010
SAPS ^a	EU	81	91	113	155	172	221	260	38
CNDP ^b	National	100	68	61	106	169	102	67	10
Sugar premium	EU	–	–	13	14	16	37	–	–
Fuel tax rebate	National	21	24	26	29	29	30	16	2
HRDP^c									
Technical assistance	EU/National	–	1	15	6	1	–	11	2
Investment in agriculture	EU/National	6	60	61	93	44	9	106	16
LFA payments ^d	EU/National	65	77	80	87	102	94	102	15
AEPs ^e	EU/National	3	29	57	53	85	122	115	17
Afforestation of farmland	EU/National	–	–	7	–	6	14	–	–
Total payments		275	349	433	542	624	629	676	100

a) Single area payment scheme.

b) Complementary national direct payments.

c) Harmonised rural development programme.

d) Payments to less favoured areas.

e) Agri-environmental payments.

Source: Ministry of Agriculture.

StatLink  <http://dx.doi.org/10.1787/888932496862>

At the same time, the share of payments based on non-current (historical) parameters increased from 45% of total payments in 2005 to 54% in 2010 (Table 6.2). Although this category of payments is decoupled from current agricultural production, it does not target specific environmental outcomes. It includes the single area payment scheme (SAPS), a key element of CAP support, which is to rise progressively to reach 100% of the EU15 level by 2013. In Slovakia, cross-compliance requirements⁴ fully apply to the SAPS only from 2011.

Table 6.2. **Direct payments, by category of support**

EUR million				
Basis of support	Purpose of payment	2005	2010	Comment
Commodity output		–	–	There is no such payment in Slovakia
Input use		86	125	
	Fuel tax concession	24	16	National payment
	Other variable input subsidies	2	–	Water subsidies and credit subsidies
	Investment subsidies	60	106	For farm buildings and machinery (HRDP axis 1)
	Insurance subsidies	1	4	
Current area, headage, revenue, income		89	167	
	Area payments (CNDP)	62	7	For arable crop, hops and tobacco
	Sugar premium	–	13	Financed from EU funds
	Headage payments (CNDP)	6	62	For cattle, sheep and goat
	Basic scheme (AEP)	6	27	For environmental activities going beyond the code of good farming practices
	Soil erosion prevention (AEP)	5	24	For practices reducing soil erosion risk
	Organic farming (AEP)	8	29	
	Arable land conversion (AEP)	1	5	One-off payment for land converted to grassland
Non-current area, headage, revenue, income		151	362	
	Single area payments	84	260	Flat-rate payment (EU funds)
	Less favoured areas	67	102	For areas with less favoured production conditions (HRDP axis 2)
Payments based on non-commodity criteria		8	22	
Resource retirement		–	–	
	Afforestation of farmland	–	–	For farmland converted to forest
Non-commodity outputs		8	21	
	Biodiversity (AEP)	8	21	For protection of high-value biotopes, including Natura 2000 sites
Total		333	676	

CNDP: complementary national direct payments; AEP: agri-environmental payments.

HRDP: harmonised rural development programme.

Source: OECD; PSE/CSE Database 2010.

StatLink  <http://dx.doi.org/10.1787/888932496881>

The category also includes payments to less favoured areas. The main objective is to maintain farming in such areas. The payments have an income objective: the less favourable the conditions for farming, the higher the payment. Less favoured areas are mountainous or hilly; they often represent key elements of the landscape and may have high recreational value. It is assumed, therefore, that maintaining farming in these areas provides landscape stewardship. But no specific environmental objectives are set.

The share of payments based on current parameters (area, headage, income, revenue) remained relatively unchanged, slightly decreasing from 27% of total payments in 2005 to 25% in 2010 (Table 6.2). This category includes complementary national direct payments (CNDPs). During the transition, Slovakia (like other accession countries) can complement the SAPS with CNDPs. In 2010, the two accounted for nearly half of budgetary support (Table 6.1). CNDPs are often tied to production of specific commodities, thereby creating incentives for more intensive forms of production.

The category also includes agri-environmental payments (AEPs), which require farmers to reduce the use of inputs and/or take up environmentally friendly farming practices. AEPs are provided for specific farming practices within programmes to which farmers may apply voluntarily. Though designed to address environmental issues, AEPs in most cases are targeted not to particular (measurable) environmental outcomes, but to specific farming practices, and the objectives are set in terms of area under those practices, as is the case in most other EU countries.

Last but not least, Slovakia uses payments based on non-commodity criteria, though to a limited extent. Their share in total payments increased from 2% in 2005 to 3% in 2010 (Table 6.2). This category groups payments to plant forests on agricultural land and to protect high value biotopes (Natura 2000 sites). They are better targeted to environmental outcomes than some of the other types of payment.

The payments related to Natura 2000 sites are the only AEP programmes in which it is compulsory for eligible farmers to participate. This is because Natura sites are designated with the application of EU criteria, and because farmers operating in these areas have to comply with the restrictions imposed.⁵ On the other hand, farmers have to apply for the payments, which are not granted automatically.

Payments under CAP Axis 2 (improving the environment and the countryside) represent the largest, and increasing, part of expenditure in the harmonised rural development programme. They include payments for less favoured areas, AEPs and payments for farmland afforestation (Table 6.1).

Agri-environmental measures

In 2004-06, a rural development plan, jointly funded by the national budget and the EU, provided for agri-environmental programmes including basic area payments conditional on adoption of environmental farm management practices; support for conversion of arable land to permanent pasture; and payments for organic farming (Table 6.3). Basic area payments were provided per hectare of arable land, permanent cropland (*e.g.* orchards, vineyards) and/or permanent grassland. Fixed rates were set for each category. In addition, acreage payments were provided for conversion to organic farming, where lower rates continued to be granted after the conversion period. Payments were also provided to prevent or mitigate soil erosion and for conservation of high-value biotopes on grassland.

Agri-environmental programmes for 2007-13 have been strengthened and expanded (Table 6.3). They primarily aim at:

- more extensive forms of farming, for which the basic scheme sets standards;⁶
- organic farming (with stricter limits for farming practices than under the basic scheme);
- integrated production in vineyards, orchards and vegetable production;
- protection from soil erosion on arable land, in vineyards and in orchards;

- conversion of arable land (mainly in less favoured areas) into grassland with extensive forms of production;⁷
- protection of biotopes in semi-natural and natural grassland (rich in species);
- breeding and preservation of endangered animal species;
- protection of selected bird species biotopes (in Natura 2000 sites).

Table 6.3. **Agri-environmental payments, 2004-10**

EUR million

Programme	2004	2005	2006	2007	2008	2009	2010	% 2010
Basic scheme	–	6	13	14	27	34	27	23
<i>Erosion prevention</i>	–	5	13	15	24	31	24	21
Arable land	–	5	13	15	23	31	23	20
Orchards	–	–	–	–	–	–	–	–
Vineyards	–	–	–	–	–	–	–	–
Conversion of arable land into grassland	–	1	3	4	6	8	5	5
<i>Protection of biotopes</i>	–	8	15	9	10	21	21	19
Grassland	–	8	15	9	8	17	19	16
Birds	–	–	–	–	2	3	3	2
Endangered farm animal species	–	–	–	–	–	1	1	1
Integrated production	–	–	–	–	4	6	8	7
Organic farming	3	8	12	10	14	20	23	20
Organic farming and biotope protection	–	–	–	–	–	2	6	5
Total payments	3	29	57	53	85	122	115	100

Source: OECD, PSE/CSE Database 2010.

StatLink  <http://dx.doi.org/10.1787/888932496900>

Other environmental policies

Since 2004, EU membership has also required Slovakia to adopt other EU environmental policies that significantly affect the agricultural sector, most notably the Nitrates Directive. Under the directive, about 60% of Slovak farmland was designated as nitrate vulnerable zones, and the Water Act was amended to set more stringent technical requirements in these areas (e.g. for manure storage and application).

The environmental performance of agriculture is also affected by national environmental and taxation policies. Since 2000, ammonia emissions have been taxed at EUR 50 per tonne per year. Support is provided to reduce costs of irrigation water by up to 50% for surface water (including energy costs for pumping water), though farmers pay abstraction charges for groundwater.⁸ Until 2006, national support was also provided for the operation and maintenance of irrigation infrastructure (EUR 0.8 million in 2006). This support was ended in 2007. Between 1992 and 2004 a tax was imposed on land removed from agricultural use to protect the most fertile farmland from conversion to non-agricultural use. In 2004, the tax was abolished.

Assessment

The transition of Slovakia towards a market economy, begun in the 1990s, has substantially reduced environmental pressures from the agricultural sector. Most environmentally harmful subsidies applied until 1990 were abolished, particularly subsidies that stimulated excessive use of inputs such as fertiliser and pesticides, as well as payments

based on commodity output. Together with the closing of export markets in the Council for Mutual Economic Assistance (Comecon) countries, this policy change contributed to a significant reduction in the use of fertiliser and pesticides and in the numbers of livestock.

Overall support to EU agriculture, as measured by the percentage producer support equivalent (%PSE), decreased from 30% in 2005 to 24% in 2009.⁹ This was mostly due to a reduction in market price support, potentially the most production- and trade-distorting measure, and one that contributes to environmental pressure. Compared with some other European countries, like Norway and Switzerland (%PSE of around 60%), this level of support is relatively low, although its structure is similar.

Driven by negotiations on EU accession and the adoption of the CAP from 2004, Slovakia has strengthened its environmental regulation and introduced in its policy mix measures providing incentives for positive externalities provided by agriculture (and forestry).

However, there has been limited progress on identifying landowners and on reparcellising the cadastre. The agricultural land market is not sufficiently developed, and 85% of farm operation is on leased land. From an environmental perspective, this means less motivation to take care of farmland in a longer term perspective, and creates problems in the management of voluntary agri-environmental programmes, which must apply for five consecutive years.

There has been little progress in building capacity for evaluation of the efficiency of agri-environmental policies, as well as their effectiveness, though there is good co-operation between the Ministry of Agriculture and the Slovak Environmental Agency on the latter.

Within the process of designating agricultural and forest sites to be included in the Natura 2000 network, there has been a lack of communication between the Ministry of Environment (responsible for the designation of the sites) and the Ministry of Agriculture (responsible for compensation of landowners/users). There has also been a lack of communication with the owners or users of these sites.

Payments to less favoured areas, which make up 50% of agricultural land, have contributed to maintaining fairly extensive forms of farming and preventing land abandonment in areas with high environmental and recreational values, enhancing the potential to develop tourism in such areas.

Notes

1. Areas with less favoured production conditions, mainly in mountainous and hilly areas.
2. Special Accession Programme for Agriculture and Rural Development (SAPARD), Instrument for Structural Policies for Pre-Accession (ISPA) and Phare programme.
3. The fuel tax rebate was removed in 2011.
4. This means that farmers have to comply with good farming practices to be eligible for payments.
5. Slovakia is relatively rich in biodiversity, so 37% percent of its territory was identified as part of Natura 2000, using EU criteria (Chapter 3). There are five levels of protection in Natura 2000 areas; 8% of Slovak territory is in the stricter levels 3 to 5.
6. Examples include limits on the use of fertiliser and chemicals, mandatory records of fertiliser and chemical use, limits on animal stocking densities and no use of genetically modified organisms.
7. Methods of production required under either the basic scheme or organic farming.

8. Surface water is the main source of irrigation water.
9. The overall level of support to agriculture for Slovakia can be assessed using the %PSE only for the EU, where the CAP applies.

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The government documents, OECD documents and other documents used as sources for this chapter included the following.

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OECD EPR / THIRD CYCLE

I.A. SELECTED ENVIRONMENTAL DATA (1)

	AUS	AUT	BEL	CAN	CHL	CZE	DNK	EST	FIN	FRA	DEU	GRC	HUN	ISL	IRL	ISR	ITA	JPN	KOR	LUX	MEX	NLD	NZL	NOR	POL	PRT	SVK	SVN	ESP	SWE	CHE	TUR	GBR ¹	USA	OECD ²		
LAND																																					
Total area (1000 km ²)	7741	84	31	9985	756	79	43	45	338	549	357	132	93	103	70	22	301	378	100	3	1964	42	268	324	313	92	49	20	505	450	41	784	244	9832	35294		
Nitrogenous fertiliser use (t/km ² of agricultural land)	0.2	2.7	9.8	2.9	2.1	7.6	6.5	4.4	7.5	6.9	9.2	3.7	5.1	0.7	8.0	9.1	5.2	9.3	17.3	11.3	1.1	10.9	2.3	10.2	9.1	2.8	5.9	4.9	2.7	7.4	3.4	3.6	5.2	2.7	2.2		
Pesticide use (t/km ² of agricultural land)	-	0.11	0.51	0.05	-	0.11	0.12	-	0.07	0.25	0.19	0.22	0.17	-	0.07	-	0.61	1.18	1.32	-	0.04	0.56	0.04	0.07	0.09	0.47	0.20	0.24	0.15	0.07	0.04	0.15	0.07	0.07			
Livestock densities (head of sheep eq./km ² of agr. land)	59	500	1586	139	218	244	824	250	321	470	649	388	159	58	1120	1121	422	723	1492	999	252	1982	817	844	312	425	211	750	307	380	765	244	547	168	190		
FOREST																																					
Forest area (% of land area)	19.7	47.0	22.3	34.1	1.7	34.3	12.7	52.6	72.9	29.0	31.8	29.8	22.4	0.3	10.5	7.1	30.6	68.5	64.3	33.5	33.5	10.8	31.5	32.4	30.5	37.7	40.2	62.0	35.7	66.7	30.8	14.4	11.8	33.2	30.7		
Use of forest resources (harvest/growth)	..	0.6	0.8	0.7	..	1.0	0.9	0.2	1.0	0.7	0.4	0.5	0.5	..	
Tropical wood imports (USD/cap.)	2	9.1	0.9	28.1	3.2	-	0.9	7.7	-	5.8	9.8	3.7	5.0	0.1	8.0	7.1	-	7.4	7.9	5.0	0.7	0.9	33.2	5.3	4.0	1.4	14.1	1.8	-	6.1	1.5	0.6	2.1	3.0	2.8	4.9	
THREATENED SPECIES																																					
Mammals (% of species known)	24.4	26.7	27.7	20.3	30.6	20.0	22.0	2.9	10.8	19.0	34.4	25.7	37.8	-	1.8	56.2	40.7	23.3	7.4	51.6	31.8	25.0	19.0	18.2	12.4	26.2	21.7	38.2	13.3	18.3	32.9	14.3	7.9	16.8	..		
Birds (% of species known)	13.2	27.3	22.6	9.8	11.6	50.0	16.3	10.3	13.3	19.2	35.6	14.1	14.5	44.0	24.1	18.6	18.4	13.1	5.2	34.8	16.2	20.7	19.6	14.5	7.6	33.3	14.0	27.1	26.9	17.5	35.7	3.7	2.4	11.7	..		
Fish (% of species known)	0.9	46.4	60.0	29.6	58.7	41.5	15.8	12.2	11.8	36.1	30.1	31.8	43.2	-	33.3	18.8	35.1	36.0	8.9	27.9	27.6	60.0	25.9	-	28.6	62.9	24.1	47.1	51.4	10.9	43.6	11.1	11.1	31.7	..		
WATER																																					
Water withdrawal (% of gross annual availability)	3.6	4.1	31.2	1.1	5.2	10.7	4.0	11.2	2.1	17.0	17.2	12.1	4.9	0.1	2.3	-	24.0	20.1	40.3	2.9	17.8	11.8	1.6	0.8	18.3	12.4	0.8	2.9	29.2	1.4	5.0	17.3	12.0	19.5	10.3		
Public waste water treatment (% of population served)	..	93	69	86	83	76	90	80	80	80	94	67	57	57	63	95	94	74	89	95	40	99	80	79	64	70	58	52	92	86	97	46	97	68	75		
Fish catches (% of world catches)	0.2	-	-	1.1	-	-	-	0.9	-	0.2	0.6	0.3	0.1	-	1.6	0.2	-	0.3	4.7	2.0	-	1.6	0.5	0.5	2.6	0.2	0.3	-	..	1.0	0.3	-	0.6	0.7	5.2	25.7	
AIR																																					
Emissions of sulphur oxides (kg/cap.)	122.9	2.7	9.1	52.0	51.1	168.8	3.6	51.7	12.9	5.8	6.1	39.8	8.8	48.1	10.0	25.2	4.9	6.1	8.3	6.4	..	3.1	18.7	4.2	26.2	10.0	12.8	6.7	11.6	3.3	1.8	15.1	8.3	34.2	18.2		
(kg/1000 USD GDP)	3	3.5	0.1	0.3	1.5	3.7	0.7	0.1	2.8	0.4	0.2	0.2	1.5	0.5	1.3	0.3	1.0	0.2	0.2	0.3	0.1	..	0.1	0.7	0.1	1.6	0.5	0.6	0.2	0.4	0.1	-	1.2	0.2	0.8	0.6	
% change (2000-2008)	11	-29	-43	-25	-34	-34	-33	-26	-15	-42	-22	-10	-82	74	-68	-35	-61	-15	-18	134	..	-29	25	-25	-34	-64	-45	-86	-64	-26	-15	-26	-58	-29	-30		
Emissions of nitrogen oxides (kg/cap.)	82.5	24.7	21.9	64.2	23.9	25.1	27.6	25.6	31.7	20.5	16.8	31.8	18.2	70.3	24.4	27.0	18.0	14.7	24.5	38.2	..	16.6	37.8	36.8	21.8	24.5	17.5	23.3	27.5	16.9	10.6	18.1	22.9	48.7	28.0		
(kg/1000 USD GDP)	3	2.3	0.7	1.8	1.7	1.1	0.8	1.4	0.9	0.7	0.5	1.2	1.0	1.9	0.6	1.0	0.6	0.5	1.0	0.5	..	0.4	1.5	0.8	1.3	1.1	0.9	0.8	1.0	0.5	0.3	1.5	0.7	1.1	0.9		
% change (2000-2008)	17	-	-29	-15	24	-18	-25	-5	-20	-23	-25	7	-2	-17	-20	-17	-27	-11	6	12	..	-26	16	-14	-1	-13	-12	-4	-11	-27	-18	24	-25	-27	-19		
Emissions of carbon dioxide (t/cap.)	4	18.5	8.3	10.4	16.5	4.4	11.2	8.8	13.1	10.6	5.9	9.8	8.3	5.3	6.9	9.9	8.6	7.2	9.0	10.3	21.5	3.8	10.8	7.8	7.9	7.8	4.9	6.7	8.3	7.0	5.0	5.7	3.7	8.3	18.4	10.6	
(t/1000 USD GDP)	3	0.52	0.23	0.31	0.46	0.32	0.48	0.26	0.71	0.32	0.19	0.29	0.31	0.29	0.19	0.25	0.34	0.26	0.29	0.40	0.29	0.28	0.31	0.16	0.48	0.22	0.33	0.30	0.25	0.14	0.15	0.30	0.25	0.42	0.34		
% change (2000-2008)	17	13	-6	3	34	-4	-4	21	4	-2	-3	7	-2	3	7	15	1	-3	19	30	18	3	12	12	2	-12	-3	19	12	-13	5	31	-2	-2	1		
WASTE GENERATED																																					
Industrial waste (kg/1000 USD GDP)	3.5	10	..	40	30	10	..	100	50	20	..	30	-	30	..	20	40	30	20	..	30	10	20	90	40	80	..	20	100	-	20	20	..	40	
Municipal waste (kg/cap.)	6	600	580	490	380	380	310	820	510	480	530	590	480	430	550	660	610	540	380	390	710	360	610	580	830	320	520	300	450	560	480	690	390	540	720	540	
Nuclear waste (t/Mtoe of TPES)	7	-	-	2.2	6.3	-	1.8	-	-	2.0	4.3	0.9	-	1.9	-	-	-	-	1.4	2.9	-	0.1	0.1	-	-	-	-	-	3.3	-	0.8	4.9	2.3	-	1.8	0.9	1.4

.. not available. - nil or negligible.
 1) Data refer to the latest available year. They include provisional figures and Secretariat estimates.
 Partial totals are underlined. Varying definitions can limit comparability across countries.
 2) Total imports of cork and wood from non-OECD tropical countries.
 3) GDP at 2005 prices and purchasing power parities.
 4) CO₂ from energy use only; sectoral approach; international marine and aviation bunkers are excluded
 Source: OECD Environmental Data Compendium.
 5) Waste from manufacturing industries.
 6) CAN, NZL: household waste only.
 7) Waste from spent fuel arising in nuclear power plants, in tonnes of heavy metal, per million tonnes of oil equivalent of total primary energy supply.
 GBR: pesticides and threatened species: Great Britain; water withdrawal and public waste water treatment plants: England and Wales.
 OECD: excludes Chile, Estonia, Israel and Slovenia.

OECD EPR / THIRD CYCLE

I.B SELECTED ECONOMIC DATA (1)

	AUS	AUT	BEL	CAN	CHL	CZE	DNK	EST	FIN	FRA	DEU	GRC	HUN	ISL	IRL	ISR	ITA	JPN	KOR	LUX	MEX	NLD	NZL	NOR	POL	PRT	SVK	SVN	ESP	SWE	CHE	TUR	GBR	USA	OECD	
GROSS DOMESTIC PRODUCT																																				
GDP, 2009 (billion USD at 2005 prices and PPPs)	773	288	349	1166	222	232	179	22	164	1909	2639	294	168	11	159	190	1600	3804	1243	35	1384	603	108	228	637	227	106	51	1243	301	266	837	1976	12880	35778	
% change (2000-09)	30.8	14.1	12.0	16.8	37.2	33.8	5.7	41.5	16.1	10.8	5.1	31.4	19.1	28.7	29.3	30.2	1.3	4.8	41.1	30.4	10.9	12.3	25.4	16.4	40.9	5.4	54.3	29.2	22.9	16.2	14.6	33.8	13.4	14.7	14.1	
per capita, 2009 (1000 USD/cap.)	35.2	34.5	32.4	34.6	13.1	22.1	32.4	16.1	30.7	30.5	32.2	26.1	16.7	33.9	35.7	25.3	26.8	29.8	25.5	70.4	12.4	36.5	25.0	47.2	16.7	21.4	19.5	25.1	27.1	32.4	36.9	11.6	32.4	42.0	30.0	
Exports, 2009 (% of GDP)	19.9	51.2	73.0	28.7	..	69.2	47.2	64.7	37.3	23.0	40.8	19.1	77.4	53.0	90.7	34.7	23.9	12.5	49.9	167.6	27.8	69.2	28.5	42.4	39.5	27.9	70.1	58.1	23.4	48.5	51.7	23.2	27.7	11.2	24.2	
INDUSTRY																																				
Value added in industry (% of GDP)	27	29	22	32	43	38	23	27	28	19	27	18	29	27	32	22	25	29	37	13	34	24	25	40	32	23	35	31	26	25	27	26	21	21	..	
Industrial production: % change (2000-09)	12.9	9.4	-3.5	-15.9	25.6	35.6	-11.0	31.6	3.8	-12.9	0.2	-8.1	28.4	142.0	35.4	19.3	-20.4	-15.2	30.2	-3.8	0.2	2.6	1.1	-10.7	57.5	-15.4	54.3	11.3	-15.3	-7.0	11.3	27.4	-15.9	-4.6	..	
AGRICULTURE																																				
Value added in agriculture (% of GDP)	3	2.6	1.5	0.7	1.7	3.4	2.3	0.9	2.6	2.7	1.7	0.8	3.2	3.3	6.4	1.0	2.1	1.8	1.5	2.6	0.3	3.7	1.7	5.6	1.2	3.6	2.3	3.9	2.4	2.6	1.8	1.2	9.3	0.7	1.2	..
Agricultural production: % change (2000-09)	-7.2	..	-7.7	15.7	21.4	..	8.1	38.1	2.0	-3.0	4.0	-22.0	7.5	5.9	-8.1	19.8	-4.0	-5.0	..	-7	18.4	-6.0	11.9	-3.1	13.3	-6.0	4.3	-2.0	-5.9	-1.0	2.0	10.6	-3.9	11.9	..	
Livestock population, 2009 (million head of sheep eq.)	247	16	22	94	34	10	22	2	7	137	110	18	9	1	47	6	57	37	27	1	259	38	93	9	50	15	4	4	86	12	12	96	97	689	2320	
ENERGY																																				
Total supply, 2009 (Mtoe)	131	32	57	254	29	42	19	5	33	256	319	29	25	5	14	22	165	472	229	4	175	78	17	28	94	24	17	7	127	45	27	98	197	2163	5176	
% change (2000-09)	21.2	10.8	-2.2	1.1	16.5	2.5	-0.2	0.7	2.8	1.7	-5.6	8.7	-0.6	66.6	4.7	18.1	-4.0	-9.0	21.9	20.4	20.3	6.8	3.5	9.2	5.5	-2.3	-5.8	8.7	3.8	-4.5	7.8	27.9	-11.7	-4.9	-1.2	
Energy intensity, 2009 (toe/1000 USD GDP)	0.17	0.11	0.16	0.22	0.13	0.18	0.10	0.22	0.20	0.13	0.12	0.10	0.15	0.48	0.09	0.11	0.10	0.12	0.18	0.11	0.13	0.13	0.16	0.12	0.15	0.11	0.16	0.14	0.10	0.15	0.09	0.12	0.10	0.17	0.14	
% change (2000-09)	-7.3	-2.9	-12.7	-13.5	-15.1	-23.4	-5.5	-28.8	-11.4	-8.2	-10.1	-17.3	-16.5	31.0	-19.0	-9.3	-5.3	-13.2	-13.7	-7.7	8.5	-4.9	-17.5	-6.2	-25.2	-7.3	-38.9	-15.9	-15.5	-17.9	-5.9	-4.4	-22.2	-17.1	-13.4	
Structure of energy supply, 2009 (%)																																				
Solid fuels	42.0	9.1	5.2	9.3	12.8	40.7	21.6	64.2	16.3	4.3	22.4	29.0	10.5	1.5	15.1	34.0	7.9	21.5	28.4	2.1	4.4	9.6	8.3	1.9	54.1	12.1	23.3	19.8	7.4	4.3	0.6	30.5	15.2	22.4	19.6	
Oil	30.8	38.0	42.2	34.3	54.8	21.1	37.9	10.7	28.7	31.3	32.9	54.3	27.7	14.2	50.3	45.5	41.9	42.5	38.7	63.5	56.5	39.0	35.4	36.4	25.5	48.5	20.0	35.8	47.4	26.5	42.4	29.8	32.5	38.9	37.2	
Gas	21.6	23.7	25.8	30.3	7.9	15.6	21.0	11.2	10.9	14.9	23.9	10.2	37.4	..	30.0	15.6	39.7	17.1	13.5	30.4	27.9	45.0	20.3	19.0	13.0	17.8	26.6	11.6	24.5	2.5	9.9	29.6	39.7	25.1	24.1	
Nuclear	..	..	21.6	9.2	..	16.5	..	..	..	19.1	41.3	11.0	..	16.6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hydro, etc.	5.6	29.3	5.2	16.8	24.5	6.1	19.5	13.8	25.1	8.1	9.8	6.5	7.8	84.3	4.6	4.9	10.4	3.5	1.5	4.0	9.5	5.0	36.0	42.7	7.4	20.6	7.6	12.1	9.8	36.4	20.4	10.2	3.4	5.7	7.8	
ROAD TRANSPORT																																				
Road traffic volumes per capita, 2007 (1000 veh.-km/cap.)	10.1	10.3	9.2	10.1	..	4.6	8.2	..	10.1	8.5	7.0	10.1	2.3	9.6	10.1	..	9.4	6.8	4.7	8.8	0.7	8.4	13.7	8.2	4.2	8.9	2.9	..	5.2	8.6	8.3	1.0	8.4	16.3	8.7	
Road vehicle stock, 2007 (10 000 vehicles)	1417	513	575	1883	..	483	282	..	239	3655	4922	608	349	24	226	235	4021	7413	1590	36	2569	822	273	289	1702	573	166	114	2696	478	430	946	3316	24795	67323	
% change (2000-07)	19.4	3.6	9.8	7.2	..	29.5	16.3	..	21.1	8.4	7.9	42.1	26.9	34.4	46.5	33.9	11.2	4.8	31.8	20.8	67.7	11.7	17.4	16.7	41.2	20.6	15.6	21.8	25.8	9.0	11.9	56.6	17.1	12.2	14.9	
per capita (veh./100 inh.)	67	62	54	57	..	47	48	..	56	59	60	54	35	78	52	31	68	58	33	75	24	50	65	57	45	54	31	57	60	52	57	13	55	82	57	

.. not available. - nil or negligible.

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

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

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

4) Breakdown excludes electricity trade.

Source: OECD Environmental Data Compendium.

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

OECD: excludes Chile, Estonia, Israel and Slovenia.

REFERENCE II

Actions taken on the 2002 OECD review recommendations

Recommendations	Actions taken
GREENING GROWTH	
Enhance inter-ministerial co-operation, to foster the institutional integration of environmental concerns in economic and sectoral policies.	Since 2005, the Government Office unit that housed the Secretariat of the Sustainable Development Council has been co-ordinating policy integration into the National Strategic Reference Framework and individual programmes to draw EU funds. The Inter-ministerial Working Group on Climate Change co-ordinated the preparation of National Allocation Plans as well as national communications on climate change. A high-level Commission for the Climate and Energy Package was established in 2008 under the supervision of the Ministry of Environment and the Ministry of Economy. However, inter-ministerial co-operation suffered from the instability of environmental administration in the second part of the last decade.
Extend further strategic environmental assessment in sectors, such as energy, transport, tourism, and agriculture; continue environmental planning and programming efforts.	The 2006 amendment of the Environmental Impact Assessment Act transposed the EU directive (2001/42/EC) on Strategic Environmental Assessment (SEA). It regulates procedures for SEA of sectoral policies and plans. Several strategies and policies have been evaluated since then, including the strategy for the final stages of nuclear energy production cycle, the energy security strategy and the operational programme for transport. Environmental planning and programming efforts have been largely pursued in the framework of EU cohesion policy. The National Environmental Action Programme 2003-07 (NEAP III), implementing the 1993 strategy and updating NEAP I (1996) and NEAP II (1999), was prepared but never adopted.
Enhance market-based integration of environmental concerns in sectors such as transport, energy, and agriculture.	Slovakia participates in the EU Emissions Trading System (EU ETS) but systematic overallocation of allowances has provided inadequate incentives for participants to reduce their emissions. Prices of energy products used in the residential sector and in industries not covered by the EU ETS are relatively high; however, their tax components do not always adequately reflect GHG emission costs. Slovakia removed some energy subsidies and tax exemptions, including on natural gas and coal used by heating companies. However several such exemptions remain, including to energy-intensive industries. Public support to rail transport failed to improve the performance of the sector. In 2010, Slovakia introduced an emission-based electronic toll system for trucks, but the related positive impact on the environment has been offset by a reduction in the diesel tax rate to attract freight transit. Farm support has been further decoupled from agricultural production, contributing to a significant reduction of environmental pressures. Agri-environmental payments were developed during the EU membership process and since adoption of the EU Common Agricultural Policy upon accession.
Further investigate possibilities to introduce eco-taxation, e.g. by shifting the tax burden from labour to the environment.	Over the past decade, Slovakia has made significant progress in expanding the use of environmentally related taxes by increasing taxes on transport fuels and broadening the energy tax base. The implicit tax rate on energy (comparing energy tax revenue to total final consumption) rose significantly in real terms. The 2004 tax reform initiated a shift from labour taxation to less distorting taxes on consumption, including on energy products. However, taxes on petrol and diesel were not adjusted for inflation. The lowering of the tax on diesel in 2010 has resulted in growth in diesel consumption and a drop in related revenue. Vehicles used for commercial purposes are subject to an annual road tax with a rate which is not systematically linked to environmental performance. Pollution taxes are low in comparison with other OECD countries.
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.	Since 2003, the Regulatory Office for Network Industries has regulated water prices. Water supply and wastewater treatment charges have been raised dramatically and cross-subsidies between households and other users have been removed. This has contributed to the increasing cost recovery of operations. However, the increase in prices has made some households reluctant to pay for connection to new water facilities. Current levels of water and waste charges are not sufficient to support infrastructure needs.
Explore possibilities of creating environmental-related jobs (e.g. biomass, eco-tourism, nature conservation).	Attempts have been made recently to estimate the impact of environmental policies on the labour market, but lack of knowledge remains a major obstacle to assessing this relationship.

Recommendations	Actions taken
As part of the process of devolution of power to regions and municipalities, ensure that both obligations and revenues are adequately phased in.	The 2003 Act on State Administration of Environmental Protection resulted in the delegation of several environmental management responsibilities from national level to regional and district offices and the devolution of decision making to municipalities for water and waste management, nature protection, and building and land use planning. Responsibilities were devolved partly as “own responsibilities” of subnational governments and partly as state responsibilities “delegated” to them. Decentralisation also involved the devolution of revenue. Since 2005, all personal income tax proceeds have been earmarked for subnational governments and distributed through an equalisation fund. Both the base and rate of the tax remained centrally determined. Municipalities are entitled to collect taxes (e.g. on real estate) and charges (e.g. on waste management). Since 2005, the MoE has provided about EUR 700 000 a year in subsidies to municipalities for activities related to delegated responsibilities (water protection, nature and landscape protection, air protection and flood prevention).
Implementation of environmental policies	
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.	Transposition of EU legislation has meant the responsibilities of the Slovak Environmental Inspectorate have increased significantly, particularly as regards integrated permitting and bio-safety, but also concerning prevention of major industrial accidents and response to serious water pollution. Non-compliance fees have increased and can now reach up to EUR 25 000 for breaches of nature conservation law or up to EUR 125 000 for serious breaches of requirements prescribed in water, waste and air pollution laws. In 2005 much higher penalties for criminal offences were introduced (up to EUR 2 million for significant deterioration of a protected habitat, unlawful discharge of hazardous substances into water, or illegal dumping or transboundary shipment of waste). Slovakia's criminal code includes one of the world's most stringent penalties for water- and waste-related offences: imprisonment for up to eight years. The traditional “command-and-control” approach to environmental compliance assurance has been supplemented over time with broader compliance promotion measures. Environmental authorities, in particular the Slovak Environmental Agency and its Environmental Management Centre in Trnava, have carried out regular seminars and training sessions for representatives of industry. The Slovak Environmental Inspectorate grants regulatory relief to certified companies, reducing the frequency of inspections to every ten years.
Introduce specialised prosecutors for environmental cases and standing access to courts for recognised environmental NGOs.	In 2009, the investigative capacity of the General Prosecution Office concerning environmental crimes was strengthened through an increase in the number of prosecutors specialising in environmental matters. The specialised staff, comprising 100 people at the central, regional and district prosecutors' offices, receives guidance documents and they co-ordinate activities with the police and environmental agencies. Laws promulgated in 2007 and 2008 weakened participation rights and reduced access to courts in challenging the legality of administrative decisions. Changes reducing public participation in the EIA procedures, also introduced in 2007, were redressed in 2010.
Increase the use of environmental auditing to assess environmental liabilities arising from past operation of state enterprises, particularly within the context of privatisation.	While privatisation was progressing, Slovakia missed the opportunity to set up a legal framework defining environmental liabilities from past operation of state enterprises. Legal provisions for the use of financial resources of the National Property Fund to cover part of remediation costs (by reducing the purchasing price of the privatised asset) have not been used. The 2003 draft Act on contaminated sites, promoting the use of environmental audits, has not been adopted.
Complete land use planning at municipal level (e.g. in the eastern part of Slovakia).	Over 2006-09, the Ministry of Construction granted EUR 561 000 in subsidies to municipalities for land use planning; 837 plans (out of 2891 municipalities) were approved or amended during this period, of which 35% were in eastern regions. The Prešov and Košice regions still have lower percentages of municipalities with land use plans.
Continue to implement the action plan on environment and health.	Implementation of the National Action Plan for Environment and Health (NEHAP) continued. In 2006, the government approved an updated plan (NEHAP III) with a special emphasis on children. However, there is still no integrated approach to environment and health. The Public Health Authority has been given limited resources for implementation of the NEHAP.
Further review the effectiveness of environmental monitoring systems, regardless of institutional boundaries without compromising on the quality and timeliness of environmental information.	Environmental monitoring and information systems were further strengthened during the review period with information collected through dedicated agencies that cover specific elements of the environment. Expenditure on environmental monitoring increased during the review period from EUR 5.2 million in 2002 to nearly EUR 8 million in 2009. Water monitoring benefitted from large increases and accounted for over 50% of the total in 2009. The resources devoted to the monitoring of forests also increased, but those devoted to nature protection decreased significantly.
Continue to improve access to environmental information, public participation in decision-making, and access to justice in environmental matters.	Slovakia ratified the Aarhus Convention in 2005, though measures facilitating public access to environmental information predated this, starting with the 2000 Freedom of Information Act. The requirements were further clarified in the 2004 Act on Collection, Storage and Dissemination of Environmental Information.

Recommendations	Actions taken
Continue to foster public environmental awareness with a mix of instruments.	In 2005, an environmental information portal, Enviroportal, was launched as a gateway to information generated by environmental agencies using state-of-the-art information technology. It helps increase public awareness on environmental issues and promotes environmental education. It contains all state of environment reports produced annually since 1992. The reports are complemented by the Environmental Regionalisation Atlas of the Slovak Republic, which presents information concerning the state of the environment, environmental pressures and policy responses, superimposed on maps of Slovakia.
Air management	
Make the enforcement of emissions charges and fines more effective (e.g. through monitoring and reporting on enforcement and related revenues).	Reporting obligations and measuring methods were set and refined in the 2002 air legislation. Revenue from air emission taxes peaked in 2006 and 2007. Transitional non-compliance fees that have been added to basic rates of taxes on air pollution have helped in meeting EU technical requirements and contributed to the closure of obsolete installations.
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.	The 2004 tax reform was combined with a significant reduction of tax relief measures, some of which had provided perverse environmental incentives. As part of the fiscal consolidation package, and in line with obligations under the EU Energy Tax Directive, a number of exemptions were removed in 2011. However, exemptions favouring some energy-intensive industries remain, such as that for electricity used for industrial production if the costs of electricity represent more than 50% of the average own costs of the product manufactured.
Clarify the sharing of funding and other responsibilities between the private and public sectors concerning air management projects under the National Environmental Action Programmes.	Air management projects were implemented under the 2004-06 operational programme for basic infrastructure and then under the 2007-13 operational programme for environment, which specify the sources of finance.
Include more quantified targets and timelines into strategies and programmes dealing with air management, energy, transport, and climate policy.	Air quality targets and emission limits were included in the 2002 Air Protection Act and subsequent decrees. In 2007, the government approved a national programme to reduce emissions of the main pollutants in line with the EU Directive National Emission Ceilings Directive. Slovakia is obliged to comply with the EU Climate and Energy Package, which includes quantified targets and timelines. The country participates in the EU-ETS and adopted national allocation plans for 2005-07 and 2007-12. Numerical targets were set in the 2007 strategy and subsequent action plans (2007, 2011) on energy efficiency, the 2008 energy security strategy, the 2007 strategy for higher use of renewable energy forms, the 2008 action plan on biomass use, the 2010 National Renewable Energy Action Plan and the 2010 strategy for transport development to 2020.
Continue adjusting electricity and gas prices to reflect costs and promote efficiency in the energy sector, taking into account social considerations.	The electricity and gas markets have been progressively liberalised. However, many segments of the electricity, gas and heat markets continue to be regulated, including electricity and natural gas prices for households and small businesses. The Regulatory Office for Network Industries has steadily raised end-use prices to phase out cross-subsidies from industrial to domestic customers. The energy market reforms have led to dramatic increases in energy prices.
Continue fuel switching from domestic brown coal to natural gas and renewable energy sources (e.g. biomass), taking into account employment and environmental implications.	The share of coal in total primary energy supply (TPES) has been further reduced and that of renewable energy sources has slightly progressed. Slovakia is actively developing biomass as an input into combined heat and power generation. Fuel mix changes have led to declines in CO ₂ emissions per kWh of heat and electricity generation, even though electricity and heat output increased. Domestic lignite production continues to receive subsidies for energy security reasons and to maintain jobs in the mining areas where unemployment is high.
Further decouple energy use from economic output in the Slovak economy by improving energy efficiency in different sectors through appropriate incentives and programmes.	The 2008 energy security strategy aims at cutting final energy consumption by 11% by 2020 (compared to the average consumption for 2001-05 period). Slovakia adopted two national energy efficiency action plans (in 2007 and 2011) to implement this target. Structural changes and efficiency gains have underpinned the dramatic reduction of energy intensity (TPES per unit of GDP), the largest recorded among OECD countries. However, in 2009, Slovakia's energy intensity was still well above OECD and OECD Europe averages. Between 2000 and 2008, energy consumption in the transport sector grew faster than GDP.
Water management	
Adopt the proposed new Act on water protection and water management transposing EU legislation, and implement the new institutional framework for water management.	The introduction of the Water Act in 2004 harmonised Slovak water legislation with the EU Water Framework Directive and introduced a river basin approach. However, the institutional framework for river basin management is yet to be completed.
Prepare water management plans by river basin, taking into account flood prevention concerns.	Two main river basin districts were designated, for the Danube and the Vistula. Ten river sub-basins were established: Danube, Morava, Váh, Hron, Ipel', Slaná, Bodrog, Hornád and Bodva in the Danube basin, and Dunajec-Poprad in the Vistula basin. Management plans were prepared in 2009 for all sub-basins. The development of river basin management plans included assessment of the human impact on surface water and groundwater bodies, economic analysis of water use (completed in 2005), establishment of programmes for surface- and groundwater monitoring and definition of the status of protected areas (2006), and development of measures (2009). Draft versions of the plans were finalised in 2009 and subject to wide consultation with stakeholders. The process was completed with the adoption of the Water Plan of the Slovak Republic in 2010. The Flood Protection Act adopted in 2010 should result in further measures to reduce the negative impact of floods. It has already led to the launch of 23 projects on flood prevention. However, more emphasis should be placed on integrating flood protection into river management plans and on better use of nature protection and land use planning policies in flood prevention.

Recommendations	Actions taken
Mobilise financial resources to upgrade and extend the urban sewerage and waste water treatment infrastructure.	The number of wastewater plants increased from 350 to 570, but capacity rose by only 15%. The share of the population connected to wastewater treatment plants increased from 51% in 2000 to 58% in 2009, well below the government target for 2013 of 81%. Most treatment plants (89%) use lower-performance mechanical-biological processes.
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.	Water prices and charges have been raised substantially. Cross-subsidies between households and other users have been removed. Prices are regulated by the Regulatory Office for Network Industries with the aim of covering the full cost of water investment and services while taking into account social considerations. However, investments needed to comply with the EU Water Framework Directive are huge and heavily rely on EU financing.
Identify areas vulnerable to nitrate pollution by agriculture.	Areas vulnerable to nitrate pollution by agriculture were defined in the Act 617/2004; 60% of agricultural land is located in nitrate vulnerable zones as defined by the EU Nitrate Directive (91/676/EEC).

Waste management

Promote waste minimisation initiatives.	Waste minimisation is promoted through regulatory instruments, in particular the Acts on waste, packaging and chemicals. Industrial waste generation has been decoupled in absolute terms from economic growth, hazardous waste generation has remained broadly stable but municipal waste has grown (although more slowly than private final consumption).
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.	Separate collection of municipal waste rose from 9 kg to 23 kg between 2002 and 2009 and recovery slightly progressed but landfilling continues to be the main type of municipal waste management, with a share of 80%. Apart from some exceptions (end-of-life vehicles), the Recycling Fund seems ineffective in supporting the development of separate collection of municipal waste.
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.	Incinerators not meeting EU standards (including 30 for waste from health care) were closed in 2004; 9 installations treating waste from health care have been built since then. Several small incinerators in hospitals still exceed dioxin emission standards. Two strategies on hazardous waste management and on management of health care waste were to be prepared in 2010.
Elaborate a comprehensive programme to map contaminated sites of industrial origin, assess the potential risks for the environment and propose remedial measures.	An inventory of contaminated sites was completed in 2008, including a preliminary risk assessment. Remedial measures have been implemented on 685 sites out of 1 819. In 2010, the government approved a state programme on contaminated sites for 2010-15 setting priorities on specific sites and proposing remedial measures over different time horizons. The programme will be mainly financed by EU funds.
Fully adopt the OECD Green List for the import of waste destined for recovery operations.	The OECD Green List for the import of waste destined for recovery operations was adopted in 2004.

Nature and biodiversity

Increase co-ordination and communication between the ministries and state agencies involved in land management and nature protection.	The 2002 Act on Nature and Landscape Protection made provision for co-operation between the Ministry of Environment (responsible for nature protection) and the Ministry of Agriculture (responsible for agricultural and forest policy implementation). However, co-operation between the two ministries on protected areas and hunting remains challenging.
Harmonise hunting legislation and nature conservation legislation to enhance biodiversity protection.	Legislation on hunting and nature protection was almost harmonised during the process of EU accession (e.g. harmonisation of periods of protection/ hunting of selected species). The Act No. 274/2009 has introduced biodiversity protection in the hunting definition. However, poaching is still a cause for concern.
Develop incentives and voluntary initiatives with private forest land owners to integrate biodiversity conservation in forest management plans and forestry practices.	The 2005 Forest Act provides for biodiversity measures to be included in forest management plans, which must be approved by the Ministry of Agriculture. Almost half of Slovakia's forest area is subject to restrictions for nature protection.
Enhance protection of wetlands and other key biotopes in grassland and forests.	The 2002 Act on Nature and Landscape Protection, transposing the EU Birds and Habitats directives, aims to protect habitats and species of Community interest and to develop the Natura 2000 network. The government adopted a wetland programme for 2003-07 (later updated for 2008-14) and an action plan for 2008-11. Three additional Ramsar sites have been designated since 2000. The Carpathian Wetland Initiative, initiated by Slovakia in 2004, was approved as a Ramsar Convention regional initiative. Mapping of habitats that started before EU accession was pursued only on a limited scale, for grasslands and wetlands.
Pursue efforts to develop agro-tourism and eco-tourism enterprises, including in under-used areas of the country.	Public support for agro-tourism has been provided <i>i)</i> directly as part of the harmonised rural development programme (measures to promote rural tourism); and <i>ii)</i> indirectly through payments that maintain farming in less favoured areas. Very little has been done to promote eco-tourism despite increasing demand (e.g. for hiking and cycling in national parks).

Recommendations	Actions taken
INTERNATIONAL COMMITMENTS	
Ratify and implement relevant international agreements.	Slovakia has ratified a number of environmental agreements on air (Gothenburg and Aarhus protocols to the Convention on Long-range Transboundary Air Pollution), chemicals (Stockholm and Rotterdam conventions), industrial accidents (Helsinki Convention), information (Aarhus Convention and Kiev Protocol), environmental assessment (Kiev Protocol), and biodiversity, nature and landscape protection (Cartagena Protocol on Biosafety, European Landscape Convention, Carpathian Convention).
Continue the transposition of EU environmental legislation, with appropriate resources, and strengthen the implementation and enforcement of related new legislation and commitments.	Environmental legislation underwent a major overhaul during the EU accession process. Harmonisation stimulated the adoption of several new laws on specific environmental media. The media-specific Acts were accompanied by the adoption of horizontal legislation and establishing instruments regarding pollution and environmental management. After accession in 2004, Slovakia's environmental legal system was further adjusted to harmonise the national framework with new developments at EU level. Today, the overall conformity of Slovak legislation with the EU environmental legal framework is relatively good, and it was generally achieved on time. However, a few non-conformity cases have been launched since 2006, though the number has decreased each year: out of 451 environment-related infringement cases in the EU in 2009, 19 concerned Slovakia.
Set national commitments for reducing greenhouse gas emissions, and develop and implement policies and measures accordingly, and improve energy efficiency.	Slovakia has been a party to the Kyoto Protocol to the United Nations Framework Convention on Climate Change since 2002. Its individual target is to reduce its GHG emissions by 8% in the 2008-12 period compared with the 1990 level. Slovakia participates in the EU ETS and has to comply with the EU Climate and Energy Package, which translates into the following targets for Slovakia in 2020: <i>i</i>) limit GHG emissions in sectors not covered by the EU ETS to 13% above the 2005 level; <i>ii</i>) increase the share of renewable energy to 14% of gross final energy consumption; and <i>iii</i>) increase the share of biofuels to 10% of the transport fuel mix. The 2008 energy security strategy aims at saving 11% of final consumption by 2020 relative to the average for 2001-05. Slovakia adopted national energy efficiency action plans (in 2007 and 2011) to implement this target. Other measures were outlined in the 2007 strategy for higher use of renewable energy forms, the 2008 action plan on biomass use, the 2010 National Renewable Energy Action Plan and the 2010 strategy for transport development to 2020. Energy efficiency has improved in all sectors but transport.
Contribute to the effective implementation of international agreements concerning the Danube and its river basin, as well as the Black Sea.	Slovakia contributed to the development of the Danube River Basin District Management Plan, adopted during the 2010 Ministerial Meeting of the International Commission for the Protection of the Danube River (ICPDR). In 2009, Slovakia held the ICPDR presidency and promoted implementation of the EU Water Framework Directive.
Continue co-operation in the field of the environment with its neighbouring countries	Co-operation with neighbours has been strengthened, particularly in the areas of nature protection, wetlands and water management. Bilateral agreements have been signed with Hungary (exchange of data from early warning systems against radiation, 2001), Austria (implementation of the Convention on Environmental Impact Assessment in a Transboundary Context, 2004) and Poland (geology, 2009). Agreements were signed with Austria and the Czech Republic on the protection of great bustards (2001) and on climate (2004). In 2004, Slovakia, Austria and the Czech Republic requested that the floodplains of the Morava-Dyje-Danube confluence be designated as a trilateral Ramsar site (officially declared in 2009). Four transboundary Ramsar sites have been declared with Hungary: the Upper Tisza and Tisa River alluvium in 2003 and Ipoly Valley and Poiplie in 2007.
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.	Before accession to the EU, Slovakia benefitted from various instruments aiming at gradual adoption of the EU environmental <i>acquis</i> (Phare programme) and funding for environment infrastructure (through the Instrument for Structural Policies for Pre-Accession). Between 2004 and 2009, Slovakia received EUR 64 million in European Economic Area and Norway grants. One-quarter of it was aimed at projects on environment and sustainable development. In the context of the 2007 framework agreement between the Swiss Federal Council and the Government of the Slovak Republic, Switzerland allocated about EUR 41 million to Slovakia for 2008-12, with "environment and infrastructure" representing around 40% of the total funding. Between 2000 and 2010, the Global Environment Facility granted USD 22 million to Slovakia for ten national projects helping the country meet its obligations under the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change, the Stockholm Convention and the Montreal Protocol. More than half the budget was allocated for a project to develop non-combustion technology to destroy PCB waste, but the project was not carried out because the main private co-financer, responsible for the pollution, went bankrupt. Additional funds have been channelled to Slovakia through global and regional projects, mainly focused on Danube River protection, energy efficiency, and phasing out of HCFCs and methyl bromide. Slovakia graduated from the World Bank assistance programmes in 2008, and is not eligible for GEF assistance in the 2010-14 programming period.

Source: OECD, Environment Directorate, *OECD Environmental Performance Reviews: Slovak Republic, 2002*.

REFERENCE III

Abbreviations

AAU	Assigned amount unit
AEP	Agri-environmental payment
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
CH₄	Methane
CHP	Combined heat and power
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLRTAP	Convention on Long-range Transboundary Air Pollution
CNDP	Complementary national direct payment
CO	Carbon monoxide
CO₂	Carbon dioxide
CWI	Carpathian Wetland Initiative
DAC	Development Assistance Committee, OECD
EEA	European Economic Area
EIA	Environmental impact assessment
EU	European Union
ETS	Emission trading system
EUR	Euros
EXIMBANKA SR	Export-Import bank of the Slovak Republic
FAO	Food and Agriculture Organization of the UN
FDI	Foreign direct investment
GDP	Gross domestic product
GHG	Greenhouse gas
GIS	Green Investment Scheme
GPS	Global Positioning System
HCB	Hexachlorobenzene
HFC	Hydrofluorocarbon
HRDP	Harmonised Rural Development Programme
ICPDR	International Commission for the Protection of the Danube River
IEA	International Energy Agency
IPPC	Integrated pollution prevention and control
ISO	International Organization for Standardization
ISPA	Instrument for Structural Policies for Pre-Accession
IUCN	World Conservation Union (International Union for Conservation of Nature)
IWAC	International Water Assessment Centre
MoE	Ministry of Environment
NEAP	National Environmental Action Programme

NEEAP	National Energy Efficiency Action Plan
NEHAP	National Environment and Health Action Plan
NGO	Non-governmental organisation
NH₃	Ammonia
NMVOC	Non-methane volatile organic compounds
NO_x	Nitrogen oxides
N₂O	Nitrous oxide
ODA	Official development assistance
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyls
PFC	Perfluorocarbon
PM	Particulate matter
POPs	Persistent organic pollutants
PPP	Purchasing power parities
R&D	Research and development
REAP	Renewable Energy Action Plan
RONI	Regulatory Office for Network Industries
SEA	Slovak Environmental Agency
SF₆	Sulphur hexafluoride
SO_x	Sulphur oxides
SWME	Slovak Water Management Enterprise
TFC	Total final consumption
TPES	Total primary energy supply
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
USD	United States Dollar
VAT	Value-added tax
VOC	Volatile organic compounds
WEEE	Waste electrical and electronic equipment
WHO	World Health Organization
WTO	World Trade Organization
WWF	World Wildlife Fund

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SLOVAK REPUBLIC

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This report is the second OECD review of the Slovak Republic's environmental policy performance. The previous review was published in 2002.

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